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C O N T E N T S

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STUDIES ON THE USE OF AMMONIUM NITRATE VERSUS UREA, ON WHEAT CROP, IN BURNAS PLATEAU AREA, TELEORMAN COUNTY, ROMANIA

Mihai BERCA[1], Roxana HOROIAŞ[2], Gabriel PĂSCUŢ[2]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, Email: prof.mihai.berca@gmail.com
[2]AGROVET SA, 20 Siriului Street, District 1, 014354, Bucharest, Romania, Email: roxana.horoias@gmail.com

Corresponding author: prof.mihai.berca@gmail.com

Abstract

To produce one ton of wheat, the crop consumes an amount of 22- 26 kg N, depending on the variety (protein content), but also on the climatic conditions, influencing the assimilation of chlorophyll. In Romania, the nitrogen is commonly applied in two forms: nitrates and urea. Less often, nitrogen solutions are used. For more than 7 years, agricultural practice, looking to increase the efficiency of agricultural nitrogen nutrition, publicly raises the issue regarding the most effective form of nitrogen for the wheat crop and its quality. This subject is also current for the European agriculture. For a long time it has been considered that the difference between the two forms of fertilization, at the same amount of active substance, is insignificant. Recent researches conducted in Europe (France, Germany, England) have statistically demonstrated that nitrogen as nitrate is superior to urea, at the same dose of nitrogen, with about 500 kg wheat/ha and up to 0.7% protein content. At the same time, ammonium nitrate is up to 50% less polluting than urea. Burnas Plain research, carried out during 2014-2016 with two wheat varieties, Arnold and Adesso, with nitrogen doses from 0 to 200 kg/ha, have highlighted the superiority of ammonium nitrate, with increases of 3.1-5.1 q/ha, at higher doses to Arnold variety. The differences in ammonium nitrate favour are smaller for Adesso variety, namely 1.4 q/ha, regardless of dosage. The protein content brought in addition by nitrate is 0.36% for Arnold and 0.56 for Adesso variety. In average for the two varieties, yield gain variation is between 2.25 q/ha (N40) and 3.31 q/ha (N200), while the protein increase brought by nitrate is 0.35% at N40 and 0.47% at N200.

Key words**:** *ammonium nitrate, urea, wheat, yield, protein*

INTRODUCTION

Both forms of fertilizer are coming from ammonia (NH_3), and ammonia comes from the air nitrogen. Ammonia can also be made of methane gas, in which case pollution is greater.

The manufacturing of urea is longer than that of the ammonium nitrate and, therefore, the nitrogen absorption from urea is also longer.

In terms of physical characteristics, Borealis Group determined that the parameters are in ammonium nitrate advantage, which has a higher density (900 kg/m^3) compared to urea (770 kg/m^3). As a consequence, in transversal plane, the coefficient of variation of the fertilizer distribution ranges from 6% for ammonium nitrate and 26% for urea.

From ecological point of view, the EcoX parameter, calculated by Lammel and Brentrup (2003), shows that only ammonium nitrate falls within acceptable limits. The volatilization, for ammonium nitrate in arable land, varies between 3% (DEFRA, 2003-2005) and 0.6% (EMEP, 2007). In case of urea, the volatilization coefficient is very high and ranges between 22% (DEFRA 2003-2005) and 11.5% (after EMEP, 2007).

These unfavourable information to urea have raised the practical problem of its biological effectiveness, compared with other nutrients, such as ammonium nitrate. For this, extremely numerous researches to the main agricultural crops have been made.

On wheat, research carried out in Hanover area in 1999-2002 and published in the German newspaper "Top Agrar" shows that, regardless of the applied nitrogen dose,

ammonium nitrate achieves higher yields compared to urea, but still insignificant.
Other multiannual experiences (ADA, 2015) show differences of 9 and 12 q wheat/ha on ammonium nitrate compared to urea. The dose of nitrogen was 153 kg N/ha in both cases.
If we were to do an overall average of all research conducted in England (Levington Agriculture, 1999; mentioned by Lammel), Germany (ADA, 2015; ADA, 2016) and France (YARA, 2011), we could say that the difference between ammonium nitrate and urea in wheat yield is around 500 kg/ha (about 7%), and the protein of about 0.4% in favour of ammonium nitrate.

MATERIALS AND METHODS

Research has been conducted during the 2014-2015 and 2015-2016 agricultural years, in the experimental field of Agrovet SA – Poroschia, Teleorman County, Romania.
Soil is an easily leached chernozem, degraded, with 3-3.5% humus.
The climate is a forest steppe one, caused by the forests' disappearance. Average annual rainfall: 460 mm.
Those two years were atypical for the wheat crop. 2014-2015 was wet in autumn, making difficult the wheat sowing. It was dry at the end of April and wet again during harvesting.
2015-2016 was quite similar, noting that the alternation of wet and dry periods was more pronounced. Humidity was higher in May-June-July, favouring foliar diseases attack.
Through experiences and verification plots in the field, have been aimed:

- → the ammonium nitrate effectiveness on wheat after rape;
- → the urea effectiveness on wheat after rape;
- → the used doses, expressed in kg/ha, for both nutrients were 0, 40, 80, 120, 160 and 200 kg N / ha, or 6 nutrition levels;
- → the two nutrients that have been used, were: ammonium nitrate 33.5% N and urea 46% N;
- → the experiment has been conducted using two varieties of premium wheat, with protean potential, in order to see how the nutrients may influence this parameter:

(i)Arnold variety, early, genetically made to obtain high percentages of protein;
(ii)Adesso variety, not so early, offering a smaller amount of protein.
Because were installed 2 x 2 x 6 = 24 variants, the research type experience has been organized on a 12 hectares, each variant occupying 0.5 hectares.
Harvesting and sampling were done on five repetitions, using the random survey method, each survey having 10 sqm.
There has been measured the yield level and the protein content, in Probstdorfer Saatzucht Romania SRL laboratory. Data were statistically processed by variance analysis. Correlation calculation was performed in 2D and 3D. In this paper are presented only some of the results.

RESULTS AND DISCUSSIONS

Evaluation of production for varieties, for fertilizers type and dosage are presented by the two years average and only on the yield increase, calculated from level "0". To facilitate interpretation, aren't presented the 3D graphs, but an enlarged version of 2D.
Yield increase. For Arnold, Adesso and their average, the results are shown in Figures 1, 2 and 3, which show the following:

- → yield increases very significantly with increasing doses of nitrogen, but only up to 160 kg N/ha, regardless of its form;
- → at all doses, yield increases were favourable to ammonium nitrate, with differences between 3.1 and 4.5 q/ha;
- → not high doses gave the greatest difference, but the variations within the error limits;
- → the dose of 120 kg N/ha is the one that brings the higher difference between the two forms of fertilizer (5.5 q wheat/ha); it is, in fact, the most common used dose for the wheat crop in Romania.

For Adesso variety (Figure 2), the two curves are much closer, although in all cases the ammonium nitrate yields increases are over those of urea.

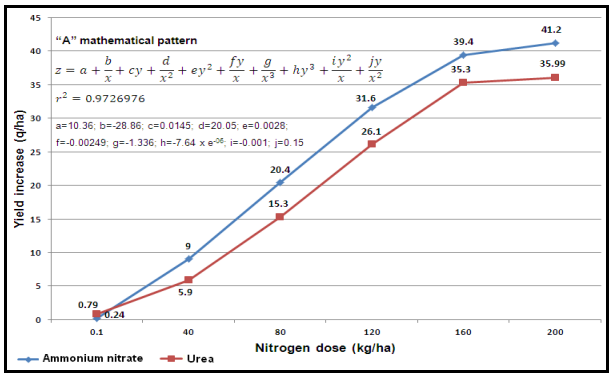

Fig. 1. The influence of wheat variety and dosage of nitrogen fertilizer on yield increase for Arnold variety

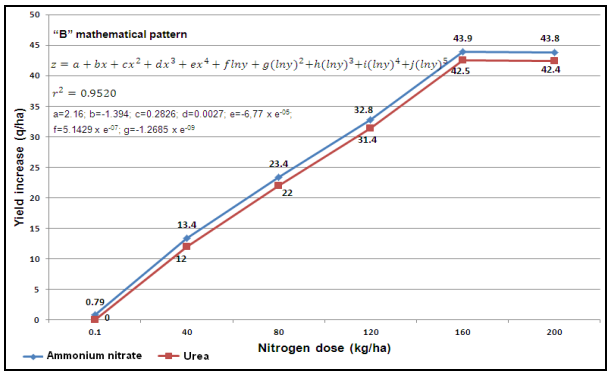

Fig. 2. The influence of wheat variety and dosage of nitrogen fertilizer on yield increase for Adesso variety

The differences, however, are of borderline significance – 1.4 q/ha from the dose of 40 kg N/ha and up to the one of 200 kg N/ha.
In these circumstances, the varieties average (Figure 3), shows significant differences between doses: 2.25 q/ha at 40 kg N/ha → 3.25 q/ha at 80 kg N/ha → 3.45 at 120 kg N/ha, with a significantly yield increase in favour of ammonium nitrate.

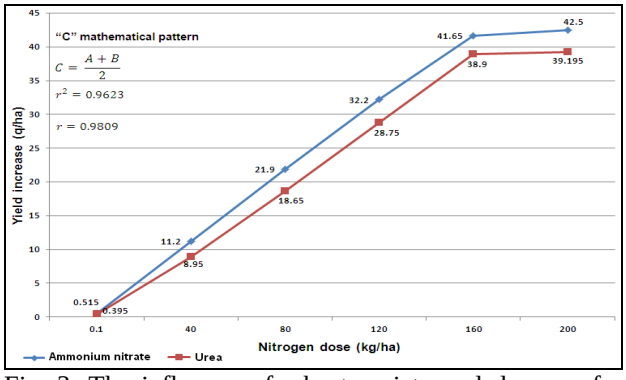

Fig. 3. The influence of wheat variety and dosage of nitrogen fertilizer on the average yield increase for Arnold and Adesso varieties

Conclusion: the statistical analysis of yields increases demonstrate that ammonium nitrate obtained, on average, significant increases for Arnold variety and for the average, but insignificant for Adesso variety.
Requests generated by the higher amount of protein obtained by the Arnold variety can be an explanation for its better reaction towards ammonium nitrate. Figure 4 gives us a synoptic structure of examined factors behaviour.

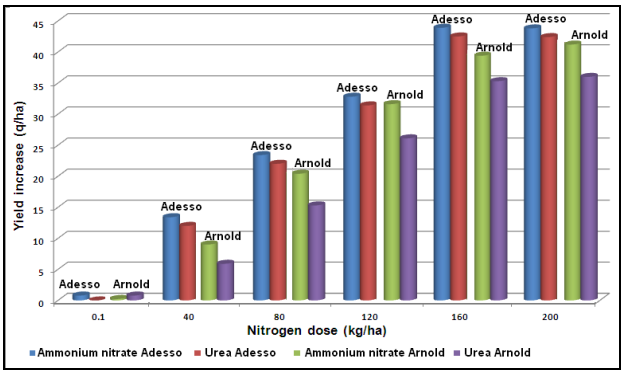

Fig. 4. The influence of nitrogen forms and doses on yield increases, for Arnold and Adesso varieties

Protein content variation. Results are presented in Figures 5, 6, 7 and 8.
For Arnold, ammonium nitrate brings significant protein progress in comparison with urea, increases that correlate with the dose of nitrogen: + 0.3% at 40 kg N/ha → 0.34% at 80 kg N/ha → 0.36% at 120 kg N/ha → 0.38% 160 kg N/ha.

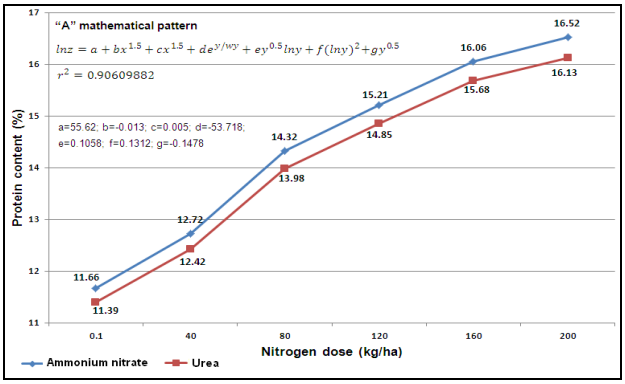

Fig. 5. The influence of wheat variety and dosage of nitrogen fertilizer on protein content for Arnold variety

For Adesso (Figure 6), as opposed to the production, ammonium nitrate brings a significant increase in protein, namely 0.4% at 40 kg N/ha → 0.46% at 80 kg N/ha → 0.51% at 120 kg N/ha → 0.53% at 160 kg N/ha → 0.56% at 200 kg N/ha. Adesso variety has excellently used the ammonium increase the protein content of the wheat grains.

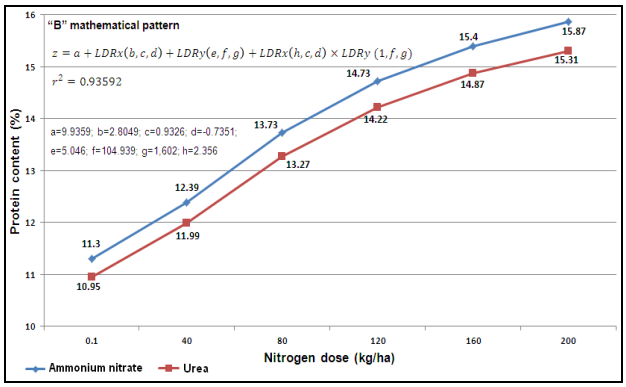

Fig. 6. The influence of wheat variety and dosage of nitrogen fertilizer on protein content for Adesso variety

The average shown in Figure 7, as well as the synoptic chart from Figure 8, further demonstrate that the nitrogen as ammonium nitrate is always superior to urea, concerning the protein content of the two wheat varieties.

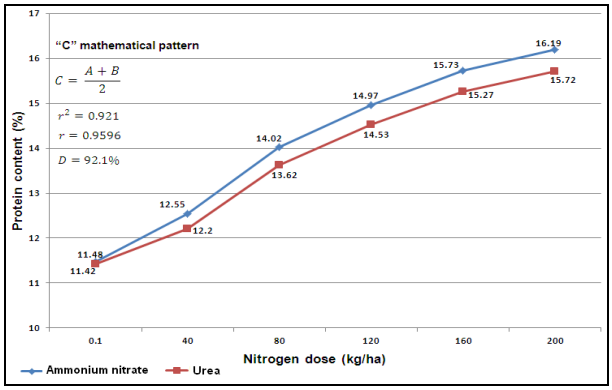

Fig. 7. The influence of wheat variety and dosage of nitrogen fertilizer on the average protein content for Arnold and Adesso varieties

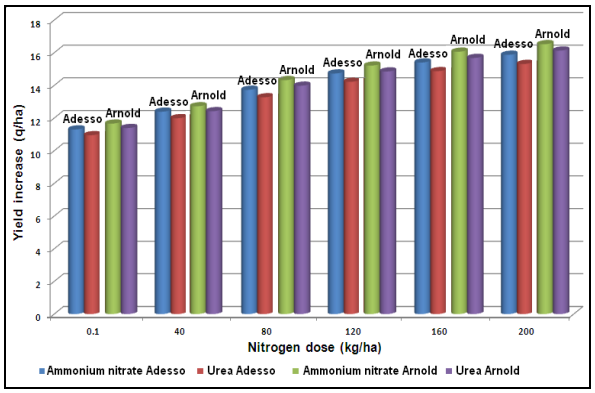

Fig. 8. The influence of nitrogen forms and doses on protein content, for Arnold and Adesso varieties

Most often, these differences relatively small in absolute terms, may go unnoticed at farm level, although farmers were the ones who requested this research.

No matter in which for is nitrogen administrated to plants, it will get to be exploited by them in the form of ammonium (NH_4^+) and nitrate (NO_3^-). Farmers require a nitrogen fertilizer that is immediately absorbed and processed by plants and that is able to provide the expected technical and economic satisfaction.

CONCLUSIONS

Studies conducted in Burnas Plain on the effect of ammonium nitrate and of urea towards the level of yield increases and of protein content in grains, showed that:

(i)Ammonium nitrate is superior to urea, at the same dose applied, achieving to offer higher yield increases.

(ii)The average yield increase is of about 3.5 q/ha. Adesso variety, although it was superior when ammonium nitrate was applied, stays at very short distance of the results obtained with urea.

(iii)For both varieties, the protein content it's very significantly influenced by the ammonium nitrate use, compared to urea.

(iv)It appears that the absorption in plants is by several percent higher for ammonium nitrate than to urea.

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RESEARCHES ON ECONOMIC POTENTIAL OF AGRICULTURAL TOURISM IN WESTERN ROMANIA

Marius BOIȚĂ[1], Gheorghe PRIBEANU[1], Ionela Mihaela MILUTIN[2]

[1]"Vasile Goldis" Western University of Arad, 86 L. Rebreanu Blvd, Campus UVVG, C Building, 1st Floor, 310444, Arad, Romania, Phone: +40257.243.777, Fax: +40257.243.777, Emails: bmarius1963@yahoo.com, g_pribeanu@yahoo.com
[2]Western University of Timisoara, 16 Pestalozzi Blvd, 300115, Timisoara, Romania, Phone: +40256.592.505, Fax: +40256.592.500, Email: ionelamilutin2006@yahoo.com

Corresponding author: bmarius1963@yahoo.com

Abstract

Agricultural tourism, any other sphere of the science of tourism activity is subordinated both to the environment and food reserves, being its "raw material", its scope and activity. This study seeks to identify and assess the potential of bio-resources and of bio-productivity in order to develop rural tourism; for the completion of modern indicators of territorial capital; development of eco-bio tourism packages in Western Romania. Our research has focused on identifying the traditional bio-resources and developing a strategy for promoting and implementing in rural tourism, on the identification and evaluation of bio-productivity in order to develop rural tourism in Western Romania. Through this study, we were able to capture current and future main sides of the agricultural tourism in a territorial system.

Key words**:** *eco-bio tourist packages, bio-resources, bio-productivity, agricultural tourism, tourism*

INTRODUCTION

Agricultural tourism has some features that differentiates it from the traditional, standard tourism, namely: tourist consumption is happening in rural areas (essential are: the quality of the rural tourism pension and customization and adaptability of reception services from farmers, knowledge of the natural, human and cultural environment and tourism products originality); the touristic offer is genuine, original, diverse and personalized, organized and led by farmers (by the village people with the characteristic sizing for the ethnicity represented); is an authentic activity, complementary to farm activity and not an alternative or substitute for it; it offers to the population with lower-income the opportunity for rest and comfort, for leisure (of holidays or weekend in the picturesque landscape of the rural environment, with cultural and educational values and a specific hospitality); does not require large investments for general infrastructure facilities and tourist facilities; it is a diffuse tourism (by its specific diversified offer and high spread in space); through good management the farmer can create the perfect environment for trips in time for the unforgettable moments of childhood for its guests; it is not compatible with mass tourism (developed in resorts and tourist centers in peri-urban areas).

Agricultural tourism is placed on an intermediate level between the health of the individual and the influencing factors. This level allows to work both ways, awarding it an important role in the structure of the quality of life and hence of economic growth.

The topic of agricultural tourism in Western Romania, as an agricultural tourism research tool, was insufficiently addressed by Romanian scientific literature, most studies undertaken so far being mainly focused on rural tourism.

The research methodology of the agricultural tourism phenomenon is a challenge in a continuously development that requires argumentation and implementation discussions of a research methodology both in Western Romania and nationally. For this research, we have deepened specialized bibliographic resources realizing that it was the starting point for the done research to

which we have added information from locals, keepers of traditions and crafts. The information provider that determines the type of tourism management suitable for the area is given by tourism indicators. The evolution of rural tourism is analyzed considering the existing tourism resources recovered and recoverable, including those who up to now have not been exploited to their real capacities.

In this context, it was done a statistic of all attractive resources in the county, in terms of their quality, of the existing tourism infrastructure, of the tourism services, with classification of all the resources, but also highlighting the link that is established between collaborators in terms of supply and demand for some of the sights of the area. Using direct and indirect observation method we sought to highlight the potential of agricultural tourism in Western Romania, of the characteristics of the offer, the economic, social and environmental effects on local communities. Alongside this method, we have also accessed sources with databases about the studied region and noticed that there are deviations to the presents reality, thus furthering the research through the methods of field survey and interview.

MATERIALS AND METHODS

Tourism activity in rural areas

"Tourism provides a production and consumption of heterogeneous goods or services that contributes to the satisfaction of the needs of tourists, of non-residents" (Petcu, 2005) [3].

It has evolved in a relatively short period of time, becoming from a "freak of townspeople" in a well-defined socioeconomic activity. For those working in this area, rural tourism represents the sphere in which they manifest especially as entrepreneurs and the chance of attaining a profit enabling them to raise the standard of living in the condition of drastic reduction of their chances to survive in acceptable conditions in rural areas. In the situation where the only occupation seems to be subsistence agriculture agricultural tourism provides the opportunity to increase income of rural inhabitants and retention of young people. At the same time, it allows capitalization of local resources, creating a market for certain goods and services, resulting from the activities otherwise doomed to extinction. Agricultural tourism is also a source of income to support host communities or areas, because it has the power to bring money, which used as an investment in the field can generate more revenue in the future. However, development of rural tourism as a business should not be done at the expense of the natural, social environment or relinquishment of authenticity.

Potential of agricultural tourism in Western Romania

"Depending on capacity, the tourism market is classified into theoretical tourism market, potential tourism market and effective tourism market " (Witt, Brooke M. and Buckley P, 1995) [5]. Attractiveness and functionality of the tourism area rural is given by landscape appreciation that concomitantly constitute a heritage of the community in a particular region with identity value. The criteria for quantitative assessing (statistical and mathematical, cartographic, technical-instrumental), qualitative (relations between landscape and benchmarking), establishing the degree of artificiality and degradation of landscapes, capturing the degree of stability, determination of territorial homogeneous landscape, etc., can determine the attractiveness of rural tourism area of Western Romania.

"The infrastructure for the transportation services, telecommunication, electricity, water, gas and waste management are very important for the initiation and development of businesses". (Milin, Merce and Pet 2009) [2].

The research methodology of the agricultural tourism phenomenon is a challenge in a continuously development that requires argumentation and implementation discussions of a research methodology both in Western Romania and nationally.

Agricultural tourism has several features that distinguish it from classic tourism:

- the space where this activity takes place is the rural space.

The touristic environment is thus quite different from that with which the tourist is familiar. This is because usually it comes from urban areas. Most often, this rural environment is in the mountainous or piedmont area;

◙ people in charge of these activities have different levels of training. In the agricultural activity, rural dwellers are hosting tourists, not having special training in tourism. They have folk outfits and attract tourists with popular specific. In contrast, in the classic tourism, people who practice this activity are trained and specialized in tourism;

◙ agricultural tourism product is different to the classic tourism. Thus, accommodation is different, agricultural tourism rented rooms are rustic with folk decorative elements, individualized and highly diversified. Food is also different, being prepared at a small scale with products from the peasant household, according to traditional recipes. The negative aspect is completed by the existence of fresh and unpolluted products. Agricultural tourism services are also different. There are visits to workshops, observation of usual rural activities, are practiced sports or recreational activities specific to rural areas;

◙ although tourism activity cannot be stored like the one from classic tourism, the peasant household is elastic, and can be more easily adapt to each conjuncture and the activity of agricultural tourism is an alternative activity, sometimes auxiliary, that does not generate serious situations that cease the household existence.

However, an adequate organization of these activities should take into account several key issues for its effectiveness:

■ a first issue concerns the accurate knowledge of the absorption capacity of tourists. This capacity involves assessing both the accommodations and especially its correlation with the possibility of providing food, providing transportation and other services that were advertised as available to tourists. The lack of such correlations determines either a waste of resources and inefficient use of them or on the contrary (overloading them with negative consequences on the quality) inability to provide the required services, with repercussions on customer satisfaction;

■ another aspect, which is closely related to the first, is the correct estimation of investment to be made in a household that wants to practice such activities. To achieve positive results, any practitioner of agricultural tourism, must provide to tourists a minimum of comfort according to the existing agricultural tourism norms. Even a simple activity such as camping in the household's yard, requires certain services that can be achieved with some effort: water, toilet, security at night, etc. Obviously, the more complex the services are and its quality is better, agricultural tourism activity is more likely to succeed.

■ a third issue to be analyzed is that of the opportunities provided for rural diversification of the services that can be offered to tourists. This analysis has a double meaning; it is the clear program of collateral services that can be satisfied in that environment, inherent possibilities of economic development of the rural area.

■ the fourth issue involves a conscientious analysis of the quality (qualitative parameters) of services that can be offered. It is important to note the motivation of rural tourism and agricultural tourism: that of going back to origins, to simplicity, to tradition, ancient customs and nature.

■ Agricultural tourism activity can take place in virtually limitless variations: from the simple assurance of a camping spot in the household yard, to simple hosting in rooms or houses unused to the most complex forms that require refined accommodation, meals and entertainment. If the first two activities are the simplest forms of supplementing incomes by renting surplus, the others involve complex and diverse efforts. They are themselves extremely varied: accommodation can be simple or with multi-stage facilities and comfort; food involves a large number of possibilities from a simple breakfast to all three meals or special or occasional orders.

Agricultural tourism is an important source of revenue growth for the rural community members, and for the whole rural area an alternative economic and social development.

Agricultural tourism allows the development of a large variety of the small industry, parallel with the revival of traditions and development of complex rural services with beneficial consequences for rural dwellers. There is an interrelationship between agricultural tourism and other economic village branches, because agricultural tourism determines their development (pottery, milling, vegetable growing, harvesting medicinal plants, cultivation of berries and processing, fisheries, handicrafts, weaving) and these in turn creates new opportunities for rural tourism development and expanding. Agricultural tourism is one of the important branches of national economy that aims to develop tourism in rural areas closely correlated to the local economy being a close link between tourism and other sectors of the local economy and in this case specifically with agriculture.

RESULTS AND DISCUSSIONS

In current conditions, when "mass tourism" becomes almost impracticable because of high prices, a chance to practice tourism is agricultural tourism.

The current trend of integration of rural tourism in the international tourism circuit, assumes the existence within this tourism of an infrastructure and a degree of comfort to Western standards, infrastructure being a motivating factor in choosing a private farm as a destination for the holidays.

Agricultural tourism may be an opportunity to start a new activity parallel to that which already is done by rural dwellers, using to increase profitability the infrastructure already available. The reasons for the decision to practice agricultural tourism are:

- the market is expanding; the development of the tourism demand is estimated by a 3.5% annual growth for international tourism and with a 4% for rural tourism;
- investments are much smaller than in classic tourism, this because they only require upgrades, refurbishments and adequate facilities for receiving tourists;
- there is not needed expertise that is difficult to achieve. At a household level, getting the minimum necessary knowledge is possible after taking certain courses of short duration;
- work is complementary, it does not mean ordinary business interruption (agricultural);
- can harness higher household products obtained from agricultural activity. The law provides for the possibility to sell products from their own farms and more efficient use of them
- is a family business that can be achieved by all family members and also by rotating after the existing possibilities;
- the state encourages this activity through a number of financial incentives.

Table 1. Evolution of the number of tourists accommodated in Romania during 2010 - 2015

Years	No. of tourists (Thousands)	Dynamic indicator I	Of which					
			Romanian (thousands)	Dynamic indicator	Ratio of Romanian tourists	Foreigners (thousands)	Dynamic indicator	Ratio of foreign tourist
2010	678	64.2	653	63.2	96.3	25	52.1	3.7
2011	689.5	65.3	663	65.8	96.2	26.5	55.2	3.8
2012	634.5	60.1	601.7	59.7	94.8	32.8	68.3	5.2
2013	674	63.8	637	63.2	94.5	37	77.1	5.5
2014	682.8	64.7	637.7	63.3	93.4	45.1	93.6	6.6
2015	650	61.6	614	61.2	90.2	36	90.2	5.6
I	-	96.93	-	96.78	-	-	99.55	-
R	-	-3.07	-	-3.22	-	-	-0.45	-

Source: INS - Statistical Yearbook of Romania, 2010-2015, Processed by authors

"Tourist attractions have a more restricted sphere, limited to elements that draw attention, produce impression, incites to travel" (Stănciulescu and Micu, 2009) [4].

A rural location can provide many services to tourists, the number and type depending on the size and location of the guesthouse, the tourism potential of the area, the creativity of the householder.

"The intensification of the demand for practicing agricultural tourism has positively influenced the concerns of the developers from tourism, meaning reorientation to the activities of this form of tourism." (Boiţă and

Constantin, 2010) [1].

The most expressive indicators used to characterize the dynamics of tourist traffic are: number of tourists, number of overnight stays and average length of stay. Number of tourists as the most representative physical, quantitative indicator had during 2010-2015 the progress in shown (Table 1).

Since 2010 the number of tourists arriving in Romania fell, reaching 61.6% in 2015. An important factor that determined this trend is the declining purchasing power of the Romanian population, due to lower revenue growth compared to the price jump.

In these circumstances the number of Romanian tourists who arrived in Romania, with a total share of tourists (90-93%) was decreasing and naturally has shaped the total number of tourists accommodated in this period.

Thus, if the average annual decline in the total of tourist's arrivals in Romania was at a rate of 3.07% for Romanian tourists registered in 2015, which represented 61.2% of those who arrived in 2010, the average annual decline was 3.22. After a sinusoidal evolution and a minimum recorded in 2010, foreign tourist arrivals in Romania have returned, the level in 2015 stood at 90.2% compared to 2010. It should be emphasized that the results of a poll are estimates of the parameters of the population and ant estimate assumes a margin of error. In opinion polls is accepted a margin of error of +/- 3%.

Table 2. Expected and observed frequency of responses

Response Type	Observed frequency	Expected frequency
Yes	90	75
No	60	75

The statistical results obtained and the relationships uncovered should be interpreted qualitatively in order to provide a holistic view on the issue investigated.

Statistical inference is based on data obtained, systematized and interpreted from a sample extracted from a population; therefore, it requires that the sample chosen to be representative and characteristic for that population. This survey was attended by 150 tourists from the Western part of Romania.

This study is non-experimental, with a pencil-paper design. Analysis was conducted between different samples of subjects. To test the hypothesis was applied a questionnaire created by the authors.

The questionnaire consists of 7 items, of which 6 are closed questions and one open. The participants have to choose the response that corresponds to their expectations the best of the 2 possible answers (Yes / No). The questionnaire was pre-tested with the classic method on a sample of 150 subjects. We gathered the yes" and the "no" answers ". For statistical processing, we used the largest quota, where the majority answers "yes" were marked with the code '22' and the majority answers "no" were marked with the code "11".

The survey was conducted in October 2016 specifying to the participants the privacy of the data and only their use for scientific purposes.

For data processing was used SPPS software, version 11, and to test the statistical hypothesis the $\chi 2$ technique was used (Table 2 and 3).

Table 3.Test of the statistical hypothesis

Variable	Tourists feedback
The value of $\chi 2$ test	$\chi 2$ (1) = 0.11, p <.05
N	150

Preliminary results

The main conclusions drawn from the study are the following:

■Regarding the practice of agricultural tourism in the last 10 years, as seen in the graph (Fig. 1) most respondents have practiced agricultural tourism 4 times or more (33%). This share is with 13% higher than that of those who are on their first stay. The share of those who previously practiced agricultural tourism 2 or 3 times is equal (17%).

So, we can estimate that most tourists visiting such locations are firmly convinced of the benefits of practicing agricultural tourism.

■ If we refer to the frequency if visits to the Caras - Severin area, most of the respondents appear to remain faithful to the chosen area,

visiting it over 2 times. None of the respondents responded with "never", which aims to support the estimate that the tourist that once visited a location and found it satisfactory to its desires and needs, remains faithful to the choice made and doesn't seek a new destination

■ In terms of the average duration of a visit to Caraş- Severin, it may be noticed that the vast majority spend a week or over seven days at the destination; the share of those who only stay here overnight is quite low in both locations considered.

■ Regarding the appeals that leads tourists to frequent hostels in Caras - Severin, it may be noticed that in addition to the landscape, included in the "other" category, a large share for both hostels, what attracts tourists in the Caras - Severin area is the natural.

■ Referring to the sources of information, we concluded that the main sources of information used in selecting the destination by Romanian tourists are accounting from kith and kin, followed by internet and ANTREC leaflets.

These results can be explained by the preponderance of tourists who base their choice on subjective information received from their entourage and less by means of objective information. Also among the other age categories the Internet is considered a reliable and sufficient source of information, statistics showing that travel agents bring to hostel 15% of the average, the best way to promote the tourist offer remaining the Internet

■Concerning what type of tourism is practiced in the Caras - Severin area, as expected most choose a tourism stay, besides the relaxation, followed by the knowledge or weekends tourism and less of proactive tourism.

■ Regarding the preferred means of travel, most tourists go to travel in groups, by group meaning their partner and/or extended family.

Considering that most responded that they practice tourism for the stay, the number of those traveling individually is smaller, association with the affiliation group improving the feeling of relaxation that is intended to be achieved by "going on leaveIf we talk about the reservation, where it was taken, most respondents made a reservation in advance. However, the differences between those who did and didn't do a reservation are not high, a result explained by the fact that as mentioned previously, most tourists weren't on their first visit to the location. Those that have made a reservation they "went" straight to the source, making it at the tourist reception, and the rest have resorted to intermediaries: ANTREC or travel agency, which is consistent with the information mode.

■ concerning the destination, many use the Internet, organizing their own stay.

Concerning the services that were included, most opted for packages including full board, half board and accommodation with breakfast being at parity. These results can be explained by differences in material possibilities. Some tourists opted for transportation as well. To move to the hostel most, use their personal vehicle, offering greater comfort, followed by the train, minibus or coach or combinations thereof.

■ Regarding the level of comfort, most opt for accommodation presenting a medium level of comfort (2 or 3 stars), extremes underrepresented.

■ About the quality of the menu, the majority answered that it was good.

■ Regarding willingness to spend extra for a higher standard, tourists who attended Gărâna Pension responded in a significant number with yes.

■ Regarding the availability of the tourists to return in the next three years to Gărâna Pension, object of this study, most respondents said they would return to it, but this result should be evaluated with caution considering the number of those who answered "I don't know" which can denote either indecision or social desirability of the subject.

■ In this study, have participated 80 males and 70 females.

■ The majority of respondents were aged between 26-35 years and 56-65 years.

■ In terms of occupation, most participants in this study were either employees or retirees.

The result shows interest in agricultural tourism, but in the future, it is necessary to

pursue a more "aggressive" program with more coverage of the pensions in Romania.

CONCLUSIONS

As in all tourism services also in agricultural tourism the indicators used in assessing economic agents refer to items like: demand, supply, quality of service. Analysis of the possibilities and implications of the activity of rural tourism and ecotourism is given by the rough standard margin that is considered the methodological concept of making such analyzes.

The potential given by relief, climate, natural, architectural conditions and beyond, are for Western Romania, elements of attractiveness for tourism.

The Romanian village, through its millennial existence, represented the vein of continuity for our people in this area, today Romania, as an adaptation to the geographical environment, which was the crucible for its forming, its culture and its civilization.

The agricultural potential of the Romanian village is extremely complex, comprising in its composition natural and cultural-historical ingredients of great variety and tourist attraction. Along with the natural composed of landscape aspects, elements of flora and fauna, great attractiveness landforms, rivers and lakes, balneary elements, some nature reserves, national parks, the rural Romanian space also benefits from an ethnographic and folklore potential of high originality and authenticity.

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HUMAN POTENTIAL IN AGRICULTURE OF THE REPUBLIC OF MOLDOVA

Simion CERTAN[1], Ion CERTAN[2]

[1]State Agrarian University of Moldova, 42 Mircesti Street, Chisinau, Republic of Moldova, Email: simcertan@hotmail
[2]Moldova Institute of International Relations, 54, Pushkin Street, Chisinau, Republic of Moldova, Email: ioncertan@gmail.com

Corresponding author: simcertan@hotmail

Abstract

After approval of the Declaration of Independence (August 27th 1991), Moldova lives hoping to consolidate their place among the democratic nations of the world and to build its new socioeconomic system. Agriculture has been and remains the strongest factor of balance in harmonizing economic development of any country, including our country. Moreover, for us agriculture has a significant contribution to the gross domestic product, which even if reduced from 36.14% to 15.23% in 1990 to 2014, remains the backbone of the national economy. The level of agricultural development of our country undoubtedly is dependent on natural resources and materials that are emphasized by the available human potential. Sure, all those involved in the agri-food sector must increase its effort to gain new generation of products, to develop and apply appropriate technologies for their production would exclude or, at least, limit risk and uncertainty. It is natural to manifest constantly awake curiosity and also hard to available human potential for national agriculture, creativity farmers achieve the desired result. The article reflects on human potential evolution of the number of people employed in national agriculture, knowledge and skills, professionalism and creativity of farmers. The authors come up with some proposals that would help ensure agriculture with the necessary human resources, in order to enhance professionalism and creativity of those working in this sector of national economy

Key words**:** *agriculture, efficiency, human resources, professionalism, creativity*

INTRODUCTION

Changes in the national economy were initiated by the decision of the Moldovan Parliament on 25 July 1990 described "... transition to a market economy as a model of management .... The core concept of agrarian reform and socio-economic development of the village (still conception), adopted by the Moldovan Parliament decision of 15 February 1991, was focused on land relations reform. The main focus of land reform was and remains de-monopolization of State ownership of land and, as a result, the occurrence homestead (farm type), based on a real economic independence.

In such circumstances the role of the peasant farmer increase considerably, which obliges us, no doubt, to amplify and intensify scientific research that contributes to the formation of appropriate human potential. Interest for such studies is explained as organic production, in contrast to other segments of the agricultural activity, is growing.

MATERIALS AND METHODS

The materials used in research are part of the normative acts of the EU and Moldova, textbooks, monographs and other publications specific to issue that allowed us to identify factors influences human potential impact on agriculture.

Quantitative analysis is performed on selected and processed by the authors data based on statistical yearbooks of Moldova and other official sources of the institutions of our country and the European Union.

Empirical study, analysis of the links provided us meanings and explanations relevant to the phenomena or processes of human potential impact on agriculture in Moldova.

RESULTS AND DISCUSSIONS

A. Smith's statement [4] that human activity creates real weight applies to the man working in agriculture, labor, over time according to need an application to accomplish that goal "is to defend the social and economic peasant ".

The total population in our country is decreasing slightly to 4.3616 million people in 1990 to 4.3479 million due to changes in natural increase from 8.0 to 0.8 percent per year and in 2000 to 3.6441 million as since 1996 statistics excludes residents from Dniester left bank districts.

After 2000 the population continues to shrink reaching 3.5552 million in 2015 or by 2.44 percent as a result of reduction in natural growth and migration.

The rural population dominates. Share of rural population increased from 52.6% in 1990 to 57.6% of the total population in 2015.

The natural growth in rural areas decreases from 6.6 in 1990 to -1.8 in 2000 and subsequently registered only negative values. The aging coefficient reached 16.2%, including males - 15.9% to 16.4% female and exceeds the indicated Gamier G. Bojio scale value of 12%.

Human potential is part of the resources flowing freely throughout space Survey. It is natural that our country join the free movement area of human resources. In our country dominates those who goes abroad in search for a job. In 2008 309.700 people were declared left to work abroad, in 2010-311.000 and in 2013 – 332,500, which form respectively 24.7%, 27.2% and 28.4% out of total employed in the country. Note that the number of people who left the country annually increased from 5,432 people in 1995 to 9,128 in 2000, then steadily decreases reaching 2374 people in 2014. Today, according to expert estimation, our country loose every day about one hundred people. Is increasing (from 68.6% in 2008 to 70.9% in 2010 and 71.5% in 2013) the proportion of persons leaving the countryside in search of better paid job. The total number of people who went abroad to work in rural areas dominates and is increasing (28% in 2008, 32% in 2010 and 47% in 2013) the group of people aged 25-34 years. Given that more than half of those who leave the country for “adventure” of searching of better payed employment are aged between 15 and 35 years and that fact will worsen considerably demographic situation and in the future will become extremely difficult to ensure the economy, particularly agriculture, with those who must produce goods and provide services. Economic and social measures are needed to motivate human resources to work in the national economy. The economically active population remaining in the country is reduced from 1.696 million in 1995 (Table 1) from 1.266 million in 2015, or 27.13 percent. More pronounced activity rate decreases from 47.1% in 1995 to 34.7% in 2013 or by 12.4 percentage points.

Table 1. Population by participation in economic activity in the Republic of Moldova (thousand persons)

	1995	2000	2005	2010	2011	2012	2013	2014	2015
Population, total	3,604	3,639	3,595	3,582	3,560	3,560	3,558	3,557	3,555
of which economic active	1,696	1,655	1,422	1,235	1,258	1,215	1,236	1,232	1,266
share, %	47.1	45.4	39.5	34.7	36.3	34.1	34.7	34.6	35.6
of which employed	1,673	1,515	1,319	1,143	1,173	0,1147	1,173	1,184	1,203
share, %	46.5	41.2	36.6	32.1	33.0	32.2	32.9	33.3	33.8
of which employed in agriculture	711	765	537	315	323	303	338	361	382
share, %	42.8	50.5	40.7	27.5	27.5	26.4	28.8	30.5	32.0

Source: authors calculations based on Statistical Yearbook of the Republic Moldova [5]

Number of labor force declined from 1.673 million in 1995 to 1.203 million in 2015 or by 28.1 percent. If in 1995 the employment in our economy as 98.6% of those active, then in 2015 - 95.0 percent or 3.6 percentage points less. Number of people employed in agriculture has decreased and emphatically from 711 thousand in 1995 to 382 thousand in

2015 or by 1.86 times. The employment rate in agriculture was reduced from 42.8% in 1995 to 32.0% in 2015 or by 10.8 percentage points less. Very few (3.09% in 2005 and 4.52% of those employed in 2015) were employed in the total number of works in industry. If the total number of employed population decreased by 29.97 percent, then the active population aged 15 to 34 years, practically remains the same level of 425 thousand people (29.88% of total) in 2005 and 427 thousand people (33.73% of total) in 2015 (Table 2).

Table 2. Population by age in economic activity in Moldova (thousand persons)

	Total		**Age range, years**											
			15-24		**25-34**		**35-44**		**45-54**		**55-64**		**65 and over**	
	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
Active population	1,422	1,266	152	107	273	320	367	307	407	299	164	195	60.6	36.9
Employed population	1,319	1,204	124	93.6	252	300	341	293	384	290	158	190	60.2	37
Of which: rural space	745	648	71.9	56.2	121	138	184	159	222	161	93.4	108	52.8	42972
Agriculture	512.5	358.4	39.0	30.9	74.1	62.7	119	81.6	155	87.4	73.9	71.8	51.3	23.9
Industry	40.8	54.5	9.5	5.7	9.6	16.0	10.6	13.9	8.8	12.8	2.4	5.8	0.0	0.2

Source: authors calculations based on selected information from http / www.statistica.md [11]

The most pronounced decrease of 25.4% in those years, was registered within active population aged 15-24 years. However, the share of young workers who come in agriculture increased from 22.07% in 2005 to 26.1%, but even in 2015 it remains insufficient. Active population aged 35-54 in 2005 made up 54.5% or 774 thousands of people while in 2015 - only 606 thousands or 47.9% out of them. In other words the number of those who are in the prime of life and work in the last ten years was reduced by 21.7 percent. Population aged 35-54 employed in the national economy in 2005 stood at 725 thousand people and made up 93.66% and in 2015-583 thousand people or 96.2 percent of the number of active ones. The number of people aged 35-54 employed in agriculture decreased from 274 thousand (37.8% of those employed) in 2005 to 169.0 thousand (29.0%) in 2015. At the same time in 2005 total number of employed people aged 65 and over was 69.2 thousand out of which in agriculture 51.3 thousand or 74.1%, and in 2015 it constitutes 37 thousand and 23.9 thousand or 64.6 percent respectively. The population employed in the private sector increased from 871.1 thousand persons or 69.8% out of total employed in 2007 to 876.9 thousand persons or 74.0% in 2014 (Table 3).

Table 3. Population distribution by ownership (thousands)

	2007			**2014**		
	total	private	public	total	private	public
Total employed population	1,247.2	871.1	326.5	1,184.9	876.9	307.9
of which: Rural space	698.6	530.9	153.0	646.9	504.5	142.4
Agriculture	392.1	384.8	3.8	344.6	341.4	3.2

Source: author's calculations based on Workforce in Moldova. Employment and Unemployment, National Bureau of Statistics of the Republic of Moldova [7]

Number of people employed in the private sector in rural areas increased from 530.9 thousand persons (76.0% of total) in 2007 to 504.5 thousand persons (78.0% of total) in 2014. The most of the people in the rural areas working in the private sector are engaged in agriculture, forming 72.5% in 2007 and 67.7% in 2014 respectively. In the public sector dominates only those trained in public administration, education, health and social assistance. The market economy produces spectacular changes in the ratio of employees, self-employed, unpaid family workers and other categories of persons

employed in all types of economic activities. In total people employed in the national economy dominates employees even if their number is reduced from 830.6 thousand (63% of total) in 2005 to 787.6 thousand people (65% of total) in four employment categories in 2015 (Table 4).

Table 4 Population distribution by the main types of economic activity, thousands

	Total		**employees**		**self-employed**		**family workers**		**owners**	
	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
Persons	1,318.7	1,203.6	830.6	787.6	464.7	362.8	14.6	45.9	8.7	7.2
of which in Rural space	745.1	648.3	339.6	308.8	391.3	291.3	13.1	45.3	7.0	2.9
Agriculture	512.5	358.4	127.6	54.8	372.0	258.6	12.8	44.6	1.69	2.88

Source: authors' calculations based on information http / www.statistica.md [11]

The number of people employed in the national economy decreased from 1.3187 million in 2005 2015 to 1.2036 million people, or by 8.7%, and the number of employees decreased respectively from 830.6 thousand to 787.6 thousand or by 5.2%, self-employment - from 464.7 thousand to 362.8 thousand or by 11.93%. In those years the number of unpaid family workers increased only from 14.6 thousand in 2005 to 45.9 thousand or 3.14 times. Basically all we paid family workers engaged in agriculture in the national economy. The significant number of self-employed workers in agriculture, expansion of private ownership of land, organizing farms (farms) contributed to a significant increase in the number of people who take decisions by giving them more freedom, safety and, of course, greater responsibility. Effectiveness and efficiency of their work is dependent on the competence, professionalism and creativity. Abilities shall be acquired through education, which ultimately helps to ensure the state, including our country, people productive and efficient. A-productive makes people through education - Peter Drucker argues [1, 4] - is "the first of the challenges of our time." Population with higher and specialized secondary employment in the national economy is growing at 418.1 thousand persons (31.7% of total) in 2005 to 443.0 thousand persons (38.7% of total) in 2010 and 464.6 thousand (38.6% of total) in 2015 or by 11.1% more (Table 5).

Table 5. Employed population by educational level (thousands)

	Total	**Year**	**Studies**					
			High	coleague	secundary	liceum	gimnazium	primary
Population employed total	2005	1,318.7	223.8	194.3	331.2	294.9	235.0	39.5
	2010	1,143.4	262.8	180.2	277.2	236.8	178.1	8.3
	2015	1,203.6	294.0	170.6	268.1	239.1	224.8	7.0
Population employed in rural space	2005	745.1	47.5	72.8	187.3	199.8	200.5	37.1
	2010	605.0	64.2	81.0	170.3	138.8	143.5	7.3
	2015	648.3	72.4	78.0	169.8	143.2	184.1	6.3
Self-employed	2005	391.3	8.3	22.7	88.5	113.6	125.1	33.5
	2010	242.1	6.6	16.8	73.1	66.9	74.7	4.1
	2015	291.3	9.6	24.1	76.8	73.1	104.1	3.1
Agriculture	2005	512.5	11.5	29.4	119.2	154.7	161.7	36.1
	2010	295.9	9.1	22.0	81.6	80.8	95.8	6.5
	2015	358.4	12.7	29.4	87.3	90.6	132.6	5.8

Source: Authors' calculations based http / www.statistica.md [11]

Population with higher and specialized secondary education in rural areas in 2005 formed 120.3 thousand (16.1% of its total) in 2010 -145.2 thousand people (24.0% of its total) in the year 2015-150.4 thousand persons (23.2% of its total). If the self-employed in rural areas with higher and specialized secondary in 2005 numbered 31.0 thousand

(7.4% of those with such studies), then in 2010 – 23.4 thousand (5.3% of those with such studies) and in 2015-33.7 thousand (7.25% of those with such studies) population with higher and specialized secondary employment in agriculture, hunting and forestry in 2005 as 40.9 thousand persons or 9.8% of those with higher and specialized secondary in 2010-31.1 thousand people or 7.0% and in 2015 - 42.1 thousand or 9.1 % of those with higher and secondary special. Competence, professionalism and creativity of those involved in the national economy, including agriculture increased in the third cycle - PhD. The number of doctoral students increased from 1,248 in 2000 to1,685 in 2006 or about a third. Then followed a decline, forming in 2013 less than 91 percent comparing to 2005. The number of post-doctoral increase from 20 in 2000 to 28 in 2005 and 51 in 2010, then steadily decreases reaching 35 in 2013 (Table 6).

Table 6. Number of graduates doctoral and post-doctoral

	2000	2005	2010	2011	2012	2013
Number of doctoral students	1,248	1,667	1,55	1,556	1,485	1,522
Graduated doctorands	261	311	422	318	380	349
Sustained thesis	22	9	14	10	24	13
Number of post-doctoral students	20	28	51	40	39	35
Graduated post-doctorands	4	4	25	30	17	19
Sustained thesis	-	1	3	1	1	6

Source: authors calculations based on statistical Yearbooks of the Republic of Moldova [5]

Even if the number of graduates of doctoral increase from 261 in 2000 to 349 in 2013 or 33.7 per cent share in total doctoral candidates is reduced from 20.9% in 2000 to 18.7% in 2005 and then grow by 27.2% in 2010 and again reduced to 22.9 percent. The number of post-doctoral graduates increased from 4 in 2000 to 30 in 2011 and then reduced to 19 in 2013 while doctorate and post-doctorate theses were finished o as only 8.4% of doctoral graduates have defended the thesis in 2000, decreasing to 3.7 percent in 2013. The number of graduates should note that in those years the agricultural sciences were held only 28 theses forming 0.0175% of the total and 2 thesis in veterinary medicine as an agrarian country is catastrophic for the least and obviously determined activity-oriented development of market relations, the process of innovation, renewal of varieties, biological plant protection etc. Scientific research value, including agriculture is measured by patents inventions, plant varieties, securities trade mark protection. The number of patent applications for inventions increase from 246 in 2000 to 401 in 2005, and has a tendency to reduce to 96 in 2013 or 4.18 times of tremendous growth from 139 in 2014. The share of patents issued report of applications is declining which is confirmed by reducing from 76% in 1995 to 67% in 2005 to 63% in 2013 and 38.8% in 2014. Patent applications filed for plant varieties grow from 12 in 2000 22 in 2005 and 43 in 2013, but was decreased to 34 in 2014 reached unacceptably low levels for an agrarian country like Moldova. Total securities patent for plant varieties increased from 13 in 2005 to 131 in 2014, or about 10 times, but remains too poorly constituted only 34% of all titles of patent in our country. Number of units issued for trademark protection fluctuate increased from 3,827 in 1995 to 4,742 in 2005 or by 34.9% then reduced to 4,250 in 2012 or about 10.4% and increased to 5,220 in 2013 or by 22.8% decreasing in 4,939 or by 5.4 percent.

The large number of titles released for trademark protection is due to increase small and medium businesses who want to affirm in market.

Republic of Moldova ranks last, with a very low number of patents obtained abroad is explained, in addition quality of research and the high costs of patenting in these offices, which varies from 12 thousand euros (USPTO) to 30 thousand euros (EPO) (Fig. 1).

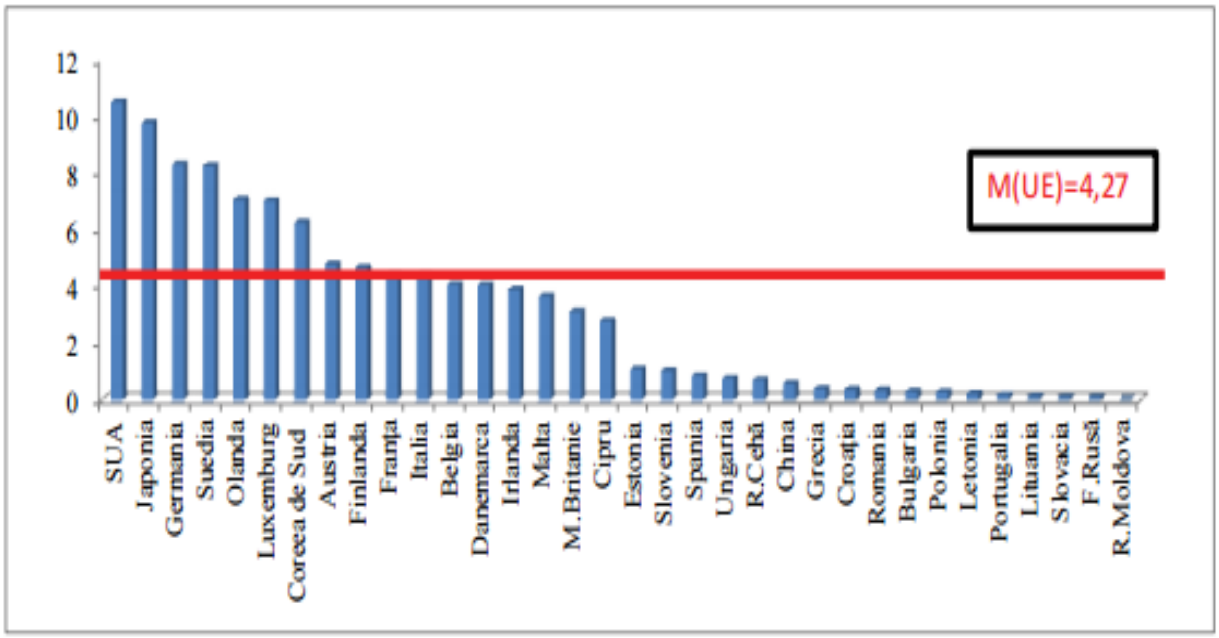

Fig. 1. EPO and USPTO Patent issued by 100 scholars opposed to cost-ENÎ.
Source: Akademos 3/2015, p. 30-38 [3]

As for publications included in the international circuit after the Republic of Moldova ranks among the top countries (most reduced costs), the cost of patents we are among the last every 10 million euro allowances are issued only 0.02 brevets.

CONCLUSIONS

Human potential national working in agriculture is declining. But their overall number is reduced from 512.5 thousand (68.8% of those employed) 2005 to 358.4 thousand persons (55.3% of total) in 2015. Among those engaged in agriculture, hunting and forestry stands freelancers the number of which in 2005 stood at 372.0 thousand (72.6% of total) and in 2015 - to 258.6 thousand people (72.4 percent of total).

Competence, professionalism and creativity of people employed in agriculture does not meet national day. Population with higher and specialized secondary employment in agriculture, hunting and forestry in 2005 as 40.9 thousand or 9.8% of those with higher and specialized secondary in 2010- 31,100 or 7.0% of those with higher and secondary special and in 2015 -42,100 or 9.1% of those with higher and secondary special. Developing scientific research, exploitation of results is poor science. What to do? In order to develop sustainable national agriculture and adjust it to the requirements of the Association Agreement between the Republic of Moldova, on the one hand, and the European Union and the European Atomic Energy Community and its Member States, on the other hand consider appropriate - to change the structure of national agriculture branches corresponding EU Common market demand; - To implement effective and efficient technologies; - Streamline everything related to human potential working in agriculture.

To this end we propose to:

(i)develop and apply mechanisms and economic instruments that can ensure natural growth of the population of our country in general and the rural in special.

(ii)stop, or at least to slow the emigration of our citizens, particularly the youth through the development and implementation of ways that it will encourage everyone to achieve in national agriculture.

(iii)starting from the reality that many of those involved in national agriculture are the generation that comes from the 50s USSR where they had a patriarchal childhood caught in the school, where the laws of physics in the 60s and acted as directed party studying in the

university in the 70s how happy will live under communism, falling into the 80s in employment during the "light" of stagnation where the roots caught stealing and corruption, and in the 90s was entrusted reform national agriculture is required to step in changing the mentality of occupation endowing agriculture with innovative qualities, performance and competence to make decisions, take appropriate action based economy incidentally markets. Article 123 of the Association Agreement between the European Union and the republic of Moldova recorded cooperation will focus, inter alia, the following areas:

a.Promoting lifelong learning, which is the key to growth and jobs and allow citizens to participate in society in full measure;

b.Modernizing education and training, enhancing the quality, relevance and access;

c.Promoting convergence in higher education, based on the Bologna Process and the EU modernization agenda for higher education;

d.Strengthening international academic cooperation, participation in EU cooperation programs, to increase mobility of students and teachers;

e.Creating a national qualifications framework to improve transparency and recognition of qualifications and competences; f. promoting the goals set in the Copenhagen process on European cooperation in vocational education and technical training.

4. Innovative activity, promoting creativity, scientific research development, exploitation of the results of science and new ideas in agriculture entering our country will change for the better through the implementation of the Association Agreement between the EU and Moldova.

From our country it is required:

a. increase domestic spending on research and development in our country, when they rose from 317.6 million lei in 2009 to 415.2 million in 2014 or 30.7 percent, their share in the national GDP decreased from 0.526% in 2009-0371 percent in 2014. for comparison in 2012, according to information presented by Ion Holban [2], the United States has allocated nearly $ 434.5 billion for research and development, which form 2.77% of GDP, Member States of European Union - 337.8 billion $ (2.03%), Japan - 194.4 billion $ (3.26%), China - 151.4 billion $ (1.84%), South Korea - 43.2 billion $ (3.74%), CIS countries - 25.1 billion $ (0.95%). Moldova domestic expenditure in research - development in 2012 formed 0.42 percent of gross domestic product.

b. by stimulating economic motivation of the material involved in educational activities and scientific research.

Average monthly nominal earnings of an employee in our country has increased from 408 lei in 2001 to 4,090 lei in 2014 or by 10 times. If in 2001 the average monthly nominal earnings made up 87 percent of the monthly subsistence minimum, then in 2014 the average monthly nominal earnings was higher than the minimum monthly nominal wage being 2.5 times. Earning in higher education increased from 830 lei in October 2001 to 5,450 lei in October 2014, or only by 6.57 times.

Earning rated national university teacher education was increased from 1,294 lei in October 2001 to 7,732 in October 2014, or by 5.98 times the lecturer and university lecturer increased respectively by 5.92 times and 5.68 times. In 2001, nominal earnings in higher education who surpassed the average of 2.03 times, and in 2014 - 1.33 times. Insignificant changes occurred in earnings ratio of teacher, lecturer and lecturer of the university. So in 2001 this ratio was at 0.5085/1.0865 and 2014 - respectively 1.0857 and 0.483.

Thus scientific work, creativity and inventiveness can be more effective by increasing the level of motivation by appealing to increased financial allocations in this area and ensuring decent wages for those involved in scientific research.

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THE OLIVES MARKET FOR CONSUMPTION WORLDWIDE AND IN THE EUROPEAN UNION

Irina-Adriana CHIURCIU, Elena SOARE, Aurelia-Vasilica BĂLAN

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax: +40213182888, Emails: irina.chiurciu@yahoo.ro, soare.elenausamv@gmail.com, balanaureliav@yahoo.com

Corresponding author: irina.chiurciu@yahoo.ro

Abstract

The paper presents the evolution of the olives for consumption market in the world and in the European Union during 2000/1-2015/16. Table olives are an important source of food because they contain high-quality fats and provide significant intake of antioxidants, minerals, vitamins, etc. For the analysis of the olives market in the world and in the European Union a number of specific indicators such as production, consumption, import and export were used. The market-specific indicators analyzed in the paper posted significant increases in the 2015/16 season as compared to the 2000/1 season.This demonstrates the increase in human consumption of table olives, mainly due to the positive impact on global population health. Worldwide, the main olive-growing countries are also the main olive-exporting countries (European Union, Egypt, Turkey). At the level of the European Union, Spain, Greece and Portugal occupy the top positions in the production and export ranking. The statistical data that led to the analysis of this market were taken from the International Olive Oil Council.

Key words*: import, export, table olives, market, production*

INTRODUCTION

Archaeological discoveries in Italy, North Africa and Spain show that the olive tree was known since the 12-th millennium BC. The area of origin of wild olive is Asia Minor, where it grows in dense forests. The Phoenicians were the ones who spread it in the XVI-th century BC, first along the Greek islands, then in the mainland Greece. Here its cultivation has gained great importance, which is also underlined by the fact that in the IV-th century BC, Solon issued decrees that regulated the planting of olives.

In the Mediterranean Sea the olive tree reached in the VI-th century BC.[2]

Considered "eternally fruitful tree", the olive tree is an evergreen plant that is growing slowly, but it is very longevive and has great power of regeneration. It prefers mild winters, warm summers and calcareous soils, where the sea breeze reaches.[6]

The olive tree is cultivated for its fruit, which can be consumed as such or as extracted oil.

The fruit of the olive tree is a dice with low sugar content (2.6-6%), high oil content (12-30%), which varies according to the year and the variety, and a bitter component.[2]

The main qualities of table olives refer to:

- size;
- form;
- pulp-kernel ratio;
- pulp texture;
- firmness;
- taste;
- oil and sugar content.

After the harvest (fruit maturity) and color, the olives are classified as follows:

-Green olives - the fruit is picked during the baking period when it has reached its normal size. After processing the color varies from green to pale yellow;

-Semi-baked olives - the fruits are harvested before the full maturity point is reached when the color changes. After processing, the color varies from red-green to brown;

-Raw olives - fruits are harvested when fully ripe. Once processed, their color is black-red, black-purple, black-green, black.[1]

Olives are an indelible food in the Mediterranean diet; they contain quality fats such as oleic acid, linoleic acid and alpha-linoleic acid. [4]

The consumption of olive provides an important contribution of antioxidants, minerals, phytosterols and vitamins, which help maintain the health of the body. [5]
The world's most widely consumed table olives are: Manzanilla - Spanish olives, Kalamon, Halkidikis, Kalamata - Greek olives, Castelvetrano, Ceringnola - Italian olives, Picholine, Nyon and Niçoise - French olives.

a ***b*** ***c*** ***d*** ***e***

Fig. 1. Types of table olives
a - Kalamata; b - Castelvetrano; c - Cerignola; d - Nyon; e – Niçoise

Kalamata - very well-known and appreciated, they are dark purple, with shiny skin and sometimes slightly wrinkled.
The shape is almost almond-shaped. They are preserved in red wine, red wine vinegar and/or olive oil and have a special taste of fruit.
Castelvetrano - they come from Sicily, the Nocerella del Belice variety and are ubiquitous in snacks. The colour is dark green, thick pulp and has a light flavour.
Cerignola - they are giant green olives grown in the Puglia region of Italy. Crisp and bland, can be filled with various food.
Nyon - small and black olives from southern France dried and ripened in brine, a bit bitter and served with Provence olive oil and flavoured herbs.
Niçoise - ingredients in French Riviera dishes or consumed alone, these olives have a herbal fragrance [3], (Fig. 1).

MATERIALS AND METHODS

To make a more realistic analysis of the world olives market and the European Union market, several indicators have been analyzed, such as the production of table olives worldwide and in the European Union; the consumption of table olives; the import and export of table olives. In order to accomplish the present work we have consulted specialized materials and used statistical data specific to the table olives worldwide and for the European Union.
The statistical data used in the paper was taken from the International Olive Oil Council. The analysis of relevant indicators for the olives market was based mainly on common statistical methods.

RESULTS AND DISCUSSIONS

The evolution of table olives production in the world and in the European Union during 2000/1 - 2015/16 is presented in Table 1. From the data presented, it is noticed that the production of table olives in the world and in the European Union had an oscillating evolution from one season to the next.
Worldwide, in the 2015/16 season there is a substantial increase in the production of table olives by 97.3% compared to the season 2000/1 (Fig. 2).
The world's largest table olives production was recorded in the 2013/14 season (2,660.5 thousand tons) and the lowest production was 1,343.00 thousand tons (2000/1).
The main olive producers worldwide are: the European Union, Egypt, Turkey, Algeria, Syria and Morocco. It is easy to see that the European Union is the first of the top olive growers.
In the 2015/1 season, 632.4% of world olive oil production was achieved.
In the European Union, olive production has varied from one period to the next.

Table 1. The evolution of table olives production in the world and in the European Union, between 2000/1-2015/16 (thousand tons)

Specification	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2015/16 / 2000/1 (%)
World total	1,343.0	1,473.5	1,773.5	1,602.0	1,852.5	1,762.0	2,088.5	2,151.5	2,082.5	2,369.0	2,563.0	2,432.5	2,512.5	2,660.5	2,581.0	2,650.0	197.3
EU	576.50	764.50	644.50	759.00	739.50	623.50	714.50	720.50	677.00	675.00	828.50	741.00	780.50	794.00	868.00	860.00	149.1

Source: [2]; own calculations

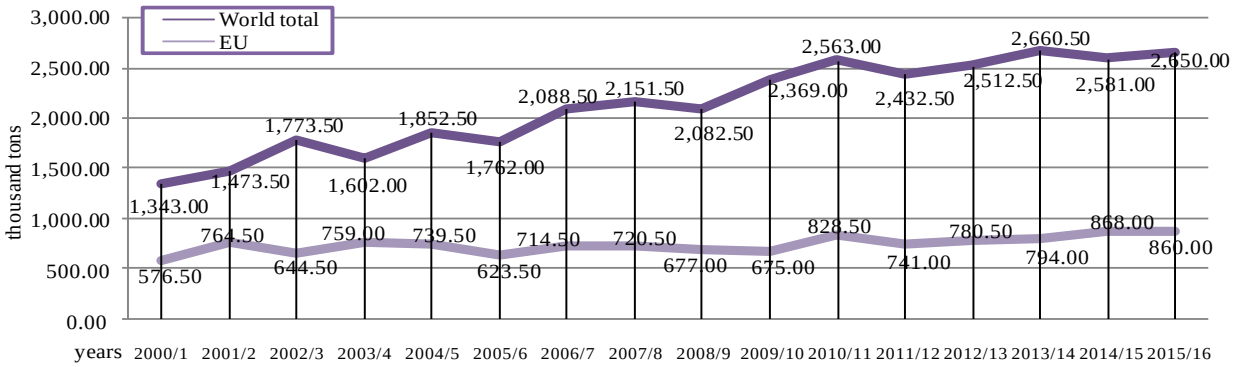

Fig. 2. Dynamics of table olives production
Source: [2]

In the 2015/16 season, the production of olives increased by 49.1% compared to the 2000/1 season. A maximum of olive production was registered in the 2014/15 season (868.00 thousand tons) and a minimum production was 576.50 thousand tons (2000/1). The main olive producers in the European Union are: Spain, Greece, Italy and Portugal. In the 2015/16 season, Spain achieved 69.9% of the EU production of olives.

The level of total consumption of olives in the world and in the European Union is shown in Table 2. Olive consumption is influenced by a number of factors, among which the most representative are: consumer preferences; age of consumers; health status; the price for the different categories of olives; consumer income etc.

Worldwide, the consumption of olives in the 2015/16 season increased by 98.0% over the 2000/1season. The world's largest consumption of olives was 2,581.5 thousand tonnes (2015/16) and the lowest was 1,303.50 thousand tonnes (2000/1) (Figure 3). The main consumers of olives worldwide are the European Union, Egypt, Turkey, Algeria, USA and Syria. The consumption of olives in the European Union accounts for 23.4% of total world consumption in the 2015/16 season.

It is important to recall that the main olive-growing countries (European Union, Egypt, Turkey) worldwide are also the main consumer states.

Table 2. The evolution of the total consumption of table olives in the world and in the European Union, between 2000/1-2015/16 (thousand tons)

Specification	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2015/16 / 2000/1 (%)
World total	1,303.5	1,382.5	1, 728.0	1, 670.0	1, 831.5	1, 829.0	2, 079.0	2,130.5	2, 110.0	2, 199.0	2, 466.0	2, 552.0	2, 522.5	2, 493.5	2, 480.0	2,581.5	198.0
EU	461.00	525.00	538.50	572.50	548.00	564.50	628.00	577.00	549.00	510.00	592.00	664.50	589.00	530.50	542.00	605.00	131.2

Source: [2]; own calculations

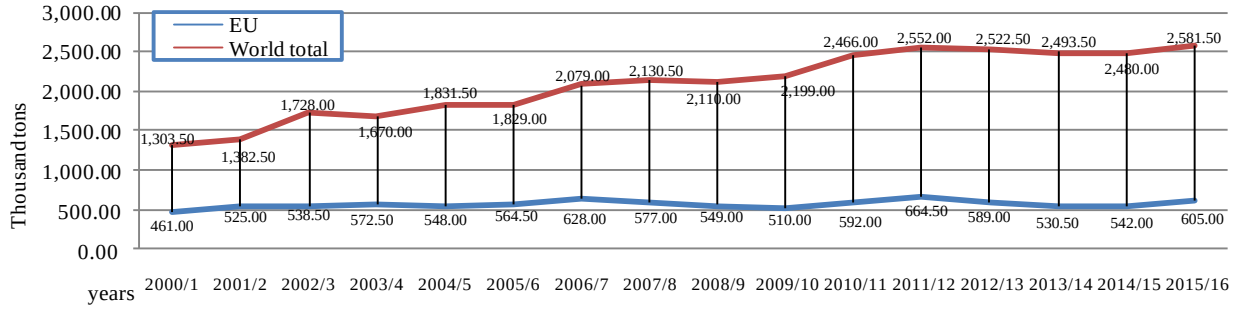

Fig. 3. Dynamics of table olives consumption
Source: [2]

For the European Union, the highest consumption of olives was recorded in 2011/12 season (664.50 thousand tons), and the lowest consumption was 461.00 thousand tons (2000/1). In the 2015/16 season, at the European Union level, the consumption of olives increased by 31.2% compared to the 2000/1 season. The main consumers of olives in the European Union are Spain, Italy, Germany and France. In the 2015/16 season, Spain consumed 31.0% of the total consumption registered in the European Union. At the level of the European Union, Spain and Italy remain at the forefront of both production and consumption.

Quantitative imports of olives worldwide and in the European Union in the period 2000/1-2015/16 are presented in Table 3. Quantitative imports of olives both worldwide and at European Union level have registered different evolutions from one season to another. Worldwide, in the 2015/16 season, imports of olives grew by 74.0% compared to the 2000/1 season.

Table 3. The evolution of olives imports globally and at the European Union level, between 2000/1-2015/16 (thousand tons)

Specification	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2015/16 / 2000/1 (%)
World total	358.0	400.0	449.5	441.0	480.0	495.0	522.0	582.5	546.0	628.5	594.0	647.5	645.5	667.5	609.0	623.0	174.0
EU*	56.5	58.0	73.0	70.5	79.0	83.5	104.5	115.0	96.5	101.0	114.0	98.5	82.0	93.0	93.0	114.0	201.7

Source: [2]; own calculations
*without intra-Community trade

From the data presented, it can be noticed that the largest imports of olives registered in the world were 667.5 thousand tons (2013/14) (Fig. 4). On the opposite side, the smallest imports were 358.00 thousand tons (2000/1).

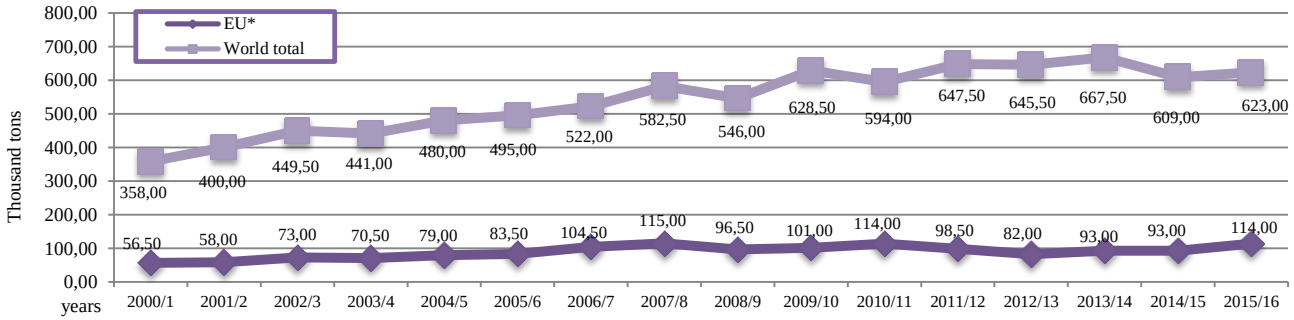

Fig. 4. Import dynamics for table olives
Source: [2], *without intra-Community trade

The main importers of olive worldwide are: USA, European Union and Brazil. Noteworthy that in the 2015/16 season, USA accounted for 24.72% of total imports of olives registered worldwide.

At European Union level, the largest quantity of imported olives was recorded in the 2007/8 season (115.00 thousand tons) and the smallest amount of olives was 56.50 thousand tons (2000/1). In the 2015/16 season, it can be seen from the data presented that at European Union level we witnessed a doubling of the imports of olives compared to the 2000/1 season. This shows the interest of European consumers in this food. The main olives in the European Union are: France, Romania, Belgium and Germany. From official statistical data, we found that France achieved 34.3% of total European Union olive oil imports, season 2015/16.

Quantitative exports of olives made globally and in the European Union in the period 2000/1-2015/16 are presented in Table 4. Worldwide, the largest quantity of exported olives was recorded in the 2011/12 season (699.50 thousand tons) and the lowest exported quantity was 364.00 thousand tons (2000/1) (figure 5). In the 2015/16 season, an increase in olives exports was recorded by 67.5% compared to the 2000/1 season. The main exporters of olives worldwide are: the European Union, Egypt, Morocco, Turkey and Argentina. The European Union accounted for 43.2% of total olives worldwide in the 2015/2016 season.

Table 4. The evolution of olives exports worldwide and at the European Union level between 2000/1-2015/16 (thousand tons)

Specification	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2015/16 / 2000/1 (%)
World total	364.0	421.5	460.5	462.0	480.0	503.0	598.0	606.5	584.5	693.0	659.0	699.5	670.0	638.0	604.0	610.0	167.5
EU*	205.5	214.0	229.0	208.5	237.0	254.0	261.0	248.0	239.0	300.0	290.5	298.0	270.0	283.5	315.0	263.5	128.2

Source: [2]; own calculations;
*without intra-Community trade

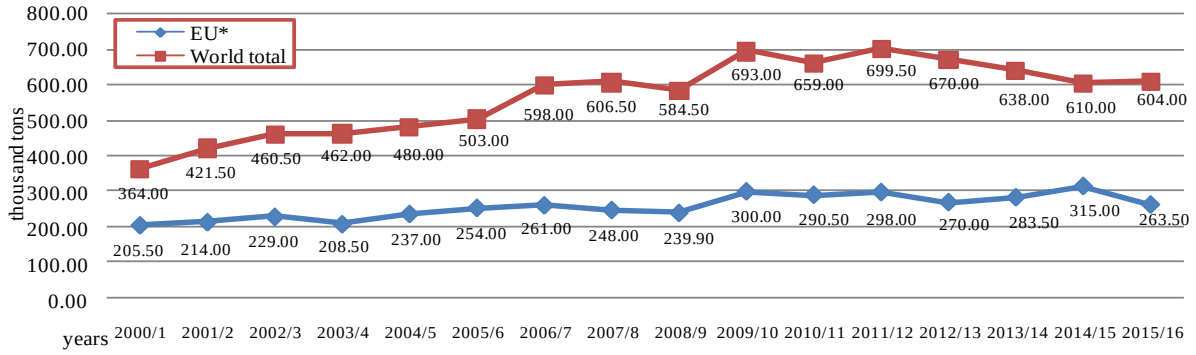

Fig. 5. Export dynamics for table olives
Source: [2]; *without intra-Community trade

The European Union exported the largest quantity of olives in the 2014/2015 season (315.00 thousand tons), and the lowest quantity exported was 205.50 thousand tons (2000/1). In the European Union, in the 2015/16 season, exports of olives increased by 28.2, compared to the 2000/1 season. The main exporters of olives in the European Union are: Spain, Greece and Portugal. Spain held 62.5% of total olive exports in the 2015/16.

CONCLUSIONS

Following the analysis worldwide and at the European Union level table olives market, between 2015/16-21/1, the following results:

-In the 2015/16 season there was an increase in mass olives production, with over 97% worldwide compared to the 2000/01 season;

-The world's largest growers of olives are: the European Union; Egypt; Turkey; Algeria, Syria and Morocco;

-868.00 thousand tons is the largest olives produced in the European Union in the 2014/15 season;
-In the 2015/16 season, the world's largest consumption of olives was of 2,581.5 thousand tons;
-The world's largest olive consumers are: the European Union, Egypt, Turkey, Algeria, the US and Syria;
-Spain consumed 31.0% of total European Union consumption of olives in the 2015/16 season;
-Quantitative imports of olives have experienced variations from one season to the next, both globally and at European Union level;
-Worldwide are the most representative olive growers are: USA, European Union and Brazil;
-At the European Union level, the main olive-importing countries are: France, Romania, Belgium and Germany;
-In the 2015/16 season, France accounted for 34.3% of total European Union imports of olives;
-In the 2011/12 season, the largest quantity of olives exported worldwide (699.50 thousand tons) was registered;
-The European Union accounted for 43.2% of the total quantity of olives exported globally in the 2015/2016 season;
-Spain, Greece and Portugal are the main exporters of olives in the European Union.

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OVERVIEW OF THE RICE MARKET IN ROMANIA DURING 2007-2015

Irina-Adriana CHIURCIU[1], Elena SOARE[1], Denisa-Florentina BURCEA[1], Aurelia-Ioana CHEREJI[2]

[1]University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax: +40213182888, Emails: irina.chiurciu@yahoo.ro, soare.elenausamv@gmail.com, burceadenisa@gmail.com,
[2]Oradea University, 1 Universităţii Street, Oradea, Bihor County, Romania, 410087, Phone: +40 259 432830, Email: aureelia_brinaru@yahoo.com

Corresponding author: irina.chiurciu@yahoo.ro

Abstract

In the present paper was carried out radiography of the rice market in Romania, during 2007-2015. Romanian culinary tradition has a strong impact on the evolution of the rice market in our country. Rice is an important food for about 50% of the planet's population and its consumption has beneficial effects on the health of the population. In order to highlight the evolution of the rice market in Romania and the changes that have taken place on this market, a series of relevant indicators have been used, such as: rice areas cultivated at national and macro-regional level; Total rice production at national and macro-regional level; Average rice production at national and macro-regional level; Rice prices; Consumption of rice at national level; Imports and exports of rice. During the analyzed period there was a positive evolution of this market because, on the one hand, we are witnessing an increase of rice surfaces and production, and on the other hand, we have identified changes in the consumption behavior of rice. Consumers in our country are aware of the rice-specific nutritional properties and have begun to use a range of varieties of this product. Rice consumption in Romania is about 4 kg rice / year /per capita. The statistical data used in the paper was provided by the National Institute of Statistics.

Key words**:** *rice, production, imports, exports, market, Romania*

INTRODUCTION

Currently, according to published statistics, rice is an important food for about 50% of the world's population. According to nutritional studies, the most favorable rice variety is the brown one. An amount of 100 grams of brown rice consumed provides a person: 120 mg of phosphorus; 99 mg of potassium; 43 mg of magnesium and 0.14 mg of vitamin B1. Unlike brown rice, consumption of white rice (100 grams/person) provides: 54 mg of potassium; 43 mg of phosphorus; 11 mg of magnesium. [5]

There are types of rice, of which:

- Brown rice (paddy) - which keeps all vitamins and minerals;
- White rice - which reduces much of its properties as the outer layer is removed;
- Red rice - specific for the Himalayan and Thailand areas, which have a red coating and the grain, is short and wide;
- Black rice - specific for China, Thailand and Bali, with a thin and black coating, and the grain is white. [11]

In Romania rice culture is not a traditional culture, but there are several strengths that make this culture possible: the superior quality of the rice made; a reduced number of diseases and pests; performing fewer treatments; Water abundantly and low prices. [12]

It is necessary to recall that the first paddy in Romania was established in the 18th century in Timis county, Partoş locality. [4]

Romania is at the northern limit of the rice growing area. [3]

According to the data provided by the Romanian producers, the investment for one hectare of rice is currently EUR 2,000 per hectare. In this sector, farmers are in a high percentage Italians who first cultivated rice in 2004. At first, the average yield per hectare of rice amounted to 3-3.5 tons. At present, Italian producers get a production of between 5.5-6.0 tons per hectare. This rice production

made by Italian farmers in Romania is lower than that obtained in Italy (9 tons per hectare) and Greece (12 tons per hectare). [12]
In Romania, a specific feature of Romanian rice crops has been identified, namely that they are well suited for the most expensive rice crops. Such a variety is "Arborio rice", which costs 700 Euros per ton, as opposed to 280 euro / ton as the cheaper rice is sold. [12]

MATERIALS AND METHODS

For the purpose of this study, statistical data relevant to the evolution of the rice market in Romania were used. The statistical data was taken mainly from the National Institute of Statistics and also from other specialized websites. A number of specialized materials have been consulted to better capture the evolution of the rice market in Romania. The period analyzed in the paper was 2007-2015.
The analysis of the rice market in Romania has been based on several indicators specific to this market, such as: rice areas cultivated at national and macroregional level; Rice production at national and macroregional level; Average yield per hectare of rice at national and macroregional level; Prices on the rice market; Consumption of rice at national level; Exports and imports of rice. In order to analyze the main indicators used in the paper we used mainly common statistical methods.

RESULTS AND DISCUSSIONS

Worldwide, rice ranks second place after the wheat crop. [8]
In Romania, the areas occupied with rice are very small compared to the wheat crop, which occupies over 2 million hectares. The evolution of the areas cultivated with rice at national level during the period 2007-2015 is presented in Table 1. The surfaces cultivated with rice in Romania have evolved from one period to the next.
The smallest area cultivated with rice was in 2007 (8,434 ha), and the largest cultivated area was registered in 2013 (13,346 ha). In 2015, the area cultivated with rice increased by 31.6% compared to 2007. The data presented in the table shows that the areas cultivated with rice are mostly in the private sector. In 2012, the areas cultivated with rice in the private sector accounted for 99.96% of the total area cultivated at national level.

Table 1. Evolution of rice-growing areas in Romania, between 2007-2015 (Ha)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2015/2010 %
Total	8,434	9,917	13,346	12,403	12,674	11,304	11,930	12,719	11,106	131.6
Of which: private sector	8,416	9,912	13,330	12,392	12,665	11,299	11,919	12,712	11,095	131.8

Source: [9]; own calculation.

In 2015, the area cultivated with rice in the private sector was 11,095 ha, which represented 99.90 of the total area cultivated with rice in Romania.
Nowadays, interest in rice culture in Romania has started to grow on the one hand due to favorable pedo-climatic conditions and on the other hand due to the forms of support for this culture. The main forms of support for rice at national level are:
-Direct payment schemes: Single Area Payment Scheme; Redistributive payment; Paying for agricultural practices beneficial to the climate and the environment; Payment for young farmers; Coupled support scheme; simplified scheme for small farmers;
-Transitional national Aid1 (ANT1).
-State aid for diesel used in agriculture. [10]
According to specialty studies published in Romania, over 50,000 ha of rice could be cultivated in high profitability conditions. Approximately half of this land area cultivated with rice could provide domestic consumption for the domestic market, and

production made on the rest of the surface could be exported to the European Union. This is possible due to the fulfilment of the essential conditions for the rice crop: land plan; Source of water near the surface of the land and warm weather. [6]

The main rice growers in the European Union are: Italy, Spain, Greece, Portugal and France. Romania ranks the sixth place in the top of rice growers in the European Union. [7]

Table 2 presents the evolution of land areas cultivated with rice in the macroregions of Romania in the period 2007-2015. From the data presented in Table 2 it can be noticed that in Macroregion 2 the largest surface with rice is cultivated. In 2015, this macroregion accounted for 47.7% of the total area cultivated with rice at national level. In 2015, we witnessed a reduction in rice gruelling, comparing to 2007.

The surface cultivated with rice decreased from 5,499 ha (2007) to 5,306 ha (2015). In Macroregion Three, there is an increase in the area cultivated with rice, from 2,526 (2007) to 4,560 (2015). During the analyzed period, there was a substantial increase in the rice surface in Macroregion four, from 387 ha (2007) to 1,240 ha (2015).

According to published statistical data, in Macroregion one was grown rice, during 2007-2010. The smallest area cultivated with rice was 9 ha (2010), and the largest area was cultivated in 2008 (25 ha).

Table 2. Evolution of areas cultivated with rice, by macroregions of Romania, 2007-2015 (Ha)

Specification	Year									2015/2010 (%)
	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Macroregion 2	5,499	6,102	7,104	6,233	6,685	5,715	7,073	6,911	5,306	96.4
Macroregion 3	2,526	2,290	3,948	3,598	3,590	4,149	4,567	4,678	4,560	216.1
Macroregion 4	387	1,500	2,275	2,563	2,399	1,440	290	1,130	1,240	320.4

Source: [9]; own calculation

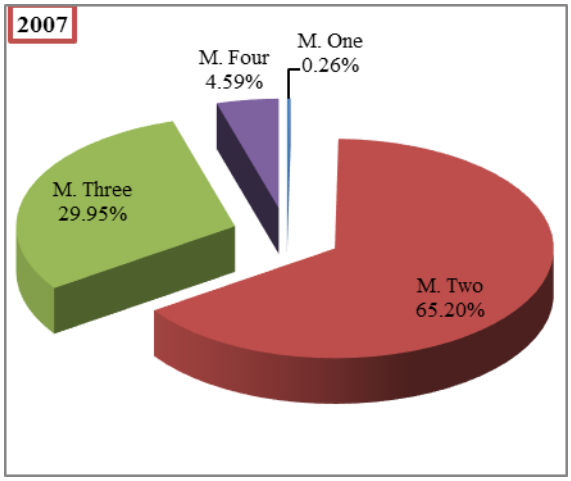

Fig. 1. The share of rice areas by macroregions, in 2007
Source: [9]

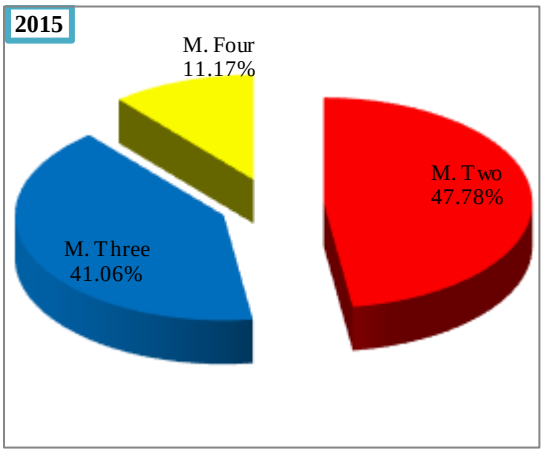

Fig. 2. The share of rice areas by macroregions, in 2015
Source: [9]

Macro-region 2 occupies the highest share of the total area of rice-cultivated land at national level (Fig. 1 and 2).

At the national level, during the analyzed period it was found that in the cereal sector the production increased. This situation is also true for rice production. [1]

The evolution of rice production in Romania for the period 2007-2015 is presented in Table 3.

Rice production in the analyzed period had a differentiated evolution from one year to the next. The smallest production was achieved in 2007 (27,518 tons). On the opposite side, the largest rice production was recorded in 2009 (72,418 tonnes). In 2015, rice production at national level increased by 80.8%, compared to 2007. This increase is explained, on the one hand, by the increase

of the area of land cultivated with rice, and, on the other hand, by the increase of the yield at hectare. More than 99% of production is made in the private sector.

Table 3. Evolution of rice production in Romania, 2007-2015 (tons)

Specification	Year									2015/2010 (%)
	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Total	27,518	48,917	72,418	61,588	65,261	50,862	54,646	45,159	49,773	180.8
Of which: private sector	27,494	48,907	72,377	61,557	65,238	50,842	54,583	45,134	49,738	180.9

Source: [9]; own calculation

The main rice producers in the European Union are: Italy, Spain, Greece, Portugal and France. Romania ranks the sixth place in the top of rice producers in the European Union. [7]

Table 4 presents the evolution of rice production in Romania's macro-regions in 2007-2015. From the data presented, it can be noticed that, in Macroregion 4, in the analyzed range was achieved the smallest rice production. The largest rice production was achieved in Macroregion 2. In 2015, in this macroregion, production increased by 51.9% compared to 2007. Macro-region 3 produced in 2015 33.7% of the national production. According to the data published by the National Institute of Statistics, Macroregion 1 produced rice production in 2007-2010. This production oscillated between 35-95 tons.

Table 4. Production of rice in macroregions of Romania, 2007-2015 (tons)

Specification	Year									2015/2010 (%)
	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Macroregion 2	17,467	31,631	38,094	32,069	27,895	17,998	23,344	21,050	26,547	151,9
Macroregion 3	8,831	10,191	20,467	17,976	23,647	26,265	31,131	19,078	16,778	201,9
Macroregion 4	1,156	7,000	13,778	11,508	13,719	6,599	171	5,031	6,448	557,7

Source: [9]; own calculation

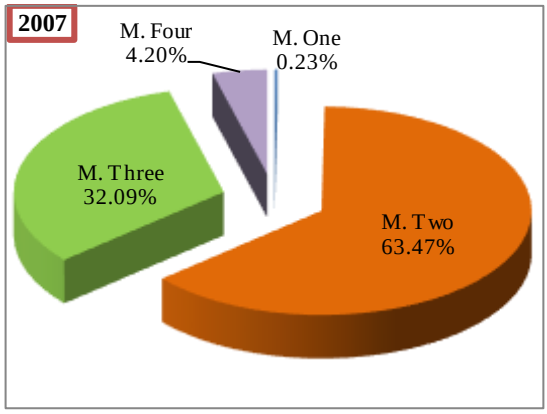

Fig. 3. Share of rice production by macroregions in 2007
Source: [9]

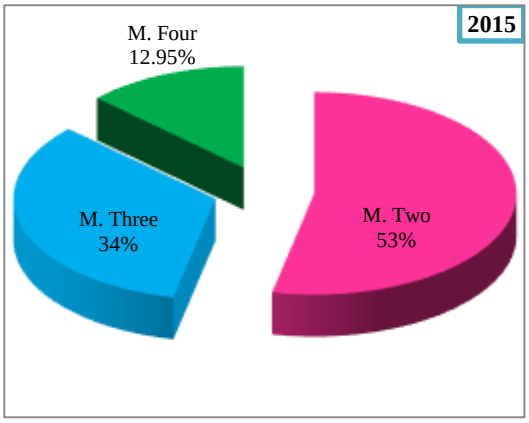

Fig. 4. Share of rice production by macroregions in 2015
Source: [9]

From Figures 3 and 4, it is very easy to see that both in 2007 and in 2015 the largest share of rice production is attributed to Macroregions 2.

Table 5 presents the average output per hectare of rice produced nationwide over the period 2007-2015. At national level, average rice production has fluctuated from one year to the next.

The highest average production was achieved in 2009 (5,426 kg/ha) and the lowest of 3,263 kg/ha (2007). In 2015, average yield per hectare of rice increased by 37.3%, comparing to 2007.

For the same period, the private sector recorded the following values: the highest average yield of rice 5,430 kg / ha (2009) and

the lowest average yield of 3,267 kg/ha (2007).

The average production per hectare of rice produced in Romania is reduced compared to the average yield per hectare in the countries with tradition in rice cultivation.

In terms of average production per hectare, the top places are: Italy, Spain, Portugal, Greece and France. Romania ranks sixth in this ranking. [7]

Table 5. Evolution of average production per hectare of rice at national level in the period (Kg / ha)

Specification	Year									2015/2010 (%)
	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Total	3,263	4,933	5,426	4,966	5,149	4,499	4,581	3,551	4,482	137.3
Of which: private sector	3,267	4,934	5,430	4,967	5,151	4,500	4,579	3,551	4,483	137.2

Source: [9]; own calculation

Table 6 shows the average production per hectare of rice in the macroregions of Romania in 2007-2015. Average production per hectare of rice at macroregional level recorded fluctuations from one year to the next. In 2015, the highest average yield per hectare of rice was recorded in Macroregion 4 (5,200 kg/ha), and the smallest was produced in Macroregion 3 (3,679 kg/ha).

Table 6. Average yield per hectare in macroregions of Romania, in the period 2007-2015 (kg / ha)

	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Macroregion 2	3,176	5,184	5,362	5,145	4,173	3,149	3,300	3,046	5,003
Macroregion 3	3,496	4,450	5,184	4,996	6,587	6,330	6,817	4,078	3,679
Macroregion 4	2,987	4,667	6,056	4,490	5,719	4,583	590	4,452	5,200

Source: [9]

Figure 5 shows the annual average per capita consumption of rice at national level over the period 2007-2015. From the data presented, it is observed that the low consumption of rice was registered in 2010 and 2012 and (3.0 kg / inhabitant), and the highest consumption was of 5.2 kg / inhabitant (2015).

In the sanitized period, the average annual consumption of rice per capita varied from one year to the next.

In 2015, consumption increased by 49% compared to 2007. The average annual consumption of rice per inhabitant in Romania was about 4.0 kg/inhabitant. Compared to other countries in the world, a small amount of rice is consumed in Romania. For example, in Egypt the average annual rice consumption per capita is 50 kg, in China 100 kg and in southern and south-eastern Asia between 120-150 kg. [2]

At European level, in Portugal, the highest annual average consumption recorded per capita is 18 kg. The lowest average annual consumption of rice is recorded in the Baltic countries (2.5 kg / inhabitant). [13]

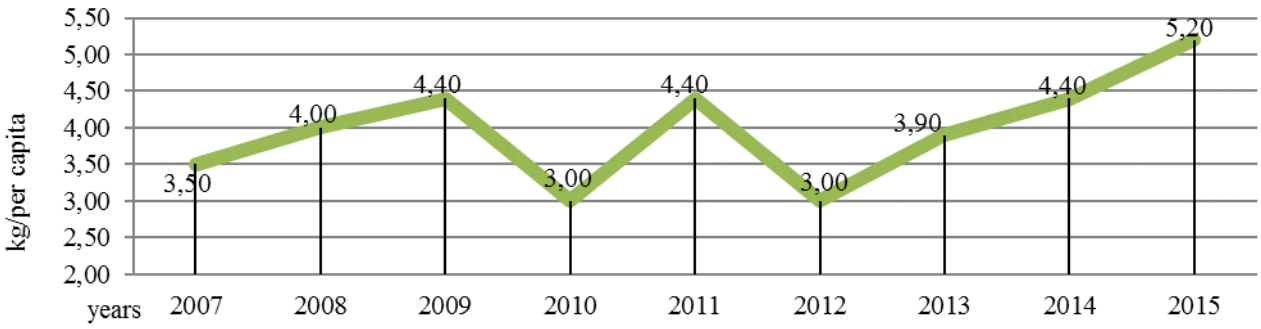

Fig. 5.Dynamics of the annual average consumption of rice per inhabitant at national level, 2007-2015
Source: [9]

Figure 6 shows the price dynamics of rice producers in Romania in the period 2007-2015.

From the data presented, it can easily be noticed that the prices for rice recorded fluctuations from one year to the next.

The lowest price was 770.00 lei/ton (2009), and the highest was 1,320.00 lei/ton (2012). In 2015, prices increased by 89.5% compared to 2007.

Over a period of time, rice has not shown a category of interest, especially on the FMCG market in Romania.

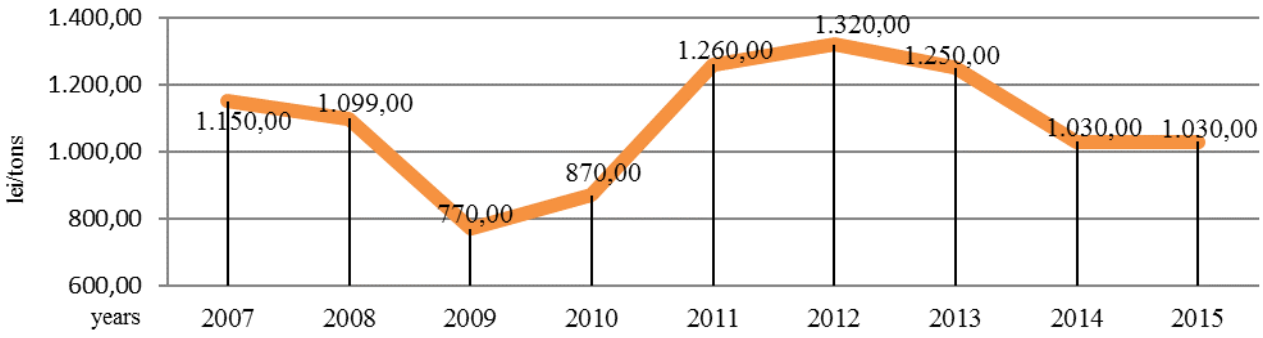

Fig. 6. Dynamics of rice producer prices in Romania, 2007-2015
Source: [9]

As new players entered the market, as well as due to the diversification of the assortments, we witnessed a variety of changes on this market. [11].

Table 7 presents the situation of intra and extra-Community trade in rice during the period 2007-2015.

In 2011, the largest imported rice quantity (114,720.9 tons) was registered, and in 2012 the lowest imported quantity (43,358.0 tons), which corresponds to the highest and the lowest import value.

The imported quantity increased by 6.42% in 2015 compared to 2007.

Table 7. Situation of intra and extra-Community trade in rice during the period 2007-2015

Year	Amount imported (to)	Value of imports (thousands Euros)	Exported quantity (to)	Exports value (thousands Euros)
2007	53,962.3	16,854.2	1,995.4	1,140.9
2008	57,789.2	32,783.7	3,774.1	2,791.1
2009	45,635.8	23,766.7	12,653.6	6,705.3
2010	49,637.8	22,179.2	49,401.8	17,359.9
2011	114,720.9	45,921.7	54,613.5	19,724.6
2012	43,358.0	20,688.6	28,727.0	12,854.8
2013	47,480.4	23,153.4	24,727.2	11,473.2
Year	Amount imported (to)	Value of imports (thousands Euros)	Exported quantity (to)	Exports value (thousands Euros)
2014	54,241.3	27,268.2	15,925.3	10,908.8
2015	57,428.6	30,707.5	11,957.8	9,308.7
2015/2007 (%)	106.42	182.1	599.2	815.9

Source: [10]; own calculations

The lowest exported quantity was recorded in 2007 (1,995.4 tons), with a value of 1,140.9 thousand Euros. The largest exported quantity is in 2011 (54,613.5 tons), with the value of 19,724.6 thousand Euros.

Quantitative rice exports have increased substantially. In 2015, there was an increase of 499.2% compared to 2007. The value of exports increased in 2015 by 715.9% compared to 2007.

CONCLUSIONS

Following the analysis of the rice market at national and macroregional level in 2007-2015, the following were found:

-In 2015, at national level, the area cultivated with rice increased by 31.6% compared to 2007;

-Macro-region 2 occupies the first position on the surface of cultivated rice;

-The most significant rice production was made in 2009 (72,418 tons);
-Macroregion 2 made the largest rice production;
-The Average production per hectare of rice increased by 37.3% in 2015, comparing with 2007;
-Average production per hectare of rice at macroregional level recorded variations from year to year;
-Average annual consumption per inhabitant of rice at national level was approximately 4.0 kg / inhabitant;
-In 2015, producer prices recorded an increase of 89.5% compared to 2007;
-At the national level, in 2011, the largest imported rice (114,720.9 tons) was registered;
-In 2011, the largest quantity of exported rice was recorded (54,613.5 tons), amounting to 19,724.6 thousand Euros.

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INTRA-INDUSTRY TRADE IN AGRICULTURAL AND FOOD PRODUCTS: THE CASE OF MOLDOVA

Liliana CIMPOIES, Cornel COSER

State Agrarian University of Moldova, 44 Mircesti Street, Chisinau, Republic of Moldova, Emails: l.cimpoies@uasm.md, c.coser@uasm.md

Corresponding author: l.cimpoies@uasm.md

Abstract

Among the most discussed issues related to world trade trends in the economic literature belongs to intra-industry trade (IIT). It can be explained as the simultaneous flows of imports and exports of commodities within the same industry group. The paper analyzes the agricultural and food trade of Moldova from different aspects of intra industry trade. The aim is to estimate the trend and extent of intra-industry trade in agricultural and food products of Moldova. The time series from 2001-2015 are examined. The level of intra-industry trade in agricultural and food products for Moldova is quite high (78%). The results of the intra-industrial trade level indicate to a decrease with EU countries and increase in relation with CIS countries. For most commodity groups the GL values present average high variability over time, fact which reflects the structural changes in Moldavian agri-food trade. The values of A indices in both examined periods are very low, fact which indicates that most of changes in trade flows had been inter-industrial by nature and probably have generated high adjustment costs. The switching results of marginal intra-industry trade B index indicate that Moldova's position on these markets considerably improved and strengthened.

Key words**:** *agriculture, intra-industry, marginal intra-industry, trade*

INTRODUCTION

The level of integration in world economy for countries which passed through similar transition period was analyzed by many economists (Bergschimidt 1998; Bonjec 2004; Bonjec 2007) [1,2,3,]. In their works the level of competitiveness of one or another branch or country are established. Other scientists (Levkovich 2007; Luka 2004) [11,12]. analyze how these results were achieved using the advantages of labor division by branches or countries, or if they were obtained as result of the (successful/unsuccessful) transition process.

Among the most discussed issues related to world trade trends in the economic literature belongs to intra-industry trade (IIT). It can be explained as the simultaneous flows of imports and exports of commodities within the same industry group. It emphasizes trade in products that are similar but slightly differentiated based on imperfect competition or close substitutes goods demanded in different countries by consumers with distinct preferences (Luka et al 2004) [11].

In the works of Greenway and Milner (2003) [7]. is emphasized that intra industry trade occurs due to traditional theory of comparative costs which is not explaining the simultaneous exports and imports to a country. When IIT exists, economies face with an additional potential source of gain, larger variety, the exchange scale economies and pro-competition effects (Greenway et al 1983) [6]. It is argued that industries with higher levels of IIT, because of trade liberalization, supports less structural changes and less adjustments costs than those with lower levels (Greenaway et al 2003,Hamilton et al 1991, Kandogan 2003) [7, 9].

The international flows had developed during the last decades. The high developed countries are important exporters and producers, often net producers. In the same time, other countries belonging to the emergent economies have become important exporters of agri-food products (Popescu, 2015) [13]. Importers prefer to buy from the markets where products have the best price for the target market, while exporters choose the market with most advantageous product price

(Dinu, 2012) [5].
Agricultural sector constitutes about 12% of the GDP and together with food industry about 30%. Also, in the agricultural sector is also employed about one third of the labor force.
The paper analyzes the agricultural and food trade of Moldova from different aspects of intra industry trade. The aim is to estimate the trend and extent of intra-industry trade in agricultural and food products of Moldova.

MATERIALS AND METHODS

The most common index used to measure the intra-industry trade is the Grubel-Lloyd (1975) [8] index. To calculate the intra-industry trade level (IIT) for an industry *i* will be:

$$GLIIT_i = \frac{(X_i+M_i)-|X_i-M_i|}{(X_i+M_i)} \times 100 \qquad (1)$$

or, it can be written as:

$$GLIIT_i = (1 - \frac{|X_i-M_i|}{X_i+M_i}) \times 100, \qquad (2)$$

where $GLIIT_i$ is the Grubel Lloyd index of intra-industry trade *i*, X_i and M_i represents the values of exports and imports in industry *i*.
GL index can take values from 0 to 100. When the GLIT value is zero it indicates that there is no IIT (because exports or imports are zero). When the value is equal to zero, then all trade is IIT (exports equals' imports).
There are many limitations for the GL index to include the dynamics of changes in IIT. Thus indicators based on marginal trade flows that could provide reliable conclusions are needed. First attempt to build an index of marginal intra-industry trade was made by Hamilton and Kniest (1991) [9]. They argued that for the purpose of evaluating the adjustment consequences of trade expansion it was important to focus on how IIT changes at the margin. This index effectively calculated the proportion of the changes in exports or imports.
The most used measures of MIIT is A index (a transposition of GL index to trade changes), developed by Brulhart (1994).

$$MIIT = A = 1 - \frac{|(X_t-X_{t-n})-(M_t-M_{t-n})|}{|X_t-X_{t-n}|+|M_t-M_{t-n}|}, \qquad (3)$$

where n represent the number of years of the relevant adjustment period. It can be written as:

$$A = 1 - \frac{|\Delta X-\Delta M|}{|\Delta X|+|\Delta M|} \qquad (4)$$

Similar to GL index, A takes values from 0 to 100. A zero value indicates marginal trade in a particular industry to be completely of inter-industry type, and 100 represents marginal trade to be totally of the inter-industry type. (Greenway and Milner, 1983) [6].
Nevertheless, the A index does not include information concerning the relative trade performance of industries in particular countries. Also, for net exports it reflects trade specialization into or out of particular industries. Thus, Brulhart (1994) [4] proposed the B index:

$$B = \frac{\Delta X-\Delta M}{|\Delta X|+|\Delta M|}, \qquad (5)$$

or $|B| = 1 - A$.
The B coefficient takes values from -100 to 100. The closer the B is to zero, the higher is the MIIT and country's specific sector performance. When B is higher than zero, the change in exports was higher than the change in imports. The opposite is true when B is below zero.
This paper is based on secondary data from the National Bureau of Statistics. The research focuses on Moldova's IIT and MIIT in agricultural and food commodities, analyzing time series from 2001-2015
In the present paper the 24 chapters, according to international nomenclature for the classification of products Harmonized Sections (HS) 2012 in two digits for agricultural and food products were analyzed. They were separated into HS 01-15 agricultural products and chapters HS 16-24 – food products. As well, the IIT trade indicators for agricultural and food products in relation with distinct groups of countries: EU, CIS, OECD and other countries is analyzed.

RESULTS AND DISCUSSIONS

Analyzing the trends in Moldova's foreign trade, during the covered time series period an increasing in value of both exports and

imports is observed. Exports increased with 11% and imports with 13%, the overall trade balance remaining negative. The negative trade balance is mainly due to high imports of energy and gas resources (Table 1).

Agri-food products are main exports commodities having a share of 45% in total exports. Unfortunately, their share diminished during the analyzed period with 18%, fact which affected the agri-food trade balance. Despite agri-food trade balance still remains positive, the amount of agri-food imports increased much more than exports, fact which affects the foreign trade turnover. The average annual growth rate for agri-food exports is 9%, while for agri-food imports reached 13% (Table 1).

Table 1. Value and share of Moldova's external trade and agri-food trade flows, 2001-2015 (selected years)

	2001	2003	2005	2007	2009	2011	2013	2015	Average growth rate
Exports, Thousands USD	565,494	789,933	1,090,919	1,340,050	1,282,981	2,216,815	2,428,303	1,966,837	1.11
Imports, Thousands USD	892,228	1,402,347	2,292,292	3,689,524	3,278,270	5,191,271	5,492,393	3,986,820	1.13
Agri-food exports, Thousands USD	356,857	463,076	582,715	506,210	604,745	917,103	1,015,546	914,488	1.09
Agri-food imports, Thousands USD	143,298	204,589	279,575	465,914	513,583	687,784	783,795	586,576	1.13
Trade balance, Thousands USD	-326,734	-612,414	-1,201,373	-2,349,474	-1,995,289	-2,974,456	-3,064,090	-2,019,983	x
Agri-food trade balance, Thousands USD	213,559	258,487	303,140	40,296.4	91,162.7	229,318	231,749	327,912	x
Share of Agri-Food exports, %	63.10	58.62	53.41	37.77	47.13	41.37	41.82	45.53	X
Share of Agri-Food imports, %	16.06	14.58	12.19	12.62	15.66	13.24	14.27	13.52	x

Source: own calculations based on data from the National Bureau of Statistics

Summarizing the evolution of agri-food trade flows, also an increasing trend is noticed in agri-food exports from 356,857 thousands USD in 2001 to 914,488 thousands USD in 2015. In 2006-2007 a slight decrease in agri-food exports was noticed, as result of Russia's first interdiction on wines, one of the main trade partners for Moldova among CIS countries.

The geographical structure also experienced many changes during the analyzed period. Most of agri-food exports until 2006 were oriented to CIS markets (Table 2). In 2007 the share of Moldavian agri-food exports to CIS countries decreased with 30%. This fact denotes a gradual decrease of Moldova's trade dependence in CIS markets, and closer trade relations with EU and other countries. An important factor was also the accession of Romania and Bulgaria to EU family in 2007 which also strengthen the relations to EU, as Romania is an important trade partner for Moldova. Also, during this period Moldova benefited of various facilities from EU as through General System of Preferences (GSP+) in 2006 and Autonomous Trade Preferences (ATP) in 2008. Preferences were given for alcoholic drinks, sugar and some agricultural products and others. In 2014 Moldova signed a Deep and Comprehensive Free Trade Agreement (DCFTA) with EU that contributes to deeper trade liberalization with EU.

In general, during 2001-2015 agri-food exports of Moldova in relation to EU countries, OECD countries and other

countries increased considerably, but decreased in relation to CIS countries by 13% (related with several interdictions imposed). In agri-food imports geographical distribution changes also occurred. During analyzed time series, had decreased agri-food imports from EU and other countries, but had increased those from CIS countries. The most important EU agri-food importers come from Romania, Germany, France, Greece, Italy, and Netherlands. The average growth rate of agri-food imports increased with 25% in respect to CIS countries and with 12% and 13% with EU and other countries (Table 2).

Table 2. Geographical structure of Moldavian agri-food trade, thousands USD, 2001-2015

Group of countries		Average		
		2001-2015	2001-2007	2008-2015
EU countries	export	229,918.8	116,310	329,326.6
	import	160,409.68	92,226.29	220,070.2
CIS countries	export	342,601.01	320,812.6	361,665.9
	import	199,341.54	101,087.4	285,314
OECD countries	exports	81,156.21	38,378.97	123,933.5
	imports	66,044.05	47,199.53	84,888.59
Other countries	exports	22,759.66	10,097	35,422.33
	imports	26,659.2	16,895.7	36,422.7
World	export	668,546.17	472,124.4	840,415.3
	import	469,221.8	254,429.9	657,164.7

Source: own calculations based on data from the National Bureau of Statistics

Despite the fact that the share of CIS countries decreased it still represent an important market for Moldova's agri-food exports and any negative event or trend related to this market can threat the trade stability in the long run. Also, it does not stimulate and strengthen the diversification of Moldova's trade relations with other countries, particularly the EU. The European market is highly competitive and it imposes strong barriers to enter it in terms of quality and food security which makes it difficult to enter it. Thus a boost in the competitiveness of the exported Moldavian agri-food products is needed, and the full use of the existing potential to increase the trade flows with EU.

Despite a decrease in the last years, the CIS countries still account about 45% from total agri-food exports. From them, an important trade partner remains Russian Federation which registered a growth of only 3% in agri-food exports. It has a share of about 30% in exports and 10% in agri-food imports. It includes mostly vegetable products (about 50%), beverages and other alcoholic drinks (35%). The agri-food exports to Russia decreased for the first time in 2006 after the first imposed interdiction on Moldavian wines and other alcoholic drinks. After signing the DCFTA agreement with EU new sanctions were imposed (on wine and other alcoholic drinks, fruits etc), thus decreasing the agri-food exports in 2014-2015. The second largest trade partners for Moldova among CIS countries are Ukraine and Belarus. The trade flows with both increased with 11% and 13% during this period

Regarding the main export destination of Moldova's agri-food exports among the EU countries, the structure of territorial distribution of exports is stable and the main trading partners among EU partners remains the same. Thus the highest share in both exports and imports belongs to Romania. Other important trade partners are Italy, UK, Germany, Poland, France, Greece and Austria. The share of agri-food export to these countries is 85%. The exports to all mentioned countries expanded, particularly a high increase is observed for Italy and Poland (about 5 folds) followed by Greece (almost 3 folds).

Concerning agri-food imports, the top EU importers are: Romania, Germany, Greece, Italy, France, Hungary and Netherlands accounting 67%.

Most of them traditionally have a positive trade balance. A negative trade balance is reached in relation with Hungary and Netherlands.

The analysis of Moldova' intra-industrial agricultural and food products over 2001-2015 is based on Grubel Lloyd (GL) index, calculated by commodity groups and by all trading partners, with respect to a specific group of countries as: EU, CIS, OECD and others.

According to the results (Table 3) the level of intra-industry trade in agricultural and food products for Moldova is quite high. From total trade in this sector, 78% belongs to the intra-industry type.

Table 3. Grubel Lloyd indices of intra-industry trade in agricultural and food trade between Republic of Moldova and its main trading partners, 2001-2015

Group of countries	2001	2003	2005	2007	2009	2011	2013	2015	Average
EU countries	94.2	91.02	93.3	86.9	87.7	71.3	82.7	60.5	85.03
CIS countries	18.2	40.08	40.3	91.9	86.9	83.5	92.2	96.5	68.4
OECD countries	29.5	92.7	76.9	97.06	92.8	95.4	70.7	60.6	81.6
Other countries	40.9	87.10	87.8	61.6	90.1	99.14	94.4	76.1	79.09
World total	57.3	61.2	64.8	95.8	91.8	85.7	87.12	78.1	78.32

Source: own calculations

During the analyzed time series, the GL index tends to decrease with EU countries and increase in relation with CIS countries. The downward trend for EU countries, regarding exports can be explained as the lack of competitiveness for Moldavian agricultural and food products which make it difficult to access those markets. The upward trend in relation to CIS countries might be caused by the increase of imports from those countries, mainly Ukraine.

The evolution of GL index results by commodity groups is presented in Table 4.

Table 4. Intra industry trade by commodity groups between Moldova and all trading partners, 2001-2015

HS Code	**2001**	**2003**	**2005**	**2007**	**2009**	**2011**	**2013**	**2015**	**Average**
01 Live animals	63.3	35.0	90.5	94.8	37.5	82.5	90.4	89.5	69.4
02 .Meat and edible meat offal	66.8	80.6	11.1	46.2	20.2	82.2	58.3	50.7	51.3
03 Fish and fish products	3.7	2.3	2.9	0.83	1.8	0.3	0.04	0.64	2.1
04 Dairy, eggs; honey etc	25.8	89.2	89.2	50.2	37.1	40.4	38.1	71.6	56.9
05 Products of animal origin	10.6	5.8	6.9	10.7	23.4	18.7	18.8	14.1	13.3
06 Live trees, cut flowers	81.3	15.0	7.7	54.8	13.5	36.7	22.4	23.9	31.2
07 Edible vegetables etc	94.8	27.2	70.9	23.7	28.04	78.4	55.7	52.9	57.02
08 Edible fruit and nuts	37.1	28.8	45.1	47.1	48.5	53.5	49.4	55.4	45.9
09 Coffee, tea, mate	1.0	7.9	18.9	15.2	10.2	5.9	4.1	21.4	11.2
10 Cereals	32.0	79.0	15.3	95.3	24.9	24.5	19.0	21.9	36.5
11 Milling products; malt; starches;	7.5	8.6	9.5	0.54	6.9	15.07	5.1	13.3	7.9
12 Oil seeds, seeds etc	66.7	83.9	58.05	78.2	38.2	19.8	27.1	29.3	49.5
13 Lac; gums, resins	1.7	0	0	7.1	4.05	0.096	0.57	12.5	3.01
14 Vegetable plaiting materials	42.9	77.8	78.5	100	37.5	43.9	68.6	4.6	52.3
15 Animal or vegetable fats etc	53.5	31.9	41.4	44.9	48.09	48.8	81.06	43.9	49.1
16 Preparations of meat, of fish	59.2	84.9	26.1	38.07	8.93	0.49	0.30	0.22	27.1
17 Sugars and sugar confectionery	99.2	76.6	95.09	47.4	58.42	77.5	89.5	50.6	74.1
18 Cocoa and cocoa preparations	26.2	26.4	30.2	19.4	24.2	17.8	35.3	43.4	26.8
19 Preparations of cereals, flour	83.4	45.2	36.9	32.2	37.2	43.3	53.5	57.5	45.8
20 Preparations of vegetables	14.2	25.4	45.2	41.5	57.06	53.5	51.3	50.4	47.04
21 Miscellaneous edible preparations	30.5	21.4	14.1	15.2	10.9	16.03	23.4	24.6	18.2
22 Beverages, spirits and vinegar	14.4	15.0	19.5	52.5	46.18	43.4	46.3	40.0	36.02
23 Residues food industry etc	84.2	54.9	71.5	98.2	69.2	95.7	57.01	76.1	78.7
24 Tobacco etc	75.4	58.0	46.8	37.7	30.1	47.2	50.1	35.0	48.7
01-15 Agricultural products	75.9	86.1	82.8	99.2	81.7	72.2	78.5	67.9	81.0
16-24 Food products	47.7	45.2	54.2	92.8	98.4	96.3	97.1	94.5	78.8
01-24 Total agricultural and food products	57.3	61.2	64.8	95.8	91.8	85.7	87.1	78.1	78.3

Source: own calculations

For some commodity groups the GL values present high variability over time, fact which reflects the structural changes in Moldavian agri-food trade. High and average magnitudes of intra-industry trade presents the following commodities: Live animals (HS01), Meat and edible meat offals (HS02), Dairy, eggs, honey (HS04), Edible vegetable (HS07), Edible fruit and nuts (HS08), Oil seeds (HS12), Vegetable planting materials (HS13), Animal or vegetable fats (HS14), Sugars (HS 17), Preparations of cereals (HS 19), Preparations of vegetables (HS20), Residues food industry (HS23), Tobacco (HS24). Low levels of intra-

industry trade exhibits Fish and fish products (HS03), Products of animal origin (HS 05), Coffee, tea, mate (HS09), Milling products, malt, starches (HS01). The commodities with low levels are mostly imported, mainly exotic products that are not produced in Moldova.

According to Kandogan (2003) [10] intra-industrial trade is more common in sector with significant product differentiation, but in those with standardized products trade tends to be more inter-industrial.

The measure of the extent of intra-industrial trade through changes in GL index, so far do not include potential adjustment costs. Thus, in order to complement the traditional intra-industry analysis we use measures of marginal intra-industry trade (MIIT), which according to Brulhart (1994) [4] is measured through A and B indices.

Table 5 presents the results for A indices for agricultural and food commodities during two time periods 2001-2007 and 2008-2015 of the trade flows with the specific group of countries. The highest share belonged to CIS countries in the first period and lately it decreased to 0.97 in 2008-2015. A decreasing tendency is valid also for EU countries. Also higher shares benefit other countries presenting and increasing tendency.

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In general all values of A indices in both period are very low, fact which indicates that most of changes in trade flows had been inter-industrial by nature and probably have generated high adjustment costs.

Table 5. Marginal intra industry trade in agro-food products of Moldova, by trade partners 2001-2015 (A indices)

Group of countries	2001-2007	2008-2015
EU countries	0.73	0.17
CIS countries	1.96	0.97
OECD countries	0.65	0.91
Other countries	1.18	1.58
World total	1.36	0.27

Source: own calculations

To measure the sectoral trade performance and marginal intra-industry trade, B index is used (Brulhart, 1994) [4]. The analysis of marginal intra industry trade using B index is applied for Moldova's agricultural and food trade with EU countries, CIS countries, OECD countries, and other countries.

From B index results (Table 6), all groups except OECD countries have negative values of B index in the first period indicating that there are more agricultural and food products with low performance.

Contrary during 2008-2015 most groups of countries present positive values for B index.

Table 6. Allocation of Marginal IIT B indices for Moldova's agricultural and food trade by main trade partners, 2001-2015

Group of countries	2001-2007	2008-2015
EU countries	1.01	0.81
CIS countries	-1.56	0.01
OECD countries	0.47	-0.083
Other countries	-0.16	0.58
World total	-0.68	1

Source; own calculations.

It indicates that Moldova's position on these markets improved substantially and strengthened during the second period. Then an increase of Moldavian trade position on the world agricultural markets is observed.

CONCLUSIONS

Moldova's agri-food trade flows experiences important changes during the examined time series. Both Moldova's exports and imports flows increased considerably, while agri-food imports increased faster than exports.

Moldova is a landlocked country, and its geographic position imposes difficulties in terms of costs for trade collaboration with many countries. In the same time close trade relations with neighboring countries are maintained. A strengthen of trade relations with EU was accentuated due to the trade agreements signed, as GSP plus, ATP and the DCFTA.

The level of intra-industry trade in agricultural and food products for Moldova is quite high (78%). The results of the intr-industrial level (GL) indicate a decrease with EU countries and increase in relation with CIS countries. The downward trend for EU countries, regarding exports can be explained as the lack of competitiveness for Moldavian agricultural and food products which make it difficult to access those markets. For most commodity groups the GL values present average high variability over time, fact which reflects the structural changes in Moldavian agri-food trade.

The values of A indices in both examined periods are very low, fact which indicates that most of changes in trade flows had been inter-industrial by nature and probably have generated high adjustment costs. The switching results of marginal intra-industry trade B index from positive to negative values during 2001-2007 and 2008-2015 indicates that Moldova's position on these markets improved substantially and strengthened during the second period. Then an increase of Moldavian trade position on the world agricultural markets is observed.

Trade liberalization has as a positive outcome an increase in the volume of agri-food exports of Moldova, particularly in terms of specialization and concentration of production and diversification of the geographical distribution. Another positive result is the decrease in the dependence on traditional markets. This fact imposed the increase in both quality and variety of exported articles. It is important to maintain the positions in relation with the main trading partners and to gather new market shares.

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CONSIDERATIONS ON THE CLIMATE CHARACTERIZATION OF THE AGRICULTURAL YEAR 2011 – 2012 FOR THE MAIZE CROP IN THE CENTRAL BĂRĂGAN PLAIN

Dana Maria (OPREA) CONSTANTIN, Elena BOGAN, Elena GRIGORE, Marina Aurelia ANTONESCU

University of Bucharest, Faculty of Geography, 1 Nicolae Bălcescu Avenue, 010041, district 1, Bucharest, Romania, Email: danamartines@yahoo.com

Corresponding author: danamartines@yahoo.com

Abstract

The maize is a culture of strategic importance for a country's agriculture. The productivity of the maize crop has significant fluctuations from year to year because of the climate variability, but mostly because of the occurrence of extreme weather events. The aim of this paper is to analyze and correlate the agro-climatic resources with the agro-cultural production from the agricultural year 2011 – 2012, in the context of the present and predicted climate changes. The study area is the Central Bărăgan Plain. This area is located in a zone where dryness and drought phenomena are produced and are growing in frequency from the West and South-West to the East and North-East, in accordance with the degree of dryness. Taking into account the precipitation amounts, the agricultural year 2011 – 2012 was a year with a dry pluviometric regime. Therefore, the vegetation stage of the maize crop was medium and weak, in general, resulting an average maize production per hectare lower than in the previous years. Knowing the climate conditions and their impact on the main components of an agricultural system, of the level of yields and quality of the crops provides the possibility to reduce losses by respecting the adequate agricultural technologies.

Key words**:** *agricultural year, the Central Bărăgan Plain, hydric resources, maize, thermic resources*

INTRODUCTION

The climate is the main factor which influences the productivity of the agricultural systems. The crop is the result of the complex action among the plant, soil nutrients and the climatic, genetic, phyto-sanitary and technological factors (Ştefan Marcela, 2003) [11].

In order toachieve the agricultural management strategies, there should be included the assessment and climate data analysis because all the agro-climatic conditions of an agricultural year determines the crop value of a particular culture (Povară Rodica, 2000) [8]. In Romania, the winter wheat and maize are crops of strategic importance, which present significant fluctuations from year to year due to the variability (Mateescu Elena et al., 2004) [6].

The maize, by the achieved hybrids, is grown in the world, in the most varied climatic and soil conditions, being a plant with high requirements to different temperature and moisture throughout the growing season (Sandu I. et al., 2010). The climate analysis on the state of vegetation and the maize yields will be made for the agricultural year 2011 – 2012. In this agricultural year, there have been eight dry months, November being the driest month between 1961 to 2014, while July is the second of the first fifth driest months for the period 1961 – 2012, also being the hottest month of the last 53 years in Romania, with a positive deviation of 4.5 °C (NAM, 2014). There will be analysed the thermic and hydric resources from the air and from the ground surface for maize in the Central Bărăgan Plain. The Central Bărăgan Plain or the Ialomiţa Bărăgan Plain represents the central part of the Bărăgan Plain, being bordered by the Ialomiţa river and Călmăţui river, while the Eastern limit is given by the lower terrace head of the Danube river (Figure 1). The plain has a river-lake origin, with altitudes which decrease from 100 m at the West to 20 m at East and with fertile soils, being particularly favorable for the agricultural crops (Geography of Romania, 2005) [12]. Before 1990, about 86% of the

arable land was irrigated, most of the irrigation system being destroyed or left to degradation so that in 2010, only 6.9% of the agricultural land is equipped with an irrigation system (Sima Mihaela et al., 2015) [10].

MATERIALS AND METHODS

The climate analysis of the agricultural year 2011 – 2012 upon the state of vegetation and maize yield in the Central Bărăgan Plain will be based on the climate data from the meteorological stations Urziceni, Slobozia and Griviţa, the agro-meteorological information from the National Administration of Meteorology (NAM) and the production data from the Ialomiţa Department of Agriculture. The methods used in the data analysis are classical, of logical, space, comparative analysis, complemented by the modern ones as operations of GIS and graphics achieved with statistics software analysis of Microsoft Office Excel. We added to these, the references research and the field observations. Geographically, the three meteorological stations are considered representative for the Central Bărăgan Plain area (Fig. 1).

Fig. 1. The geographical localization of the Central Bărăgan Plain in Romania (up) and of the meteorological stations (down)
Source: own processing from www.google.ro

RESULTS AND DISCUSSIONS

Throughout the growing season, the maize presents different requirements to climatic conditions, with maximum values in the critic consumption stage which corresponds to July-August, when the phases of vegetation are produced: flowering, fecundation, grain filling and maturing of the maize plant in milk, wax and full. The main factors with a role in the growth, development and productivity of maize are: air temperature, surface soil temperature, precipitations and the air humidity.

The air temperature influences all the stages of the plant growth and development, but also the processes of photosynthesis, respiration and transpiration (Cofas Elena et al., 2014) [5].

For the agricultural year 2011 – 2012 in the Central Bărăgan Plain, the annual average temperature was 11.7 °C (Figure 2). In Figure 2, it can be observed the annual regimes of the air temperature for all the three meteorological stations, being represented by the highest monthly average values recorded. The annual average temperature fluctuated between 11.7 °C at the station Griviţa and 12 °C at the station Urziceni, being higher than the climatological normal for this area, of 10 – 11°C (NAM, 2008) [14].

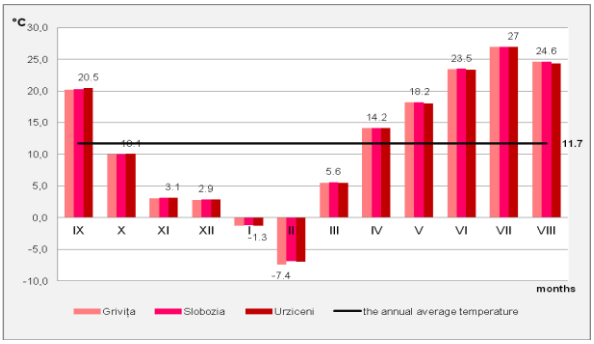

Fig. 2. The annual regime of the air temperature (°C) at the meteorological stations in the Central Bărăgan Plain, in the agricultural year 2011 – 2012
Source: processed data after NAM, 2016 [14]

The monthly averages have ranged between -7.4 °C for February at the station Griviţa and 27 °C for July at the station Urziceni (Figure 2). In the critical period of maize, the air temperature was of maximum 34.5 °C in July and of 32.5 °C August at Griviţa; 38 °C in July and 41 °C in August at Slobozia and 34.3 °C in July and 32.3 °C in August at Urziceni. These values have exceeded the maximum critical of 30 °C, comparing to the air temperature requirements in the critical

period of maize (Berbecel O. et al., 1970) [3]. The minimum threshold of 10 °C for July was not achieved at any meteorological station in the Central Bărăgan Plain, the minimum air temperature being 19.1 °C at Urziceni, 15.5 °C at Slobozia and 18.8 °C at Griviţa. Instead, the minimum threshold of 16 °C was reached on August at the station Slobozia, where the minimum temperature reached 11 °C. At the other stations, the minimum temperature was 17.1 °C at Griviţa and 17.2 °C at Urziceni.

The surface soil temperature has a significant importance in achieving the maize crop, affecting the root growth, the increase of the aerial parts and the completion phases of vegetation. Soil temperatures less than 16 °C do not mature the maize and the roots develop best at a temperature of 24 °C (Sandu I. et al., 2010) [9]. In the Central Bărăgan Plain, the average soil surface temperature was 14.1 °C, for the agricultural year 2011 – 2012 (Figure 3). In Figure 3, there are represented the annual regimes of the surface soil temperatures at the three meteorological stations, being shown the greatest values of the monthly average temperatures. The annual average temperature at the soil surface was 13.9 °C at Urziceni, 14.1 °C at Griviţa and 14.2 °C at Slobozia.

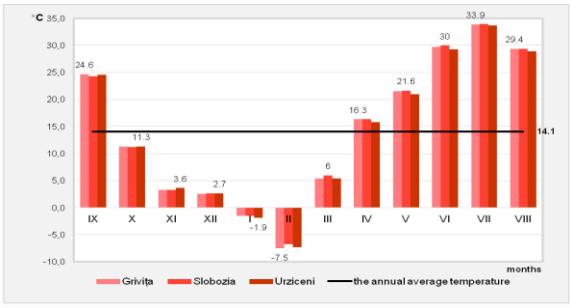

Fig. 3. The annual regime of the surface soil temperature (°C) at the meteorological stations in the Central Bărăgan Plain, in the agricultural year 2011 – 2012
Source: processed data after NAM, 2016 [14]

In April, corresponding to the period of sowing, the average temperature at the soil surface oscillated between 15.8 °C at the station Urziceni and 16.3 °C at the stations Slobozia and Griviţa. In August, when the maize reaches maturity, upper air organs develop best in soil temperatures of 28 °C. In this month, the recorded values varied between 28.9 °C at Urziceni and 29.4 °C at Slobozia and Griviţa. Due to the plasticity of the maize crop, this plant can be considered resistant to drought in relation to the relative humidity requirements. The water requirement of maize is directly proportional to the development of the plant, so that the maximum consumption is recorded in the phases of earing, fecundation and corn grain formation.

The relative air humidity influences the vital processes of the plants such as: sweating, pollination, flowering and fructification. In the Central Bărăgan Plain, the annual average relative humidity for the agricultural year 2011 – 2012, was 72.9%, ranging between 70.9% at Urziceni to 74.0% at Slobozia (Fig. 4).

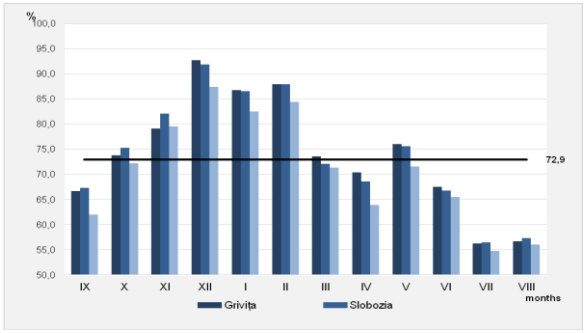

Fig. 4. The annual regime of the relative air humidity (%) at the meteorological stations in the Central Bărăgan Plain, in the agricultural year 2011 – 2012
Source: processed data after NAM, 2016 [14]

Precipitations provides the crop not only by the annual rainfall amount, but by their allocation during the growing season of the maize. The annual amount of precipitation in the Bărăgan Plain is 464.7 mm for the agricultural year 2011 – 2012, varying between 421.6 mm at Griviţa, 438.7 mm at Slobozia and 534.0 mm at Urziceni (Figure 5).

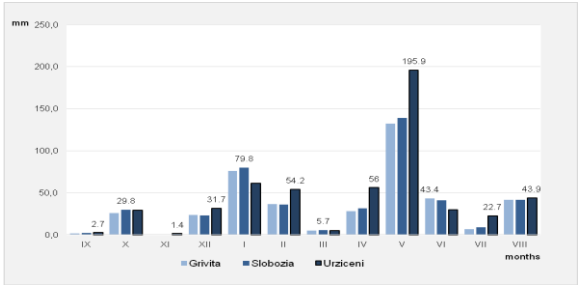

Fig. 5. The annual regime of the precipitations (mm) at the meteorological stations in the Central Bărăgan Plain, in the agricultural year 2011 – 2012
Source: processed data after NAM, 2016 [14]

In Figure 5, there are presented the annual precipitation regimes at the three stations in the Central Bărăgan Plain, the values showing the biggest monthly average values.The optimal and critic limits of the precipitations on intervals specific to the maize crop are presented in Tabel 1.

Table 1. The optimum/critical limits rainfall on maize crop characteristic intervals

time period	optimum	Rainfall (mm) in the agricultur year 2011 – 2012	meaning
IV	41 – 60	34.8	moderate draughty
V – VI	151 – 200	193.7	optimum
VII – VIII	151 – 200	55.1	extremely draughty
V – VIII	301 – 400	248.8	moderate draughty
IX – VIII	601 – 700	464.7	moderate draughty

Processed data after NAM, 2016 [14]

The moisture reserve in the soil profile of 0 – 100 cm, in non-irrigated maize crop has registered particularly low values (Co-600 m^3/ha), the pedological drought being extreme and strong in July (NAM, 2013). The soil moisture deficit continued in August.

By analyzing the climate data from the three meteorological stations, one can notice the continental climate character of the climate in the Central Bărăgan Plain, the annual average values of the various climatic parameters indicating a relative uniformity in their distribution. The extreme values highlight the major non-periodic variations of the climate in this territory (Bogdan Octavia, 1980) [4]. Also in the context of the climate changes, based on the climate scenarios predicted, the maize yields fall because of the higher air temperature and water stress, which shorten the growing season (Mateescu Elena and Alexandru D., 2010) [7].

CONCLUSIONS

The agricultural year 2011 – 2012 was characterized by an air temperature higher than normal and by a water stress, both in the air and in the soil, which had negative complex consequences on the state of vegetation and maize crop such as: forcing the stage of the maize plants; the drying, the rolling of the leaves and the partial or total drying of the leaves; delays up to 10 – 15 days between the emergence of tasseling and the forming of cobs and the incomplete or sterile formation of the cobs.

In this climate context of the agricultural year 2011 – 2012, on the territory of the Central Bărăgan Plain, the average maize production was 3,175.6 kg/ha, with 1,788.1 kg/ha less than in 2011 (DAJIL, 2016) [13].

Knowing the climate information is a necessity in agriculture, being an instrument useful in order to ensure the satisfactory yields, year by year, only if the cultivation technology is respected.

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SUSTAINABLE PRODUCTION AND CONSUMPTION IN ROMANIA

Georgiana Melania COSTAICHE, Ioana NICULAE

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Mobile:+40744 6474 10, Emails:melania.sanda@yahoo.com, niculae.ioana@yahoo.com

Corresponding author: melania.sanda@yahoo.com

Abstract

The purpose of this study is to assess the situation of sustainable production and consumption in Romania in the period 2007-2015 based on the indicator resource productivity. Production and consumption of goods and services, generate better quality of life through the increased economic development, but creates pressure on the environment in the form of natural resource consumption and those residues that cannot be used, called waste. The study was made based on the statistical data available online, at Eurostat.eu. Data refer to a period of 8 years, from 2007 to 2015. At European level sustainable production and consumption are assessed using the indicator, resource productivity, calculated as ratio between gross domestic product and consumption of raw materials. Resource productivity is an indicator of macroeconomic efficiency, relevant to sustainable development and saving it material resources, its growth trajectory pointing a progress on sustainable development and a decrease rather a setback. The value of resource productivity in Romania in analyzed period has been an oscillatory evolution and it should be kept consideration that this indicator is dependent on the economy. For a sustainable production and consumption it is necessary to have a continuous increase of resource productivity, to avoid stagnation and syncope at the macroeconomic level.

Key words**:** *consumption, production, resource productivity, Romania, sustainable*

INTRODUCTION

The society we live in nowadays is based on economic growth and development. Consequently, any country's main objective is economic growth and development. The economic activities should take into account the principles of sustainable development, so it need to ensure economic growth, environmental protection and social equity.

The term of sustainable development (sustainable) is used from the early 80 at the International Conference on Environmental Conservation, was launched with the publication of the Brundtland Report of the World Commission on Environment from1987.

In this report sustainable development is definition like "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".[8]

Sustainable development it was meant to be a solution to the ecological crisis caused by industrial exploitation of resources and environmental degradation, but the concept was extended to the quality of life from the economic and social point.

Sustainable development was the focus of the Lisbon Strategy, adopted by EU countries in 2000 which wanted until 2010 to transform the European economy into "the most dynamic and competitive economy in the world, based on knowledge, capable of sustainable development, with greater social cohesion and who is environmentally friendly" [1]

Sustainable development requires a multidimensional approach that takes into account at least three dimensions: economic, social and environmental.

Sustainable development is meant to be, by definition, a human development; achievable through the human will and that aim for their individual and collective good.[3]

Production and consumption of goods and services, generate better quality of life through the increased economic development, but creates pressure on the environment in the form of natural resource consumption and

those residues that cannot be used, called waste.

According to the World Business Council for Sustainable Development in 2008, sustainable consumption involves "the use of goods and services that satisfy basic needs and achieve a better quality of life, while minimizing the consumption of natural resources, generation of toxic materials and the emission of waste and pollutants during the life cycle, so as to exclude any risk inability to meet the needs of future generations.

Reorientation of national and international environmental agendas for sustainable production and consumption problem is caused by the negative environmental impact of industrial and agricultural activities, and increasing energy consumption, problems in water supply and waste management.[4]

Economic growth and gross domestic product of countries developing generates increasing social pressure on demand for goods and services, so the concept of sustainable consumption concerns several levels like: meeting basic needs, improving quality of life, increase resource efficiency, growth use of renewable energy sources, minimizing waste etc.[4]

Romania as a EU member state, has developed the National Strategy for Sustainable Development of Romania Horizons 2012-2020-2030 in order to fulfill its obligations under the Treaty of Accession.

According to the National Strategy for Sustainable Development of Romania the general objective of the European Union in terms of sustainable consumption and production is the promotion of sustainable consumption and production practices.

National objectives for sustainable consumption and production are: [7]

Horizons 2013: Managing the eco-efficient consumption of resources and to maximize its by promoting a model of consumption and production that makes sustainable economic growth and long-term gradual approximation of the average performance of EU countries.

Horizons 2020: Decoupling economic growth from environmental degradation by reversing the ratio between resource consumption and create added value and closer to the average EU performance of sustainable consumption and production.

Horizons 2030: Approaching the average level achieved at the time of the EU countries in terms of sustainable production and consumption.

Considering that sustainable development is a complex process, its monitoring system involves the use of common indicators and a system of indicators that vary from country to country.

Common systems of indicators of sustainable development, adopted by consensus at the international level (UN, OECD, EU, etc.) are grouped into the three pillars of sustainable development like: economic pillar, the social pillar and the environmental pillar.

The purpose of this study is to assess the situation of sustainable production and consumption in Romania in the period 2007-2015 based on the indicator resource productivity.

MATERIALS AND METHODS

The study was made based on the statistical data available online, at Eurostat.eu. Data refer to a period of 8 years, from 2007 to 2015. The analysis methods used were: comparison method, index method.

Based on the comparison method, the events are compared in time and space.

Because indicators effectively show the evolution of a phenomenon, and also the annual increase rates[2], they were used for gross domestic product (GDP), domestic material consumption (DMC) and resource productivity.

At European level sustainable production and consumption are assessed using the indicator, resource productivity, calculated as ratio between gross domestic product and consumption of raw materials.

National indicator system for evaluating sustainable production and consumption are more numerous and includes 22 indicators. Besides the resource productivity are included indicators such as: municipal waste deposited, the degree of recycling of waste, electricity consumption, average consumption of meat, livestock density index etc.

Resource productivity is gross domestic

product (GDP) divided by domestic material consumption (DMC).
DMC measures the total amount of materials directly used by an economy. It is defined as the annual quantity of raw materials extracted from the domestic territory of the focal economy, plus all physical imports minus all physical exports. It is important to note that the term 'consumption', as used in DMC, denotes apparent consumption and not final consumption. DMC does not include upstream flows related to imports and exports of raw materials and products originating outside of the focal economy.[5]

RESULTS AND DISCUSSIONS

Sustainable production and consumption is one of the objectives of the National Strategy for Sustainable Development of Romania.
To achieve this objective at national level are using 22 indicators, but resource productivity is the most relevant indicator of sustainable production and consumption. So in this paper I decided to analyze only resource productivity.
Resource productivity is an indicator of macroeconomic efficiency, relevant to sustainable development and saving it material resources, its growth trajectory pointing a progress on sustainable development and a decrease rather a setback.
At EU level 28 resource productivity in 2007 was equivalent to 1.58 euros per kg and has grown to 2.00 equivalent per kg, according of figure 1, which shows an increase of 26.5%.
It may be noted that resource productivity in Romania in 2007 was equivalent to 0.30 euros per kg (figure 1), being on the penultimate place, ahead of Bulgaria, according to data from Eurostat. The country with the highest value of resource productivity, according to Eurostat, in 2007 was the Netherlands.
In 2015 in Romania increased resource productivity equivalent to 0.31 euro per kg, being also on the penultimate place, ahead of Bulgaria. The first place in terms of resource productivity in 2015 according to Eurostat, was the UK.
The highest value of resource productivity in Romania was registered in 2014 and was equivalent to 0.33 Euros per kg.
According to Table 1, in Romania compared to 2007 the highest growth of resource productivity was in 2010, with an increase of 10%, and according to Table 2, the highest growth was recorded in 2009 compared to 2008 by 18.3%.

Fig.1 Resource productivity in Romania and European Union
Source: eurostat.eu

Table 1. The evolution of resource productivity (%)

Specification	2008	2009	2010	2011	2012	2013	2014	2015
Romania	84.5	99.9	107.3	96.4	99.6	102.5	110.8	104.5
EU	101.4	109.9	115.6	113.1	121.3	124.5	124.7	126.9

Source: Own calculations based on Eurostat.eu

Table 2. The evolution of resource productivity (%)

Specification	2008/ 2007	2009 /2008	2010/ 2009	2011/ 2010	2012/ 2011	2013/ 2012	2014/ 2013	2015/ 2014
Romania	84.5	118.3	107.5	89.8	103.3	102.9	108.1	94.3
EU	101.4	108.4	105.1	97.9	107.2	102.6	100.2	101.7

Source: Own calculations based on Eurostat.eu

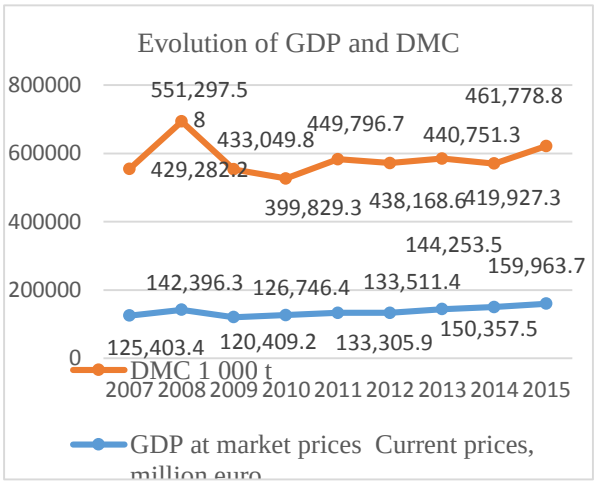

Fig.2. Evolution of GDP and DMC in Romania
Source: Eurostat.eu

Considering that this indicator is calculated by dividing the GDP to DMC, it is important to analyze the evolution of these indicators order to be able to identify the causes that result for low productivity of resources.

Romania's GDP recorded an increase compared to 2007 of 27.5% in 2015, but in 2009 compared to 2008 is a decrease by 15.5%. This negative impact on GDP was due to the financial and economic crisis which started in 2008.

Domestic material consumption in Romania increased by 7.6% in 2015 compared to 2007. This increase is an unwanted effect given that the effectiveness of the activity is necessary to reduce domestic material consumption. For efficiently use of material resources must be used modern technologies. The use of these technologies implies a reduction of consumption non-renewable energy, getting a smaller quantity of waste that pollute the environment as little as possible.

The evolution not so favorable for resource productivity at national level can be caused by a complex of factors among which we can mention: price increase of raw materials and materials, low added value products, diminished recovery of the economy, non-use of eco-technologies, appearance the economic crisis which led to a decrease of GDP.

CONCLUSIONS

The value of resource productivity in Romania in analyzed period has been an oscillatory evolution and it should be kept consideration that this indicator is dependent on the economy.

For a sustainable production and consumption it is necessary to have a continuous increase of resource productivity, to avoid stagnation and syncope at the macroeconomic level.

Should not be lost sight of that increase of resource efficiency in Europe is a means by which the objectives of economic policy, social and environmental development can achieve easier, safer and with lower costs. Improving resource efficiency will sustain the economic health of key sectors such as agriculture, forestry and fisheries. EU industries that use their products based on the surfaces / quantities available of the land, the soil, the water and biodiversity, so a higher efficiency will bring greater benefits.[7]

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IDENTIFICATION OF LEADERSHIP STYLES, WITHIN THE LOCAL PUBLIC ADMINISTRATION. CASE STUDY

Daniela CREȚU, Andrei Radu IOVA, Elena LASCĂR

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Emails: danielacretu5@yahoo.com, andrei_anglia@yahoo.com, elenalascar@yahoo.co.uk

Corresponding author: danielacretu5@yahoo.com

Abstract

The research recorded the respondents' opinions and attitudes within the local public administration in Călăraşi county, on the identification of the specific leadership skills and behaviors. The research method used was the survey, having as a research tool a semi-standardized questionnaire, with a total of 12 questions applied to 209 persons within the 37 town halls in Călăraşi county. It is found out that the persons with secondary education perceive the leaders within the organization as having an authoritarian leadership style, while the persons with higher education perceive the leaders as having a collaborative/participatory leadership style. Also, depending on the sector in which it operates, the employees of the public administration institutions in the rural areas tend to practice an authoritarian leadership style, while the employees of the town halls in the urban area tend to a collaborative leadership style. The two aspects correlate, as in the town halls in the rural area, most employees and local councelors have only secondary education, while in the urban area the situation is changing in favor of the employees with higher education. After processing the data it was found out that in terms of leadership style existent in the public administration in Călăraşi county the collaborative style prevails by a majority of 56.3%, facilitative style 9.3% and 34.4% the authoritarian style.

Key words**:** *public administration, management, leader, leadership, style*

INTRODUCTION

Leadership is a complex phenomenon that reaches nearly all organizational, social and personal processes. It depends on a process of influence, where people are inspired to achieve certain objectives by personal motivation. "... **Leadership is like the Abominable Snowman, whose steps are everywhere, but is nowhere to be seen**" (Bennis and Nanus, 2000) [1]. Leadership means to rise above the vision of a man, to take performance of a man to a higher standard, to build the personality of a man beyond his limits (Maxwell, J., 2010) [5].

Leadership involves really like management, managing the subordinates activity, the responsibility towards them and directing them towards reaching the objectives. A good leadership matters also for developing the managerial spirit in the public administration because it can transform organizations and it can have a positive impact on the lives of thousands of persons.

Indeed, leadership is not easy to be learned, but which valuable thing is simple? A good leader is formed, not born, he grows over time, it passes through a continuous process of education, training, experience and self-evaluation. (Tichy M. Noel, Cohen Eli , 2000) [6]. Leadership concerns, more than almost anything else, how a person (in this case the head of a department or organization) influences on others (subordinates, colleagues, team) to achieve an objective, directing the group he coordinates so that its actions are consistent and to be a closer cohesion among its members.

The present study is an analysis of the main components of leadership in the department in which the respondent works. The data obtained were processed statistically, ensuring the confidentiality of the information and the processing results are available for the participants in the research. The research focused on achieving a typology of leadership practiced within the local public administration in Călăraşi county.

MATERIALS AND METHODS

The research recorded the respondents' opinions and attitudes within the local public administration in Călăraşi county, on the identification of the specific leadership skills and behaviors, namely: communication within the institution; forming a team that will lead to the successful achievement of the objectives; encouraging the team in making decisions; tasks performing and organizing time effectively; changes perceptions and improving the performances and behaviors; transformation of complex projects in individual tasks, easy to follow; conflict management. The purpose of this research - to identify the characteristics of leader in the studied institutions, to observe how leader type influences the team performance and how leader perceives his colleagues and the team he belongs to.

The research method used in this study was the survey, having as research tool a semi-standardized questionnaire, with a total of 12 questions applied to 209 persons within the 37 town halls in Călăraşi county, including the operative management of town hall: mayor, vice-mayors, general manager, general secretary. Each interviewee had to choose one of three possible answers for each of the 9 questions noted by a, b or c. Three questions were of identification. Each question has three possible answers, which is given a number of points.

A score between 31-36 points represents facilitative style, between 19-30 points collaborative style and between 12-18 points is leadership style is defined as authoritarian (controlling) one.

The results obtained following the interpretation of this set of data set led to a set of conclusions on establishing a typology of leadership practiced within the local public administration in Călăraşi county.

In order to collect information and to achieve the proposed objectives it went to the method of direct survey method, face to face, to the place of work of those questioned.

RESULTS AND DISCUSSIONS

With a total surface of 5,088 square meters, representing 2.1% of the country surface, Călăraşi county ranks 28th place as size among the counties of the country. It borders to the North with Ialomita county, to the South-East with Constanta county, to the West with Giurgiu county and Ilfov county and to the South with Bulgaria. Calarasi county was established in 1981, the administrative organization of the territory, on 31st December 2007, being the following: 2 municipalities - Calarasi and Oltenita; 3 towns - Budesti, Fundulea, Lehliu Gara; 50 communes; 160 villages, including those belonging to the towns (South Muntenia Regional Development Agency, 2013) [9].

It was tried a fair sampling of the groups of respondents by age (Figure 1) and studies (Figure 2) so that the results to be conclusive

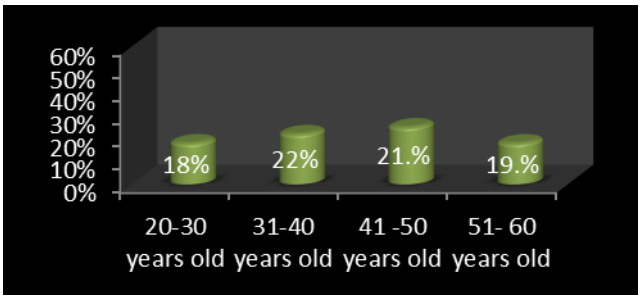

Fig. 1. The respondents' age

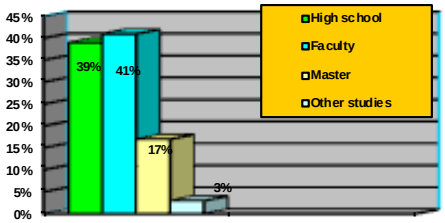

Figure 2. Level of the respondents studies

Presentation of the questionnaire and obtained results/questions.

At the question, when I discuss a difficult problem with my team, the answer options were: **a.**I express my opinion and I provide a solution; b.I listen first to the others' opinions and I suggest a solution of mutual agreement; c.I ask for people's opinion and I summarize what I heard (Fig. 3.)

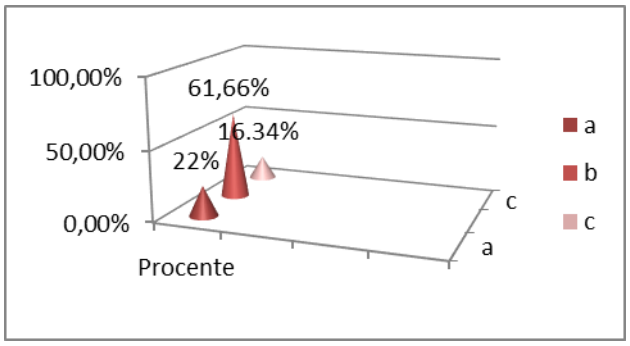

Fig. 3. Quantification of the answers obtained

The question, if the subordinates do not come to the established meetings, the options were: a.27%, I call them all providing them some motivations to participate, and ask them what should happen; b.55% I go to each team member and ask him solutions how he would improve his participations in the meetings, then decide what to do; c.18% I send a note to all team members and I tell them that the participation in the meetings is mandatory.

At the question, in a meeting with my team I feel the best when: a. 73% answered that they listen, ask questions and collect solutions from the team; b. 11% present something or somebody presents something; 16% allow someone else to lead the meeting, and they participate as team members.

At the question, in order to be sure that the subordinates follow the correct objectives: a. 23% collaborates with the team in order to determine which will be the objectives; b. 32% presents to the team the objectives received from top management and allow the team to arrange objectives; c. 45% communicate the objectives which the team wants to achieve in accordance with those received from top management.

At the question, when I participate in a meeting: a. 25% answered, I state with determination my opinions; b) 39%, I am able to present both my opinions and the group opinions; c) 36%, I am able to use the others' ideas in order to find new solutions to problems.

The statement, when I chair a brainstorming, had as answer options: a. I like to remain neutral while the rest come up with ideas; b. I am very tempted and I abstain hardly to interfere with own ideas; c.I provide an occasional input and then retire in the neutral zone (Fig. 4).

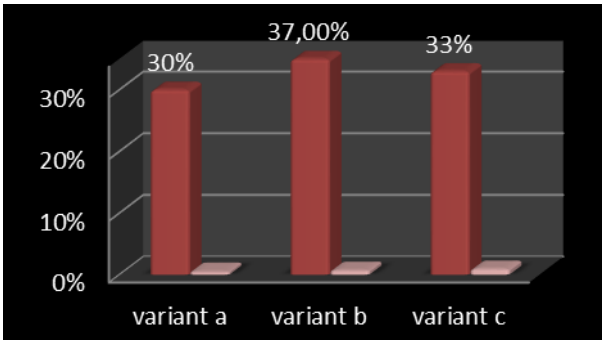

Fig. 4. Obtained results

At the question, when the team reach a conclusion I do not agree to: a) 26% say to the group that they agree to the respective conclusion; b) 56% asks the team to analyze again the facts based on some arguments they present; c) 18% agree to the conclusion and decision even they do not agree 100%.

At the question, when I know very well a problem that the team faces to: a) 35%, help the team to find the solution but remain neutral and interfere only if it is needed; b) 37%, allow someone else to chair the discussion and act as an usual member; c) 28% influence the team with the approach and with the recommendations while they chair the discussion.

Presentation of the analyzed leadership styles

We cannot talk about a recipe that leaders follow. In some cases, depending on the unpredictability of some circumstances, leaders must show flexibility in adapting to a different style of leadership to the one that he shows constantly.

Participatory/collaborative leadership style. Although participatory leaders make the final decision when it is about a project, they include the team members in the decision. They encourage the creativity and their employees are often involved in the team projects. There are a number of advantages of the participatory leader (Zlate, 2004) [7]. Their employees have a high degree of satisfaction in the work place and they are productive because they can involve in the group decisions. They feel that they control their own destiny, so they are motivated to

work for more than the financial reward. Because participation takes time, this approach is often seen in long-term tasks, but the result is generally positive. The disadvantages of this type of leadership are that sometimes the participatory management can hinder situations where speed and efficiency are essential (Cretu D., et al. 2010) [2]. For example, during a crisis, the team may lose time to listen to the opinions of each participant. Another disadvantage is that not all team members can provide satisfactory support every time.

The facilitative leadership style. Facultative leaders calls in most cases the solutions proposed by the team, but they follow the rules strictly and they ensure that their employees follow each procedure accurately. This is the most appropriate leadership style when the work place implies a high risk factor (Zlate, 2004) [7]. In most cases, leaders assume this position because of their ability to comply with the rules and to support them strongly and less because of their qualifications or performance. This causes resentment when their team members do not appreciate the advice. They are efficient in motivating others to come up with ideas but there are certain situations when the team needs to be more authoritarian or collaborative, where appropriate, especially when it is directly involved in making a decision or when it has the best technical expertise of all team members (Cretu D., et al. 2010) [2].

The authoritarian leadership style. It is an extreme form of facilitative leadership style, noting that in this case the leaders have complete power over their employees. The staff and team members rarely have the opportunity to make suggestions or to talk about a task, even if they would be in the interest of the organization. The biggest advantage is that leadership style proves incredibly efficient (Tannenbaum, R and Warren H. Schmidt, 2009) [8]. The decisions are made rapidly, and the work is done easily. The biggest disadvantage consists of the fact that few people will be treated in this way by their boss. So, where we meet this leadership style, we find also a series of twist of situations related to absent and rapid resignations. However, the style proves useful for the routine works.

Interpretation of the questionnaire.

If 31-36 points were obtained **the style is facilitative** (Mc Gregor, D., 2008) [4]. The Leader uses in most cases the solutions proposed by the team, he even allows the team to make decisions. He is efficient in motivating others to come up with ideas but he should not forget that there are certain situations when the team needs to be more authoritarian or collaborative, where appropriate, especially when he is directly involved in making a decision or when he has the best technical expertise of all team members.

If the score is between 19-30 points **the leader is collaborative** (Mc Gregor, D., 2008) [4]. He tends to bring his own ideas but also he uses the team contributions. He is interested of course, in the general objective, but equally in the relationships with the team members. There are cases when he stays neutral, leaving certain ideas to be implemented. Directions of improvement are those of understanding the complex real situations and adopting the best leadership style.

If the score obtained is between 12 to 18 points, **the leadership style is defined as authoritarian/controlling** (Mc Gregor, D., 2008) [4]**.** There are benefits of the authoritarian style, but in a changing area that requires people to adapt and support the team. This style can remove the leader, even from objective aimed. Sometimes he has the impression that the whole responsibility falls on his shoulders. In some cases, the other two leadership styles: collaborative and facilitative can make him close to the objective followed by the people he leads. For example, in situations when he needs ideas and solutions from experts in the team or from the people who know better the situations. Knowing the leadership styles focused on facilitating and collaboration, the leaders can better motivate people and they can become more influential. The interpretation of the obtained answers, and the identification of the leadership styles, on education levels of the participants in the

research reveals that the persons with secondary education perceive leaders within the organization as having an authoritarian leadership style, while people with higher education perceive leaders as having a collaborative/participatory leadership style. Also, depending on the sector in which it operates, the employees of public administration institutions in the rural area tend to practice an authoritarian leadership style, while the employees of town halls in the urban area perceive leaders as having a collaborative leadership style. The two aspects correlate, as in the town halls in the rural area, most employees and local councilors have only secondary education, while in the urban area the situation is changing in favor of the employees with higher education.

Table 1.Leadership styles, on public administration participating in the survey

Education level	**Perception of the leadership styles**		
	Authoritarian (respondents' percent)	Collaborative (respondents' percent)	Facilitative (respondents' percent)
1. High school	56%	39%	5%
2. Faculty	31%	57%	12%
3.Master and post university studies	16%	73%	11%
Average percentage	34.4%	56.3%	9.3%

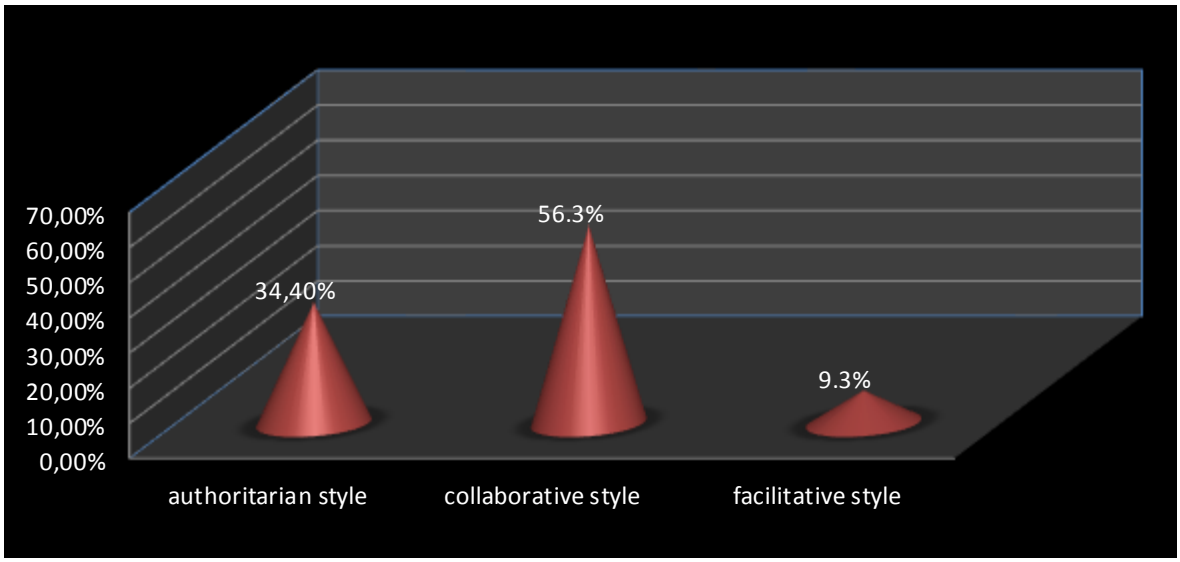

Fig. 5. The Leadership styles, in the public administration in Călăraşi

The respondents' level of education is more advanced, the cooperation prevails among the members of the organization. If a subordinate is less prepared or uncertain, he tends to be fearful in front of an authoritarian leader.

The predominant leadership style at all levels of public administration, is the collaborative one, which is due to the specific activities to be addressed. After processing the data it was found out that in terms of leadership style existent in the public administration in the Calarasi County the collaborative style prevails by a majority of 56.3%, facilitative style 9.3% and 34.4% the authoritarian style (Fig. 5.)

CONCLUSIONS

Leadership begins to be perceived as a reality "leader sets the purpose to be achieved, the management team sets the strategy for achieving the purpose, and the operational team to complete the project." (Maxwell, J., 2010)

But there is a confusion between management and leadership. The head of office is automatically treated as leader, because there is a theoretical training of the current leaders, this sector has just begun to be taught in universities, the managers are more involved in solving the employees tasks and less in their coordination, due to the lack of trust.

Within the local public administration it tends to a participatory leadership style, meaning the involvement of the subordinates in decision making related to the work, specifically with a minimum participation of the subordinates before the leader himself takes the final decision, with advantages such as: it increases the motivation of the subordinates; the quality of work increases, when participative leadership is used. First, the decisions made jointly by more employees, are better than leader himself could make - especially when the subordinates have special knowledge. Secondly, the participation can improve the quality because the employees like to work directly to solve problems without consulting their head and then have better results; the participation increases the acceptance degree of the decisions by the subordinates.

There are also some potential disadvantages in participatory leadership, such as: time and energy can be wasted. When you need a quick decision, the participation is not suitable since it requires a long time; loss of power, some leaders fear by, is actually a false problem. Some leaders believe that participatory style will reduce the power and influence. But in fact, the lack of trust in subordinates and fear that they will fail are usually wrong feelings that characterize the insecure managers; lack of responsiveness or knowledge is an impediment in some situations. It is possible that the subordinates are not receptive to participation. It may happen that the subordinates lack the knowledge necessary to make decisions.

There is strong evidence that the employees, who have a chance to participate in decision making, say they have more professional satisfactions than others (Maxwell, J., 2010),. However, it must have in mind that the participation works best when the employees are carefully selected, are intelligent and know the problem, for the participatory style shows results.

We consider that one should invest in organizing more diversified vocational training courses and employ young graduates in order to develop the leadership potential of the organization. The inability to select and develop the employees may be one reason for the failure of leaders (Crețu D., 2015) [3].

Leaders to see employees rather as team colleagues, to establish relationships, from here it develops the confidence showing more strength of character and competence - without them leaders cannot succeed, they are a team, the reach the purposes together, they need each other.

However freedom of action and employees participation should be limited, otherwise the authority may suffer.

The managers - to be considered leaders must, in addition to the objectives to reach and procedures to meet, to study, to build trust relations, to encourage staff to believe in their potential. There are few cases where the manager has the ability to be also a good leader that is why both types of persons should be highlighted.

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ANALYSIS OF THE EFFECTS OF THE ECONOMIC CRISIS CONCERNING THE PENSIONS FROM THE DANUBE DELTA

Romeo Cătălin CREŢU[1], RalucaFlorentina CREŢU[2], Petrică ŞTEFAN[1]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, Bucharest, Romania, Emails: creturomeocatalin@yahoo.com, stefanmarian2004@yahoo.com
[2]University of Economic Studies, Faculty of Accounting and Management Information Systems, Department of Financial and Economic Analysis, Bucharest, Romania, Email: cretu_raluca@yahoo.com

Corresponding author: stefanmarian2004@yahoo.com

Abstract

Globally, the impact of the economic crisis on tourism was very high. In our country too, many units of accommodation and catering were closed. Gradually, things have returned to normal. In this paper we analysed in terms of economic and financial point of view a representative guesthouse from the Danube Delta to see the actual situation of tourism in the area. The main purpose was to see if the pensions of Delta managed to overcome the economic crisis both at national and global level.

Key words**:** *analysis, crisis, Danube Delta, effects, turnover*

INTRODUCTION

Touristic activities (especially for the Danube Delta) occupy a special place. Those are becoming more and more important in all economic activities taking place in this region. The Danube Delta is an area that is poor in an economic point of view, but is very rich in biodiversity and unique landscapes.
The tourism becomes a very interesting component of economic and social life of the inhabitants of the Danube Delta, as a new source of income. The tourist accommodation plays one of the most important roles in establishing the holiday destination for Romanian and foreign tourists, being a decisive factor in choosing them.
The Danube delta is a biosphere reserve by UNESCO. It contains more than 5400 species. Some of the area is strictly protected while another part of human settlements, agriculture and fishery is possible.
However, increasingly touristic activities lead also to higher environmental impact.
Turnover and net turnover are among the specific operational indicators. Those indicators, first in the income statement, reflect sales assessment of an economic entity over a period of time. It includes all proceeds from sales by type of product or type of activity, and providing specific services the current activity of the economic entity after deducting fees related turnover, trade discounts and value added tax. Net turnover holds the largest share of operating revenue in class in terms of sustainable economic activities.

MATERIALS AND METHODS

The series of values ordered in relation to the succession of periods / time points, time series form. It is the raw material, processed by statistical methods or specific econometrics, can highlight issues repeatable analogies conditioning benchmarks [3].
To identify the level of profitability is determined profits and rates of return: commercial, consumed resources, financial and economic. To determine rates of return commercial and consumed resources using profit related to net turnover, calculated as the difference between net turnover and turnover related expenses, according to the formula:

$$\mathrm{Pr} = \sum qv * p - \sum qv * c \qquad (1)$$

Profit for net turnover compared to net

turnover is the rate of return on sales (DRR), reflecting profit of the turnover accumulated to 100 lei turnover, after deducting the expenses incidental to achievement and promotion production and goods turnover [4].

$$R^{RC} = \frac{\sum qv*p - \sum qv*c}{\sum qv*p} \quad (2)$$

The rate of return of resources consumed (RRCOM) is determined as the ratio of profit for the same turnover and turnover expenses.

$$R^{RCON} = \frac{\sum qv*p - \sum qv*c}{\sum qv*c} \quad (3)$$

The evolution of these indicators mentioned above will be analyzed further, building on information provided by a representative pension of the Danube Delta [6].

RESULTS AND DISCUSSIONS

Eden Crişan pension has 20 places in 10 rooms and a development indicator: net turnover, total revenues, total expenses, gross profit, net profit, for a period of 6 years (2010-2015) presented in Table 1.

The net turnover recorded a slight upward trend in 2010-2015, ranging between 7.22% and 26.06%. In 2013-2014 the indicator decreased by 17, 274 lei, respectively 24.11% as a result of the financial crisis that affected Romania and thus selling the services of the pension Eden.

During 2014-2015, net turnover increased by 22,496 LEI, respectively 21.39%, this being due to new marketing strategies applied by the pension.

The evolution of net turnover for the period 2010-2015 is shown in Fig. 1.

Both income and expenditure in the period under review increased by 34.14% indicates revenue in 2012 compared to 2010 and by 30.69% of spending, which generated a profit of 4,953 lei, namely 107,93%. In the period from 2011 to 2012 revenues increased slightly, with only 4.08%, while expenditures have doubled which is 8.4% (Fig. 2).

Table 1. The evolution of the main economic and financial indicators of company Touring Delta - Eden pension from Crişan, Tulcea County

Touring Delta LLC Eden Pension-Crisan / 10 rooms	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Net turnover - lei	84,133.00	106,055.00	113,709.00	122,429.00	105,155.00	127,651.00
Total revenues - lei	102.663.00	137,717.00	143,334.00	158,332.00	113,780.00	136,286.00
Total expenses-lei	98,074.00	128,175.00	138,941.00	157,398.00	108,320.00	120,844.00
Gross profit - lei	4,589.00	9,542.00	4,393.00	934.00	5,460.00	15,442.00
Net income - lei	1,722.00	6,317.00	3,351.00	627.00	2,047.00	11,483.00
The commercial rate (%)	2.05	5.96	2.95	0.51	1.95	9.00

Source: www.mfin.ro-2010-2015 financial statements [8], personal calculations

Compared to 2011, results of the indicators for 2012 were reduced respectively gross profit decreased from 9,542 lei to 4,393 lei, as shown in Table 2.

Analysing indicators for 2013 can be seen a modest increase in revenues (158,332 lei) to expenses (157,398 lei), which generated a positive gross result of only 934 lei, much less dynamic compared to the previous period. Reducing gross profit by 78.74% in 2013 compared to 2012 resulted in a reinvention of the marketing strategy; the results are visible in the next 2 years. In support of guesthouses in Crisan, this time, came local authorities that have attracted a number of European funds to improve the quality of life. In 2014, the gross result registered pension Eden was 5,460 lei, 484.58% higher than in 2014, as in 2015 it will triple from 15,444.2 lei and 182.82% higher than the same period 2014.

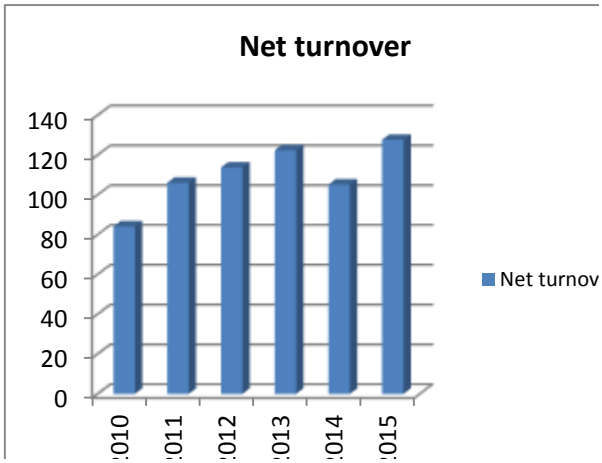

Fig. 1. Evolution of turnover in the period 2010-2015

In Fig.3. we can follow the evolution of gross profit, which increased from 4,589 lei to 9,542 lei, respectively 4,953 lei (107.93%) in 2009-2012.

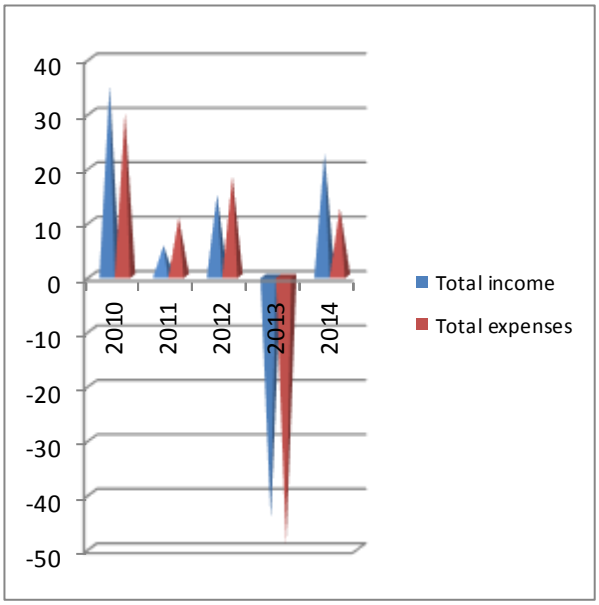

Fig. 2. The evolution of income and expenditure during the period 2010-2015

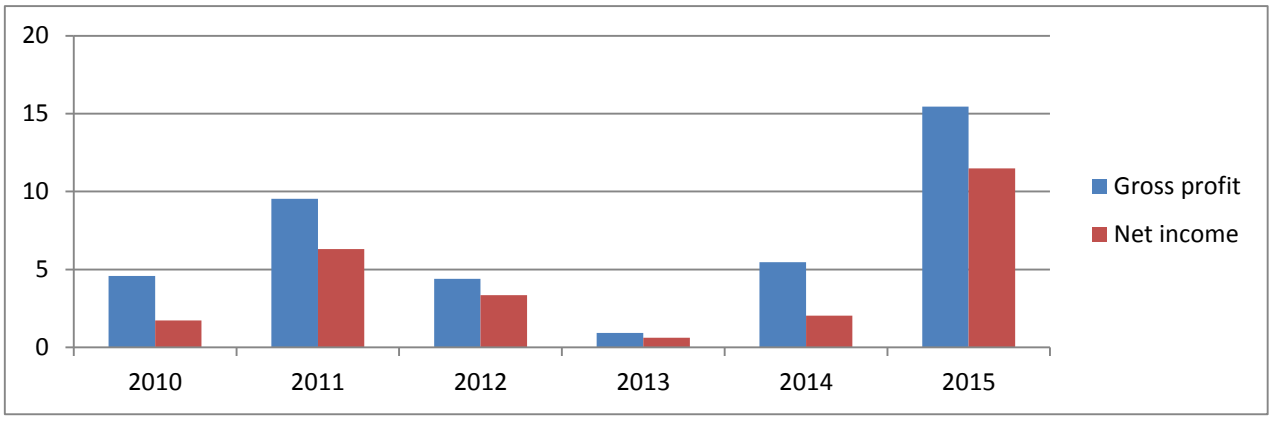

Fig.3. The evolution of the gross and the net result in the period 2010-2015

In the next two years due to the decrease in gross profit recorded economic crisis, falling from time to time with 53.96% and 78.74%, which is the turning point. 2014 and, especially, 2015 are, for the pension Eden, years of economic boom, gross profit increased by 485.58% and 182.82%, a sign that the crisis had been overcome.

For the next period, at least three years are necessary to draw up a sustainable strategy to attract as many tourists as, the Danube Delta having a huge potential in terms of ecosystem, unique in Europe and worldwide, as well as habitat for birds in increasingly rare.

In conjunction with gross profit we can analyse the evolution of net profit which is calculated as the difference between gross profit and income tax. The evolution of the financial year net profit is similar to the evolution of gross profit, knowing that a substantial increase in 2010-2011, to 4,595 lei, respectively 2.66 times; followed by a 2-year period of decline of the indicator with 46.95% and 81.29%. 2013 is considered a turning point, when profits reached its lowest value of the range 2010-2015 of 627 lei. Analysing the chart no.3 in conjunction with Table 3 reveals, a positive indicator for both the period 2013-2014 - 1,420 lei, respectively 2.26 times in 2014-2015, when this indicator registered a substantial increase 9,436 lei, respectively 4.6 times.

Based on indicators presented can make in-depth analysis on the performance indicators

of the pension in 2010-2015, respectively tax at 1 LEU turnover rate commercial profitability, etc. The commercial rate can be calculated as the ratio of profit related to turnover, result indicator, gross margin over the cost of capitalized assets or net profit and turnover. It is an indicator of performance met both Romanian and foreign literature in English under the name of Return on Sales - ROS). The advantage of this is that the rates may be based on information from the profit and loss account, is easily calculated by those who do not have access to data from enterprise management accounting. The commercial rate, however, present a limited informational value because net income can be influenced and result from operations other than sales or financial result, extraordinary result, fiscal policy and economic entity. The value of financial rate varies between 2.9% and 10.5% in the textile industry in the field of public utilities in US companies. There is an inverse relationship between the rate of return on net trade and rotational speed of total assets [11].

Table 2. Absolute and relative growth rate of economic and financial indicators

Touring Delta LLC Eden Pension-Crisan / 10 rooms	**2011-2010 (mu)**	**2011/2010 (%)**	**2012-2011 (mu)**	**2012/2011 (%)**	**2013-2012 (mu)**	**2013/2012 (%)**	**2014-2013 (mu)**	**2014/2013 (%)**	**2015-2014 (mu)**	**2015/2014 (%)**
Net turnover	21,922	126.06	7,654	107.22	8,720	107.67	-17,274	85.89	22,496	121.39
Total income	35,054	134.14	5,617	104.08	14,998	110.46	-44,552	71.86	22,506	119.78
Total expenses	30,101	130.69	10,766	108.40	18,457	113.28	-49,078	68.82	12,524	111.56
Gross profit or gross loss	4,953	207.93	-5,149	46.04	-3,459	21.26	4,526	584.58	9,982	282.82
Net profit or net loss for the financial year	4,595	366.84	-2,966	53.05	-2,724	18.71	1,420	326.48	9,436	560.97

Source: Personal calculations

In Romania, practical studies carried out on economic entities listed on the stock market in 1996-2000 demonstrates that the rate of return on net trade (the ratio of net profit for the year and turnover) registered the most moderate levels of median 0.74 % - 4.84%, which confirms that the rate of return is the least affected by inflation, the takeover simultaneous effect of inflation on both profit and turnover costs [11].

The commercial rate calculated on data from the guesthouse Eden in the Danube Delta in the period 2010-2015 was in the range 0.51% - 9%, with an upward trend during 2010-2011, 2013-2015 and one descending period 2011-2013, sensitive period affected by the economic and financial crisis. Turnover in tourism may be obtained from various activities, namely: food, accommodation, transportation, additional services offered to tourists etc. Most of the volume of receipts or turnover in tourism is played by the accommodation, which in turn is influenced by the flow of tourists in the period under review, the accommodation capacity available, that number available places; the accommodation capacity occupied (occupied many places).

To determine the occupancy rate of available capacity or utilization of available capacity and efficiency of a busy place in the guesthouse Eden, you can use the following model factor analysis:

$$CA = Ldx\frac{Lo}{Ld}x\ \frac{CA}{Lo} \quad (4)$$

where:
CA = turnover specific for tourism activity
Ld = available accommodation capacity of the guesthouse
Lo = capacity ofoccupied accommodation
$\frac{Lo}{Ld}$ = the occupancy rate of available capacity or utilization of the available capacity
$\frac{CA}{Lo}$ = return of occupied place.

Table 3 presents the evolution of the indicators mentioned above for Eden pension, on the period 2010-2015.

Table 3. Evolution of indicators in activity of accommodation

Touring Delta LLC Eden Pension-Crisan / 10 rooms-20 places	**Symbol**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Net turnover - lei	CA	84,133	106,055	113,709	122,429	105,155	127,651
Number of seats available for accommodation per year – no.	Ld	7,200	7,200	7,200	7,200	7,200	7,200
Number of seats occupied per year – no.	Lo	2,880	4,320	5,400	6,120	5,760	6,840
Occupancy of available capacity	Lo/Ld	0.400	0.600	0.750	0.850	0.800	0.950
Return of occupied place	CA/Lo	29,213	24,550	21,057	20,005	18,256	18,662

Source: www.mfin.ro - Financial Statements 2010-2015 [8], data from pension, personal calculations

Analyzing the data in Table 3 we can highlight the relationship between the three factors of influence, namely: turnover, the occupancy rate of available capacity or utilization of the available capacity and efficiency of a busy place. When occupancy is approaching to the size of available capacity unit (0.400 to 0.950), turnover increase (from 84,133 lei to 127,651 lei), which is the purpose of any economic entity. Occupancy depends on various factors: competition in the area, seasonality in tourism activity that is essential and deltaic ecosystem is a special case, charges of pensions, quality of supply, the strategy of marketing and many more [1]. Yield increases usually a busy place when accommodation rates increase. In order to not affect the occupancy of available capacity, price increase it's necessary to be economically substantiated: improving the quality of services offered, services supplementation, modification category of accommodation (number of stars), rising costs etc. A thorough analysis of the last two years can still achieve, based on data provided by Table 4.

Table 4. Working situation for factorial analysis of the turnover from tourism

Touring Delta LLC Eden Pension-Crisan / 10 rooms-20 places	**Symbol**	**2014 (lei)**	**2015 (lei)**	**2015-2014 (lei)**	**2015/2014 (%)**
Net turnover	CA	105,155	127,651	22,496	121,39
Number of seats available for accommodation per year	Ld	7,200	7,200	0	100,00
Number of seats occupied per year	Lo	5,760	6,840	1,080	118,75
Occupancy of available capacity	Lo/Ld	0.800	0.950	0.150	118.75
Return of occupied place	CA/Lo	18,256	18,662	0,406	102,23

Source: Financial Statements 2014-2015 [8], [12] data from pension, personal calculations

$$0 + 19{,}716.48 + 2{,}777.04 = 22{,}493.52\ lei \quad (10)$$

Model factor analysis and factor analysis scheme:

$$CA = Ldx\frac{Lo}{Ld}x\ \frac{CA}{Lo} \quad (5)$$

Quantifying the direct influences of three factors:

$$\Delta\ CA = \ CA_1\ -\ CA_0\ = 22.496\ lei \quad (6)$$

of which:
the influence of accommodations change available on turnover:

$$\Delta Ld = (Ld_1 - Ld_0) x \frac{Lo_0}{Ld_0} x \frac{CA_0}{Lo_0} = 0\ lei \quad (7)$$

The influence of change in occupancy rate of available capacity or utilization of the available capacity on the turnover:

$$\Delta \frac{Lo}{Ld} = Ld_1 x \left(\frac{Lo_1}{Ld_1} - \frac{Lo_0}{Ld_0}\right) x \frac{CA_0}{Lo_0} = 7{,}200\ x\ (0.15)\ x\ 18{,}256 = 19{,}716.48\ lei \quad (8)$$

The influence of the modification yield a busy place on turnover:

$$\Delta \frac{CA}{Lo} = Ld_1 x \frac{Lo_1}{Ld_1} x \left(\frac{CA_1}{Lo_1} - \frac{CA_0}{Lo_0}\right) = 7{,}200\ x\ 0.95\ x\ 0.406 = 2{,}777.04\ lei \quad (9)$$

Checking:

$$\Delta Ld + \Delta \frac{Lo}{Ld} + \Delta \frac{CA}{Lo} = \Delta\ CA$$

CONCLUSIONS

Compared with 2014, considered the base year, the turnover of the pension Eden Crişan, Delta grew in 2015, with 22,493.52 RON, respectively 21.39%, a situation considered to be favourable. This is due to three factors with direct action: the accommodation capacity available, the occupancy rate of available capacity or utilization of available capacity and efficiency of a busy place [6].

Available accommodation capacity (number of seats available bed) was constant in the analysed period 2014-2015 guesthouse featuring 10 rooms with 2 seats. During the year, 7,200 resulted accommodation pension, during this period by not extending the accommodation capacity, maximum occupancy is not reached.

The occupancy rate of available capacity or utilization of the available capacity increased number of 0.800 to 0.950, respectively 0.150 or 18.75% in the period, approaching the size of the unit in 2015, which indicating a relationship directly proportional to turnover, which is the purpose of any economic entity. This indicator was calculated as the ratio between the number of seats occupied per year and the number of seats available for accommodation per year.

Return a busy place increased from 18,256 lei / place to 18,662 lei / place to stay, or 2.23%, this being due to higher turnover from 105,155 lei to 127,651 lei, it means 22,496 increasing, respectively 21.39%, to increase the number of seats filled per year, and from 5,760 to 6,840 lei places resulting 1,080 lei grow, respectively 18.75%.

Thus increasing the income of a busy place may be due either increase the number of seats held either increase the rates. This increase in tariffs should be based on economy, not to affect employment. It imposes a tariff increase due to the provision of additional services, increase comfort by improving the accommodation services offered in general, reclassification or increase the number of flowers/stars, rising costs etc [2].

It can be concluded from the foregoing that the pension Eden is in a favourable situation in economically that has successfully passed the economic crisis in the country, but imposed a number of measures for the future in order to maintain this position or why not improve it: improving the quality of services offered; infrastructure development; modernization of communications; knowledge needs of tourists, which are constantly changing, knowing that the number of foreign tourists visiting the Danube Delta is increasingly higher, and resources are limited; the opportunities for European funds and many more [5], [9].

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THE SOCIAL ECONOMY IN ROMANIA AND THE IMPACT OF NON-REIMBURSABLE EUROPEAN FUNDS OVER THIS SECTOR

Marilena Petronela CRISTEA, Ion DONA

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd., District 1, 011464, Bucharest, Romania, Email: petronela.cristea@yahoo.com, ion_dona@yahoo.com

Corresponding author: petronela.cristea@yahoo.com

Abstract

The objective of this paper is to present the situation of the social economy in Romania. Through this work, we want to emphasize the role that non-reimbursable European funds have in the development of the social economy in Romania, by making a comparison between the state of social economy before the funding period of 2007 to 2013, the state of social economy after the funding period of 2007 to 2013, the difference been made by the results of the European funding for this section. It is based on the annual reports provided by Ministry of European Funds for Sectoral Operational Programme Human Resources Development 2007-2013, along with recent publications presenting the investigated topic. For the funding period of 2007 to 2013, the data have been processed into the following indicators: social economy structures created, people qualified or requalified in programs for vulnerable groups and the number of jobs created. After the implementation period of 2007 to 2013, the social economy sector has been improved by the foundation of approximately 1,400 social economy structures, by the qualification or requalification of over 130,000 vulnerable people and by creating over 12,000 jobs in the founded structures. As a conclusion, we consider that after the funding period of 2007 to 2013, the significant steps have been made, but the improvements still need to be made in approaching the people belonging to vulnerable groups, helping them fill the gaps that separate them from the majority population in terms of education, work culture and skills required on the labour market.

Key words**:** *social economy sector, non-reimbursable european funds, Romania*

INTRODUCTION

Social economy has been given many definitions over time. But regardless of the definition given to the concept of social economy, the main purpose of "the third sector of the economy" is the same: delivering new opportunities to people in disadvantaged groups and investing profits in social purposes. In recent years, Romania joined the EU countries by developing the tendency towards social economy, which has developed here in a diversity of types of organisations and domains.

Since 2015 there is a law dedicated to the social economy, Law no. 219/2015, whose rules have been approved by GD 585/2016, which provides for a system of certification of enterprises operating in this sector, as social enterprises.

According to this law, the social economy is: „the assembly of independently organised activities in the public sector, whose purpose is to serve the general interest, the interests of a colectivity and / or personal non-patrimonial interests by increasing employment of persons belonging to the vulnerable groups and /or production and supply of goods, services and / or works to those people" (Law no. 219/2015 – Social Economy Law)

Social enterprises can be a solution to solve social and economic deficiencies, based on the following considerations:

-They are structures that allow and encourage hiring mostly vulnerable people;

-They undertake actions that have as their goal the development of skills in various trades through training courses for vulnerable people;

-They reinvigorate traditional crafts, because each social company is created based on the specific cultural potential of the area where it is established;

-They develop the local economy, using community resources and contributing to lower unemployment.

Through this work, we want to emphasize the role that non-reimbursable European funds have in the development of the social economy in Romania, by making a comparison between the state of social economy before the funding period of 2007 to 2013, the state of social economy after the funding period of 2007 to 2013, the difference been made by the results of the European funding for this section.

MATERIALS AND METHODS

In order to characterize the sector of social economy, we have analysed the period 1990-2010 and the results after the funding period of 2007 to 2013. The data was collected from annual reports provided by Ministry of European Funds for Sectoral Operational Programme Human Resources Development 2007-2013, along with recent publications presenting the investigated topic.

RESULTS AND DISCUSSIONS

Before 2015, the year of the promulgation of the law of social economy, without a stable legal framework for enterprises in the sector, organizations were grouped according to the socio-economic characteristics and criteria formulated by Charter of Social Economy (1985) and Charter of Principles of the Social Economy (2002)(MMFPS, 2010)
Thus, in Romania the most recognized types of social economy entities were: cooperative societies, associations and foundations and credit unions. (MMFPS, 2010)

Table 1.Evolution of cooperative societies in the period 2000-2010

	2000	2005	2007	2009	2010
Crafts cooperatives	800	771	799	788	857
Consumer cooperatives	874	941	927	894	958
Credit cooperatives	191	132	93	65	75

Source: The Ministry of labour family social protection and elderly Romania

According to the Romanian National Institute of Statistics, in 2010 there were 2.017 cooperative societies, of which 857 there were crafts cooperatives, 958 consumer cooperatives and 75 credit cooperatives.

As can be seen from the table above, crafts cooperatives and consumer cooperatives were the dominant forms of cooperatives.
Nongovernmental organizations, the most common subdivision of this category in 2010 represented the most developed sector of the social economy.

Table 2. Evolution of associations and foundations in the period 2000-2010

	2000	2005	2007	2009	2010
Associations and foundations registerd (NGO register)	36,160	49,038	56,832	64,197	62,680
Active Associations (INS)	10,494	16,532	19,340	22,589	26,322
NGO with economical activity	1,219	2,446	3,116	2,404	2,730

Source: The Ministry of labour family social protection and elderly Romania

Most of NGOs were working in urban areas and only around 20% were active in rural areas. In rural areas, the most common forms of associations and foundations were represented by agricultural associations and mutual societies. As shown in the table below, they represented approximately 10% of the associations and foundations in Romania, but they were generating 30% of the total income of the branch.

Table 3. Evolution of agricultural associations and mutual societies in the period 2000-2010

	2000	2005	2007	2009	2010
Number of agricultural associations, of witch:	148	576	874	1,293	1,620
% of agricultural associations in rural areas	29.1%	51.4%	58.7%	64.2%	65.7%
Number of mutual societies, of wich:	40	597	726	969	1.106
% of mutual societies in rural areas	80.00%	85.9%	81.7%	83.1%	83.2%

Source: The Ministry of labour family social protection and elderly Romania

In 2010, in Romania there were two types of credit unions: Credit unions for pensioners (CARP) and credit unions for employees (CARS).
Since Romania joined the European Union, the social economy is supported for being a key area of intervention for the Sectorial Operational Program Human Resources Development.

Table 4. Evolution of credit unions in the period 2000-2010

	2000	2005	2007	2009	2010
Number of CARS	247	527	657	703	684
Number of CARP	133	170	186	193	203

Source: The Ministry of labour family social protection and elderly Romania

The priorities for the vulnerable categories are mostly included in the priority axis 6, *Social Inclusion Promotion*, which has as main objective facilitating the access to employment for vulnerable groups and promoting a cohesive and inclusive society in order to ensure the welfare of all citizens. The major areas of intervention are:

-Social economy development;

-Improving the access and participation to education for the vulnerable groups;

-Promoting equals opportunities on the labor market;

-Transnational initiatives for the work global market;

According to National Development Plan 2007 – 2013, the social economy is seen as a tool to boost the labor market participation for the vulnerable groups. In order to achieve the specific objective „Promoting the social inclusion" it is necessary to develop and strengthen the social economy as a way of increasing the employability of vulnerable groups by ensuring equal opportunities regarding integration and maintenance in the labor market.

The SOP HDR annual implementation report for the year 2014 shows that, until 2014 were created over 346 social economy structures, 51,069 people have participated in qualification or requalification programs for vulnerable groups, including 5,230 Roma ethnics, 3,846 people with disabilities and 731 young people who left the state child protection system. Also, there were created 12,377 jobs in the structures of social economy that were founded.

As it can be seen in the table above, the „Number of social economy structures created" indicator shows a stagnation compared to 2013, given the fact that since 2011, for KAI 6.1 - "Developing social economy" have not been released any calls for proposals.

Table 5. Evolution of the structures of social economy (SSEs) founded thru SOP HDR 6.1 in the period of 2007 to 2013

Number of SSEs founded	2007	2008	2009	2010	2011	2012	2013	2014
Achieved	0	0	11	73	144	261	346	346
Target	-	92	190	310	450	605	770	830

Source: Ministry of European Funds, AIR SOP HDR 2014

Given the target for the year 2015 (830) and the value realized by the end of 2014 (340), in order to ensure the projected values, large enough to provide a guarantee to achieve the target set at the operational program level, during 2014 two call for proposals for strategic and grant projects were launched for this area of intervention, with a total financial allocation of 200 million Euros, within which 275 financing contracts were signed until 31 December 2014. Based on these financing contracts, the beneficiaries have assumed the foundation of 1,392 structures of social economy, which were expected to create 7,941 jobs.

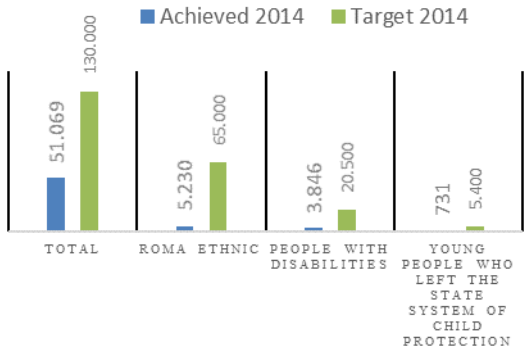

Fig. 1. The level of achievement of the indicator: people qualified or requalified in programs for vulnerable groups, at the end of the period 2007 to 2013
(Source: Data processed by authors based on AIR SOP HDR, 2014)

The main categories of vulnerable persons who have participated in qualification or requalification programs are represented by Roma ethnic, people with disabilities and young people who left the state child protection system.

One of the most important results of the projects implemented within the Programme Human Resources Development 2007-2013, KAI 6.1 - "Developing social economy", is

the number jobs created in the social economy structures created.

Fig. 2. The level of achievement of the indicator:No of jobs created, at the end of the period 2007 to 2013 (Source: Data processed by authors based on AIR SOP HDR, 2014)

It may be noted that at the end of 2014 progress were made regarding the achievment of the targets set for this period by the ”number of jobs created by social economy structures” indicator. Considering the late launch of the calls for proposals and the late contracts signing for these projects, in order to ensure the to achieve the set targets for the Operational Programme, during the year 2014 two calls for proposals for strategic and grant projects in this key area of intervention were launched. The total financial allocation for trhese Calls for proposals was 200 million Euros.

Considering the targets set for the contracts signed in late December 2014, it is estimated that the program indicators were achived as follows:

Table 6. The level of achievement of the targets at the end of the period 2007 to 2013

Indicators	Achived target (%)
Number of SSEs founded	100
Nr. of vulnerable persons participated in qualification/requalification programs	100
Number of jobs created by social economy structures	100
Nr. of vulnerable persons participated in qualification/requalification programs, of witch: - Roma ethnic - People with disabilities - Young people who left the state child protection system	100, 50 68 94

Source: Ministry of European Funds, AIR SOP HDR 2014

To summarise, after the implementation period of 2007 to 2013, the social economy sector has been improved by the foundation of approximately 1,400 social economy structures, by the qualification or requalification of over 130,000 vulnerable people and by creating over 12,000 jobs in the founded structures.

We consider that the fact that the law of social economy was promulgated during this period in which the sector is visible, promoted and supported, it is an opportunity for this sector. It led to a better reglementation for the structures of social economy and for their benefits and obligations.

Since August 2016 the attestation system for the structures of social economy is functional, so far 65 companies being certified as SSEs. Becoming a SSE, which is available for any SME in Romania, can give entrepreneurs access to funding within the POCU 2014-2020 programme, funding from the local authorities, permanent visibility through a single register of SSE records at national level and the possibility of creating a social brand by which their products and their services will be recognized.

CONCLUSIONS

We noticed that after the SOP HDR period of implementation, the most important results were: over 346 social economy structures created, 51,069 people qualified or requalified in programs for vulnerable groups, including 5,230 Roma ethnics, 3,846 people with disabilities and 731 young people who left the state child protection system. Also, within the social economy structures founded during the program implementation, over 12,377 jobs were created.

The goal of this sector can be achieved only by using a complex approach that addresses all spheres (employment, education, housing, health care, social protection etc.) and at the same time, making full use of the available resources in an efficient and concentrated manner.

Although significant steps have been made, improvements still need to be made in approaching the people belonging to vulnerable groups, helping them fill the gaps that separate them from the majority

population in terms of education, work culture and skills required on the labour market.

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SPECIFIC FEATURES OF SOPHRD PROJECTS IMPLEMENTED IN ROMANIAN RURAL AREAS

Emilia DAN, Ion DONA

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Emails: emilia_dan@ymail.com, ion_dona@yahoo.com

Corresponding author: emilia_dan@ymail.com

Abstract

Generally, rural development, as most known concept, is associated with Rural Development Program and its implication. However, in our opinion, the rural development can be stimulated thought other types of EU funding as well. Currently, 46% of the Romania's population lives in rural areas and the majority of them are involved in subsistence or semi-subsistence agriculture associated with informal employment or unpaid family work, low productivity and poverty. For the rural areas, the human capital is a very important resource and in order to increase economic growth in these areas it is necessary to invest in the education and the development of the rural population. Development of the rural population can be stimulated trough a set of supporting actions which implies changes and full support of the individuals or groups. Therefore, policies and programs designed especially for development of human resources can greatly help on educating and opening new opportunities for the rural population and in this way improving the quality of rural life. Through this paper we aim to analyze the Sectorial Operational Program Human Resources Development (SOP HRD) projects implemented in rural areas and for the rural area population and to highlight the importance of this type of projects for the development of the addressed areas.

Key words**:** *rural development, human capital, SOP HRD, rural areas*

INTRODUCTION

In Romania, rural area has substantial growth potential and a vital social role. According to data provided by National Institute for Statistics, rural surface sums up 207,522 km2, respectively 87.1% of the country surface and the population of this area, although it recorded a slight decrease in 2011-2016 period, is currently about 9.2 million people (46% of the population) (National Institute of Statistics) [5].

The rural labor force is involved, in a large proportion, in subsistence or semi-subsistence agriculture associated with informal employment or unpaid family work, low productivity and poverty, facing a variety of difficulties related to education, health, social inclusion, basic infrastructure, diversification of employment, emigration etc.

According to recent studies, modernization of the rural space involves a multifunctional development, meaning investments both in agricultural and non-agricultural activities, which can create jobs and raise the population income and living standards. It is important to educate and encourage the young people to remain or to come back in the local communities, to set up farms or to develop their own businesses. There is a need to ensure a transparent and facile knowledge transfer, provide the necessary means for the access to research and development for the companies acting in rural regions, and to education, professional development and training for the labor force and for the entrepreneurs (Dan, 2016) [1].

The rural areas development requires a change in population behavior and mentality, more involvement of the decision makers both at national and local level to find the best solutions for stimulating the multifunctional development of the rural space (Popescu, 2013) [4].

As presented above, given the fact that complex development policies are promoted for rural areas where agriculture remains the mainstay, it is required the creation and

development of other activities that meet the transposition of the concept recalled. The main focus in the rural communities development is to diversify rural economic and demographic opportunities (Dona, 2010) [2].

In the development process human capital development need to be considered an indispensable component and it should include better education at all levels, generous on-the-job training and appropriation of new technologies and ideas. Acquiring better knowledge and skills through education and training benefits both individuals and the economy as a whole. Individuals benefit in the form of higher earnings and enhanced employment, while the economy benefits in the form of higher productivity which ultimately enhances socio-economic development (Enefiok, 2014) [3].

This type of development can be achieved through a set of supporting actions which stimulates changes and fully supports capable individuals or groups. Therefore, policies and programs designed especially for development of human resources can greatly help on educating and opening new opportunities for the rural population and in this way improving the quality of rural life.

This article aimed to analyze the SOP HRD projects implemented in rural areas in 2015 and for the rural area population from the perspective of the contribution type and value, number of partners, distribution by number of covered areas, targeted group dimensions, project distribution in terms of areas of intervention covered and coordinating structures. The main purpose is to highlight the importance of this type of projects for the development of the addressed areas and for the future, to create new ways to improve the rural human capital development trough EU funds [6].

MATERIALS AND METHODS

We have conducted our research based on combining various sources of information, quantitative and qualitative, such as national and international statistical data, reports and analysis made by the Romanian National Institute of Statistics and existing publications on the investigated topic. In the same time, we selected a sample of 112 finalized SOPHRD projects implemented in the rural areas in 2015 and we have made an analysis over them regarding the following indicators: contribution type (minimum, average and maximum value per each type), characteristic of the target group (minimum, average and maximum value) and project distribution by number of partners involved, covered regions, area of intervention and coordinating structures. The analysis was performed in order to highlight and characterize these projects and the impact it have on the region where were implemented. The analyzed data were processed using tables and charts, with the analysis program Microsoft Excel.

RESULTS AND DISCUSSIONS

As we can see in the table below, for the selected projects, the beneficiary contribution was between 2,139,165.36 and 5,553.45 Ron with an average of 209,862.04 Ron. The public RO contribution was between 2,892,579.66 and 127,753.08 Ron and for 3 projects from the sample the public RO contribution was 0. In terms of public EU contribution, the maximum value was 13,725,136.05 and the minimum value was 780,874.81.

Table 1. Contribution type

Contribution Type	Maximum Value (Ron)	Minimum Value (Ron)	Average Value (Ron)
Beneficiary	2,139,165.36	5,553.45	209,862.04
Public RO	2,892,579.66	0	707,697.54
Public EU	13,725,136.05	780,874.81	4,419,871.02
Public Total	15,970,602.81	908,627.89	5,128,500.41
Total project value	16,296,533.48	961,511.00	5,337,740.88

The highest total value of a project was 16,296,533.48 and the minimum value was 961,511.00 Ron.

Regarding the **project typology**, from the total sample of 112 selected projects, 59.8% were strategic projects and the rest of 40.2% were grants.

In terms of partners number, the majority of the projects had 1, 2 or 3 partners and the maximum partners number was 9, for one single sampled project, as it can be seen in the chart below.

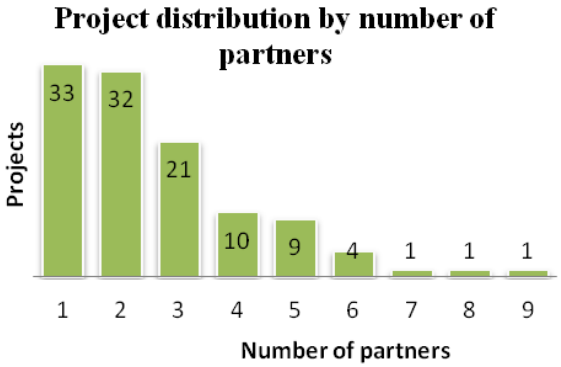

Fig. 1. Project distribution by number of partners involved in the project

Project distribution by number of covered regions

As we can see in the Fig. 2, the majority of the projects (45%) have only covered rural population from one region, 22% from the selected projects addressed the rural population from 3 regions, 20 % of the projects covered 2 regions and just a 3% of the selected projects addressed the rural population from all the regions.

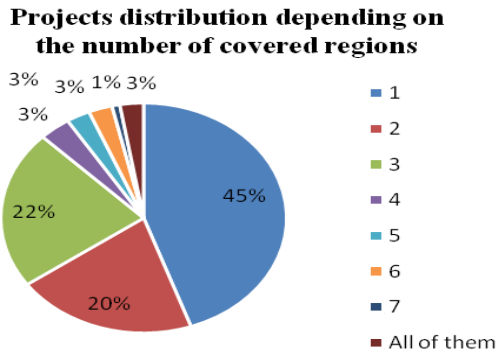

Fig. 2. Project distribution by number of covered regions

If we talk about numbers, the most targeted region was Central region, addressed by 45 projects out of 112, followed by South - Muntenia region with 36 projects out of 112 and by Bucharest-Ilfov region with 30 projects. At the opposite side was found North - West Region, addressed only by 27 projects.

The targeted groups for the analyzed projects ranged in size between 24 persons (the minimum value) and 1,876 persons (maximum value).

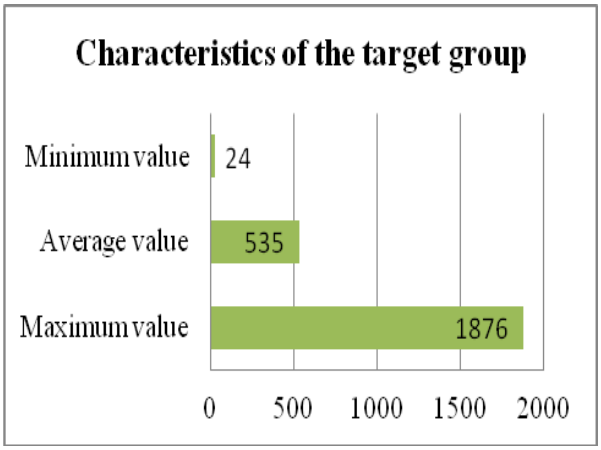

Fig. 3. Characteristics of the target group

Regarding the areas of intervention for which the selected projects were submitted, the most important (in terms of projects submitted) were: ***5.2. Promoting long-term sustainability of rural areas in terms of human resources development and employment*** with 88% followed by **6.1 *Social economy development*** with 5%. Areas like 6.2, 1.1, 1.3, 5.1 and 5.3 were also involved but to a lesser extent.

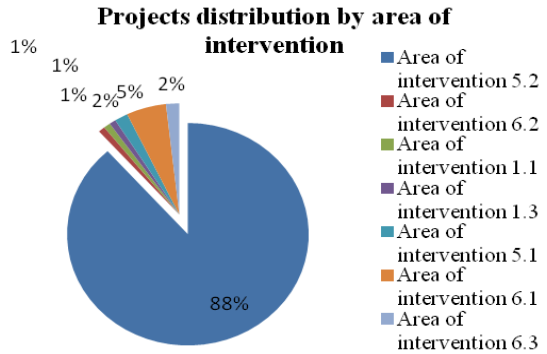

Fig. 4. Projects distribution by the area of intervention

In terms of coordinating structures, majority of 31 sampled projects were coordinated by the OIR NE, 17 by the OIR CENTRU and the rest by all the remaining structures as

presented in the chart below (Fig. 5).

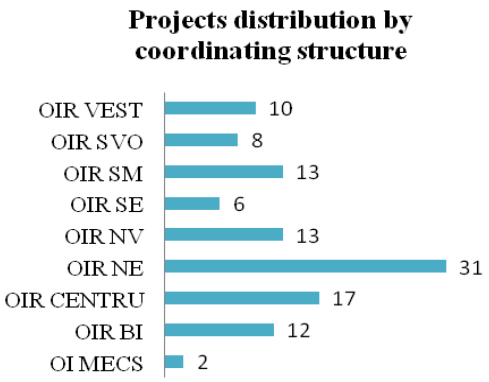

Fig. 5. Projects distribution by coordinating structure

CONCLUSIONS

As a result of our research, we observed that from more than 4,000 projects financed through SOP HDR program in 2015, just 112 were addressed specifically to rural areas population.

The aim of these projects refers to the inclusion of inactive people or those who earn their living in subsistence farming from rural areas, in the labor market, according special attention to young people, women, small entrepreneurs and future entrepreneurs (which can generate local development and employment opportunities), promoting of the social economy in the rural areas, implementation of activities such as informing and professional counseling, career planning and searching for a job assistance, job clubs, professional training, local employment programs etc.

In analyzing the sampled projects data, were highlighted aspects such as:

-**Project typology.** More than 50% of them were strategic projects, meaning a value greater than 500,000 euros and multi-regional implementation;

-**Covered regions**: 45% of the sampled projects have only covered rural population from one region, 22% addressed the rural population from 3 regions and just a 3% of the selected projects addressed the rural population from all the regions. The most targeted region was Central region, addressed by 45 projects of 112, followed by South - Muntenia region with 36 projects out of 112 and by Bucharest-Ilfov region with 30 projects. At the opposite side was found North - West Region, addressed only by 27 projects;

-**Targeted group**: ranged in size between 24 persons (the minimum value) and 1,876 persons (maximum value);

-**Areas of intervention:** the most important (in terms of projects submitted) were: ***5.2. Promoting long-term sustainability of rural areas in terms of human resources development and employment*** with 88% followed by ***6.1 Social economy development*** with 5%. Areas like 6.2, 1.1, 1.3, 5.1 and 5.3 were also involved but to a lesser extent.

-**Number of partners:** the majority of the projects had one partner, followed by those with 2 or 3 partners;

-**Coordinating structure**: majority of 31 sampled projects were coordinated by the OIR NE;

In conclusion, the rural population who is in need for more knowledge, encouragements and a change of mentality should be considered an important factor in rural development and the focus should be on educating and showing to these people all the opportunities that can be harnessed with the resources provided by the rural areas.

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ECONOMIC ANALYSIS OF DIFFERENT COLD STORAGE TYPES: A CASE STUDY OF ISPARTA PROVINCE, TURKEY

Vecdi DEMİRCAN, Mehmet Ali KOYUNCU

Suleyman Demirel University, Agriculture Faculty, Department of Agricultural Economics, Department of Horticulture Science, Isparta-Turkey, Email: vecdidemircan@sdu.edu.tr

Corresponding author: vecdidemircan@sdu.edu.tr

Abstract

The objective of this study was to carry out an economic comparison of different types of cold storage facilities for apple. Primary material of the study was comprised of original data acquired from cold storage facilities in Isparta province which is ranked number one in Turkey in the field of apple storage. Analyses were carried out by classifying the enterprises into three groups according to their cold storage types as those with normal atmosphere (NA), those with controlled atmosphere (CA) and those as cold storage facilities with a mixture of normal and controlled atmosphere (NA+CA). It was determined that the average capacities were 7,500 tons, 4,540 tons and 2,400 tons, respectively for NA+CA, NA and CA facilities. Capacity usage ratio was determined as 85.42% for CA facilities, 79.74% for NA facilities and 77.60 % for NA+CA facilities. It was determined that Golden Delicious ranked first among the apple types stored in all cold storage types. It was determined that the ratio of Golden Delicious among the apples stored in the facilities was 52.49 % for NA, 52.89% for NA+CA and 69.86 % for CA facilities. NA+CA facilities were determined to have the highest average annual operating cost among the examined facilities. Average total cost per enterprise among NA+CA facilities was determined as 355,869 USD, 192,131 USD for NA facilities and 121,282 USD for CA facilities. When the enterprises were compared with regard to net income per ton, it was observed that CA cold storage facilities were more profitable. Net income per ton was calculated to be 27 USD for CA facilities, 21 USD for NA+CA facilities and 17 USD for NA facilities. It was determined that total costs and total income were equal and that break-even point was reached when 41.62% of the capacity is used for CA cold storage facilities, 43.94% for NA+CA facilities and 45.75% for NA facilities. Facilities make profit after this point.

Key words**:** *apple, cold storage facilities, cost, profit*

INTRODUCTION

Cold storage is keeping and processing the product under conditions that will enable the preservation of its quality for future consumption, processing or marketing in order to gain higher revenues (Erkan, 2013) [5]. The history of storage dates as back as humanity itself. Humans have given significant importance to preserving, protection and storage of agricultural products for consumption in coming days, weeks and months or to make commercial use of them. Products were first stored simply in cups, wells and cellars without temperature and humidity control. Whereas today, storage activities have also developed rapidly thanks to science and technique. The storage of horticultural crops is now carried out in modern facilities by way of machines, controlling heat and moisture components in order to minimize their spoilage and rotting. Thanks to these developments; horticultural crops can now be stored for longer periods, quality losses due to storage is decreased, commercial revenue from stored goods is higher, it is possible to find fresh fruits and vegetables in all seasons and this activity creates new employment opportunities in many sectors from packaging to transportation (Sargınand Okudum, 2016) [13].

Turkey provides economic options for the production of many horticultural crops in the world thanks to its suited climate conditions. Turkey is among important producer countries in the world with a fruit and vegetable production reaching 47 million tons (TUİK, 2015) [14]. However, there are significant losses in horticultural crops produced in Turkey during and after harvesting. The ratio of these losses varies between 5-10% in developed countries according to product and

post-harvest operations and between 20-40% in developing countries (Kader, 2002; Erkan, 2012) [6, 9]. When these loss ratios are considered, approximately more than 10 million tons of raw fruits and vegetables either lose their market value or get spoiled before they reach the consumers. The most important point to take into consideration with regard to post-harvest procedures is to ensure that fruits and vegetables are processed in environments that will preserve the quality and nutritional value of the products. Post-harvest quality of horticultural crops can only be preserved by cold storage and the continuity of the cold chain (Erkan, 2013) [5].
According to 2014 data, world cold storage capacity is 552 million cubic meters, and India ranked one with a share of 23.73%. India is followed by USA (20.83%), China (13.77%), Japan (5.98%) and England (4.53%). Turkey is ranked number 14 in the world with a cold storage capacity of 6.8 million cubic meters (GCCA, 2014) [7]. The study was carried out in Isparta which is one of the most important provinces in Turkey with regard to cold storage capacity. According to 2016 data, there is a total of 108 cold storage facilities and a cold storage capacity of 430,000 tons (Anonymous, 2016) [3]. Almost all of the cold storage facilities in Isparta province are used for apple storage. The city of Isparta has ecological conditions suited for growing apples. According to 2015 data, apple production of Turkey is 2.57 million tons, and the share of Isparta in Turkish apple production is about 17% (TÜİK, 2016) [14].
The objective of this study was to carry out the economic analyses for the different types of cold storage facilities of Isparta province which is ranked number one in Turkey with regard to apple storage. To this end; cold storage facilities having only rooms with normal atmosphere (NA), controlled atmosphere (CA) and both of these rooms as mixed (NA+CA) were compared with regard to storage capacity, capacity utilization rate, length of storage time for apples, ratio of loss, temperature and humidity ratios, technical properties, cost, income and profitability indicators. In addition, the effects of storage on apple sales price were also examined with regard to break-even point determining the minimum capacity for the facilities.

MATERIALS AND METHODS

The main material of the study was comprised of original data acquired from cold storage facilities in the city of Isparta which were collected via survey method. In addition, various study results and reports on the subject were also used. Survey data were collected during May-June 2016 period.
The number and capacities of cold storage facilities according to type were asked from Isparta Food, Agriculture and Livestock Provincial Directorate. According to the records, it was determined that there is a total of 108 cold storage facilities in the city of Isparta. Equal number of facilities were taken into consideration for each cold storage type since cold storage facilities with normal atmosphere (NA), those with controlled atmosphere (CA) and those with mixed normal and controlled rooms (NA+CA) since the objective of the study was to carry out an economical comparison between cold storage facilities. It was determined according to the records that there are 8 cold storage facilities with controlled atmosphere in the study area. However, 3 of these cold storage facilities with controlled atmosphere were not taken into consideration since they were going to start operation in 2017. Accordingly, 5 cold storage types of each were taken into consideration for a total of 15 cold storage facilities with normal atmosphere (NA), with controlled atmosphere (CA) and cold storage facilities with normal and controlled rooms after which data were collected via face-to-face interviews.
Cold storage facilities with normal atmosphere are storages with which only the temperature and relative humidity can be controlled without intervening with the air composition. Gas tightness is not important since these storages have only temperature and humidity control. It is sufficient for storages with normal atmosphere to have a good thermal insulation. The ratio of the gases in the environment can also be controlled in

cold storage rooms with controlled atmosphere in addition to temperature and relative humidity. These gases are carbondioxide and oxygen which are effective on the respiration rate of the product. The basic principle for these cold storages is to decrease the respiration rate of the products by decreasing the oxygen ratio in the environment while increasing the carbondioxide ratio. Hence, the products may be stored at a higher quality for longer periods of time. Gas composition in the cold storages varies with regard to the type and variety of the product (Ormeciand Demircan,2013) [11].

Some of the information included in the survey forms prepared for the facilities have been given below:

-Area of the enterprise (m^2), number of cold storage units, period of activity

-Capacity, amount of stored apples and duration of storage

-Temperature and humidity values according to apple varieties

-Technical properties of the facilities (the coolant used, isolation and construction materials etc.)

-Enterprise costs (personnel, energy, repair and maintenance, insurance, tax, etc.)

-Enterprise income.

MS Excel software was used for the analysis of the data acquired from the enterprises via survey method. Tables were prepared according to the analysis results and these tables were interpreted according to absolute and comparative distribution using basic and weighted averages methods.

Gross income values of the cold storage facilities were calculated by taking into consideration the unit storage prices during the active season. Net income was calculated by subtracting the total costs from gross income.

The minimum capacities that enterprises should operate at were determined via break-even point analyses.

$$Q = \frac{FC}{P - VC} \qquad (1)$$

Q: Minimum capacity break-even point value that the enterprises should operate at (kg/enterprise, tons/enterprise)

FC: Total fixed costs (USD $enterprise^{-1}$)

P: Unit storage price (USD kg^{-1})

VC: Total variable cost per unit (USD kg^{-1}) (Yurdakul, 1999) [15].

Values of fixed cost were taken into consideration when determining the depreciation values for cold storage enterprises. Depreciation rates were accepted in this study as 2% for building capital, 6.66% for generators and weigh-bridges, 3.33% for climate control system, 20% for plastic cases given to rent, 20% for equipment in the administrative building, pallet trucks, trucks and the rest of the permanent equipment, 10% for the power distribution unit, 25% for the pick-up truck and forklift (Anonymous, 2016b) [4]. Real interest ratio for the building and machinery capital was calculated as 2.25%.

The values for the capitals of examined cold storage facilities such as building, machinery-equipment and vehicles were determined as a result of interviews carried out with the enterprise owners or managers.

RESULTS AND DISCUSSIONS

When the enterprises were compared with regard to the area they occupy, it was determined that NA+CA cold storage facilities occupy a greater area. Area per enterprise for NA+CA facilities was determined as 11,000 m^2, whereas the values for NA and CA facilities were determined as 7,300 m^2 and 7,000 m^2, respectively. Similar results were determined with regard to the number of cold storage rooms. Whereas the number of cold storage rooms in NA+CA facilities was 23, the number of rooms for NA facilities was determined as 13.4 and for CA facilities as 8.6. Whereas NA+CA facilities only had NA rooms when they were first set-up, it was determined that they had higher number of storage rooms and occupied a greater area in comparison with other facilities due to the fact that CA rooms were added in later years. When cold storage facilities were compared with regard to the period of activity, it was determined that CA cold storage facilities are newer. Whereas CA facilities continue operation since 1.8 years,

the active periods of time were determined as 8.6 years for NA facilities and 20.2 years for NA+CA facilities (Table 1).

Table 1. Total area, number of cold room and activity period of enterprises

	Storage type		
	NA	NA+CA	CA
Total area(m^2)	7,000	11,000	7,300
Number of cold room (units)	13.4	23.0	8.6
Activity period (year)	8.6	20.2	1.8

When different cold storage types were compared with regard to capacity, it was determined that NA+CA facilities have greater capacity. It was determined that the average capacity of NA+CA facilities was 7,500 tons, for NA facilities it was 4,540 tons and for CA facilities it was 2,400 tons. Apple is stored in all cold storage facilities examined. When a comparison was made in terms of capacity utilization rate, it was determined that CA facilities had greater capacity utilization rates. The capacity utilization rates for CA, NA and NA+CA facilities were 85.42%, 79.74% and77.60%, respectively (Table 2). Ormeci Kart and Demircan (2013) [11] carried out a study in which it was determined that the average storage capacity for cold storage facilities was 4,978.43 tons, capacity utilization rate was 84.52% and average capacity per enterprise was 7,125 tons for cold storage facilities, whereas usage ratio was 96.49%. Gencoglan et.al., (2016) [8] carried out another study in which it was determined that 33.3% of the enterprises had a storage capacity below 1,500 tons, that 16.7% had capacities of 1,500 tons, whereas 50% had capacities of over 1500 tons. No difference was determined between the storage types with regard to the time when the apples entered the cold storages. Generally, apples are placed in cold storage during September-October. It has been determined that apples are stored for longer periods in CA rooms. Apples are stored during 10 months (September-June) in CA rooms, whereas they are stored during 8 months (between September-April) in NA rooms. Product loss in the examined facilities was determined to be greater for NA rooms. This loss was determined as 6.5% for NA rooms and as 3.3% for CA rooms (Table 2). Nural et.al. (2016) [10] carried out a study in which product loss was determined to vary between 1-5% for 44% of the citrus storage facilities and that product loss varied between 6-10% for 37% of the enterprises.

Amount of apple stored with regard to variety has been given in Table 3. It was determined that Golden Delicious ranked number one among all apple varieties stored in all storage types. The ratio of Golden Delicious was determined as 52.49% among the apple varieties stored in NA facilities, whereas the ratios were determined as 52.89% and 69.86% for NA+CA and CA facilities, respectively. Red apple groups (Starking Delicious, Redchief, Scarlet Spur) were ranked as second among the stored apple varieties. Starking Delicious comprises majority of the red variety of apples stored. The ratio of red varieties was determined as 40.61% in NA facilities, as 31.99% in NA+CA facilities and as 20.55% in CA facilities.

Harvested fruits and vegetables preserve their fresh qualities for longer periods when stored in proper conditions. The proper conditions can be attained by adjusting the temperature and relative humidity. There is a temperature value and relative humidity for every fruit and vegetable at which they can be stored properly (Akdemir, 2002) [1]. The average temperature and relative humidity values for the apple varieties stored have been given in Table 4. It was determined that the average storage temperature for Golden Delicous and red apple varieties varied between -1 and 0 Cº in NA rooms and between -0.5 and 0 Cº in CA rooms. Whereas it was determined that the Grany Simit variety is stored at 0Cº in both conditions (NA and CA). When a comparison was made with regard to relative humidity, the relative humidity ratios for Golden Delicous, red varieties and Grany Simit varied between 85-90% in NA rooms and between 90-95% in CA rooms.

NA+CA facilities were determined to have the highest annual operating costs among the types of facilities examined. Average operating cost per facility was determined as 355,869 USD for NA+CA facilities, as 192,131 USD for NA facilities and as

121,282USD for CA facilities. The reason why average operating costs are higher for NA+CA facilities is due to their greater capacities. Personnel wages, machinery depreciation and electricity costs were the highest three costs for all storage types. The ratios for personnel wages, machinery depreciation and electricity cost were determined as 26.79%, 20.78% and 18.27% for NA facilities, respectively.

Table 2. Capacity utilization rate and apple storage period of enterprises

	Storage type		
	NA	NA+CA	CA
Capacity (ton enterprise^{-1})	4,540	7,500	2,400
Stored apples (ton enterprise^{-1})	3,620	5,820	2,050
Capacity utilization rate (%)	79.74	77.60	85.42
Entry period of apple for storage	September-October	September-October	September-October
Storage period of apple	September-April	NA: September-April KA: September-June	September-June
Loss ratio (%)	6.5	NA=6.3; CA=3.5	3.3

Table 3. Amount of stored apples according to varieties (ton)

Apple varieties	**Storage type**					
	NA	%	NA+CA	%	CA	%
Golden Delicious	1,900	52.49	3,078	52.89	1,530	69.86
Red varieties	1,470	40.61	1,862	31.99	450	20.55
Granny Smith	250	6.91	880	15.12	70	3.20
Other	0	0.00	0	0.00	140	6.39
Total	3,620	100.00	5,820	100.00	2,190	100.00

Table 4. Storage temperature and humidity according to apple varieties

Apple varieties	**Storage type**					
	NA		NA+CA		CA	
	C°	Relative humidity (%)	C°	Relative humidity (%)	C°	Relative humidity (%)
Golden Delicious	-1 - 0	85-90	NA:-1 - 0 KA:+0.5 - 0	NA:85-90 KA:90-95	-0.5 - 0	90-95
Red varieties	-1 - 0	85-90	NA:-1 -0 KA:+0.5 - 0	NA:85-90 KA:90-95	-0.5 - 0	90-95
Granny Smith	0	85-90	NA:-1 -0 KA:+0.5 - 0	NA:85-90 KA:90-95	0	90-95

Table 5. Enterprise Costs

Cost items	**Storage type**					
	NA		NA+CA		CA	
	USD enterprise^{-1}	%	USD enterprise^{-1}	%	USD enterprise^{-1}	%
Personnel	51,480	26.79	97,815	27.49	31,987	26.37
Electricity	35,099	18.27	56,954	16.00	28,344	23.37
Fuel- oil	1,689	0.88	8,609	2.42	2,351	1.94
Machine maintenance	3,444	1.79	10,265	2.88	728	0.60
1-MCP application	12,715	6.62	17,285	4.86	-	-
Insurance	2,781	1.45	6,126	1.72	3,126	2.58
Tax, levies and fees	1,126	0.59	2,358	0.66	132	0.11
Sanitation	530	0.28	563	0.16	331	0.27
Office supplies	364	0.19	629	0.18	265	0.22
Communication	364	0.19	960	0.27	430	0.35
Water	-	-	861	0.24	662	0.55
Other costs	-	-	662	0.19	-	-
Machinery depreciation	39,932	20.78	79,412	22.32	27,021	22.28
Building depreciation	16,715	8.70	28,318	7.96	10,556	8.70
Machinery interest	4,206	2.19	8,841	2.48	608	0.50
Building interest	18,805	9.79	31,858	8.95	11,876	9.79
Ground rent	2,881	1.50	4,354	1.22	2,864	2.36
TOTAL	192,131	100.0	355,869	110.0	121,282	100.0

These ratios were calculated as 27.49%, 22.32%and 16%, respectively for NA+CA facilities and 26.37%, 22.28% and 23.37% for CA facilities (Table 5). It was determined as a result of the study carried out by Ormeci Kart and Demircan (2014) [11] that depreciation, electricity and personal wages are ranked number one among total costs for classical and modern cold storages.

The examined enterprises were compared with regard to net income per ton according to storage types. Since net income is a net value, it is an important criteria that is used to measure the success of an enterprise. When the enterprises were compared with regard to net income per ton, it was observed that CA cold storage facilities can be more profitable. Whereas net income per ton for CA facilities was 27 USD, it was found to be 21 USD for NA+CA facilities and 17 USD for NA facilities. The reason why CA facilities are more profitable is that they have greater capacity utilization rates, storage prices and storage times (Table 6).

Break-even point gives the production volume at which the enterprise makes profit after covering all expenses. Thus, this point also indicates the minimum capacity required for the enterprise to operate (Yurdakul, 1999) [15]. Break-even points for the examined enterprises have been given in Table 7. Break-even points for CA, NA and NA+CA cold storage facilities were 999,2077 and 3,296 tons, respectively. It was determined that total expenses equaled total income and that break-even point was reached for CA cold storage facilities when 41.62% of the capacity was used, for NA+CA facilities when 43.94% of the capacity was used and for NA facilities when 45.75% of the capacity was used. The enterprises made profit after this point. It was determined that CA facilities reached break-even point earlier than other facilities. Ormeci Kart and Demircan (2014) [12] carried out a study in which it was determined that the break-even point was 2,680 tons for classical cold storage facilities and as 2,848 tons for modern cold storage facilities.

When the harvest period and after storage prices of apples were compared according to variety, the greatest change was observed in the Granny Simit variety. Harvest period price of Granny Simit variety was 0.27 USD kg^{-1} which reached 0.32 USD kg^{-1}a with an increase of about 20.99% at the end of storage period. The price increase in Golden Delicious and red apple varieties took place as 19.19% and 16.95%, respectively during the same period. Accordingly, it can be put forth that storage resulted in an increase of about 17-21% in the apple prices with regard to varieties (Table 8).

Table 6. Income of Enterprises

	Storage type		
	NA	NA+CA	CA
Gross income (USD $enterprise^{-1}$)	254,305	476,490	176,159
Gross income (USD ton^{-1})	70	82	86
Costs (USD $enterprise^{-1}$)	192,131	355,869	121,282
Costs (USD ton^{-1})	53	61	59
Net income (USD $enterprise^{-1}$)	62,174	120,621	54,877
Net income (USD ton^{-1})	17	21	27

Table 7. Break-even points in enterprises

	Storage type		
	NA	NA+CA	CA
Capacity (ton $enterprise^{-1}$)	4,540	7,500	2,400
Fixed costs (USD $enterprise^{-1}$)	82,538	152,783	52,925
Stored apples (kg $enterprise^{-1}$)	3,620,000	5,820,000	2,050,000
Price per unit storage (USD kg^{-1})	0.07	0.08	0.09
Variable costs (USD $enterprise^{-1}$)	109,593	203,086	68,358
Variable cost per unit (USD kg^{-1})	0.03	0.04	0.03
Break-even point (kg $enterprise^{-1}$)	2,077,208	3,295,743	998,956
Break-even point (ton $enterprise^{-1}$)	2,077	3,296	999
Break-even point capacity usage (%)	45.75	43.94	41.62

Table 8. Change of apple sale prices in harvest period and after storage

Apple varieties	**Apple sales prices (USDkg^{-1})**		
	Harvest	After period	Change storage
Golden Delicious	0.33	0.39	19.19
Red varieties	0.39	0.46	16.95
Granny Smith	0.27	0.32	20.99

The technical properties of examined facilities have been given in Table 9. Pre-cooling is the cooling of fruits prior to the storage in the shortest amount of time possible. This is important for preserving the quality of the fruits during storage.

Ormeci Kart and Demircan (2013) carried out a study in which price after storage increased by 43.47% for extra apples in comparison with the harvest period price, by 48.05% for first grade apples and by 50.76% for second grade apples.

Table 9. Technical features of enterprises

	Storage type		
	NA (%)	NA+CA (%)	CA(%)
Do you apply pre-cooling?			
Yes	0.00	0.00	0.00
No	100.00	100.00	100.00
Is there a quality control lab?			
Yes	0.00	0.00	0.00
No	100.00	100.00	100.00
Is there a packing facility?			
Yes	40.00	60.00	0.00
No	60.00	40.00	100.00
Used refrigerant			
Ammonia	100.00	100.00	100.00
Used insulation material			
Sandwich panel	80.00	100.00	100.00
Strafor	20.00	0.00	0.00
Used building material			
Steel	80.00	60.00	80.00
Concrete	20.00	80.00	20.00
How is the room temperature controlled?			
Automatic	100.00	100.00	100.00
How is the room humidity controlled?			
Wet the floors	100.00	100.00	100.00
Do you apply disinfectant before storage?			
Yes	80.00	100.00	60.00
No	20.00	0.00	40.00
Do you use any treatment to apples after harvest (waxing, wrapping etc.)?			
Yes	0.00	0.00	0.00
No	100.00	100.00	100.00
Do you apply 1- MCP?			
Yes	100.00	80.00	0.00
No	0.00	20.00	100.00
How do you ventilate the cold rooms?			
Manuel	100.00	100.00	0.00
Full Automatic	0.00	0.00	100.00
Which box type do you use?			
300-400 kg Wood	40.00	40.00	0.00
30 kg Wood	40.00	20.00	0.00
24 kg Wood	20.00	20.00	0.00
320 kg Plastic	0.00	60.00	80.00
21 kg Plastic	40.00	100.00	60.00
How do you stack the apple boxes?			
Forklif	100.00	100.00	100.00
Do you store other fruits with apple in the same room?			
Yes	0.00	0.00	0.00
No	100.00	100.00	100.00
Who owns the stored apple?			
Hirer	90.06	65.64	97.00
Enterprise owner	9.94	34.36	3.00
Do you see any physiological disorder during storage?			
Yes	60.00	60.00	0.00
No	40.00	40.00	100.00

There are no facilities where pre-cooling operation is carried out in the examined enterprises. The reason for this is that apples are stored for long periods of time and that this procedure is applied mostly for fruits that are stored for very short periods of time. The examined enterprises did not have quality control laboratories. It was determined that mostly NA+CA enterprises had a packaging facility. The 60% of the NA+CA enterprises and 40% of the NA enterprises had a packaging facility. Packaging facility was not determined in CA enterprises. The reason for this is thought to be due to the fact that these enterprises have very small capacities. Ammonia was used as the coolant in all of the examined enterprises. It was determined that ammonia was preferred in the enterprises in the study region with large capacity which operate all year long. Alkan (2013) [2] put forth in the studies carried out in the city of Aydın that 68% of the cold storages were using Freon gas. When different storage types were compared with regard to the isolation material used, it was determined that sandwich panels were used in all CA and NA+CA facilities. This panel was used in 80% of the NA facilities while, in the rest of NA storages (20%) styrofoam was used. Both steel and reinforced concrete are used in the enterprises as construction material. However, as can be seen in Table 9, it can be stated that steel construction is more common. Gencoglanet.al. (2016) carried out a study in which it was determined that 83.3% of the cold storages had steel construction, whereas 16.7% were reinforced concrete. It was determined that room temperature is automatically controlled in all examined facilities and that room relative humidity was attained by watering the floors. It was determined that disinfection was carried out in most of the facilities in the study region prior to placing apples for storage.

It was determined that 1-MCP (1-methylcyclopropene) application was carried out in majority of NA rooms in the examined facilities. The 1-MCP was applied in these rooms in order to ensure that fruits stay harder and more acidic. Whereas it was put forth that 1-MCP was not used in CA rooms since the

required quality criteria could be attained by adjusting the optimum gas compositions of rooms. Ventilation is carried out manually in NA storage since the rooms are opened and closed frequently for product shipments. Since this is not possible in CA rooms, ventilation is carried out automatically. Indeed, manual ventilation is not possible in CA rooms since the gas composition of rooms is disrupted. It was determined that mostly large sized (320 kg) plastic cases are used in CA storages. Whereas all box types are used in NA storages. Gencoglan et.al. (2016) [8] carried out a study in which it was determined that 50% of the facilities used plastic boxes, 16.7% wooden boxes and 33.3% both when storing products. Forklifts are used in all facilities for the stowage of apple boxes. It was determined that no other product than apple is stored in NA and CA rooms. The majority of the apples stored in the facilities belong to apple growers on provision of rent. There were various physiological disorders in the apples stored in the NA rooms in the study region such as scald and bitter pit. However, such physiological disorders were not observed in CA rooms.

CONCLUSIONS

In conclusion, it was determined that NA+CA facilities have greater capacities but that CA facilities have higher capacity utilization rates. Only apple is stored in all the cold storage facilities examined. The apples are placed in cold storage during the months of September-October. However, it was determined that apples are stored for longer periods of time in CA facilities. Golden Delicious was determined to be ranked number one among the apple varieties stored in all depot types. NA+CA facilities were determined to have the highest operating expenses among the examined facilities. It was determined that personnel cost, machine depreciation and electrical costs are ranked in the top three for average operating expenses in all storage types. When the enterprises were compared with regard to net income per ton, CA cold storage facilities were determined to be more profitable. Break-even points were determined as 999 tons, 2,077 tons and 3,296 tons for CA, NA and NA+CA cold storage facilities, respectively. It was determined that storage results in an approximate increase of 17-21% in apple prices depending on the variety.

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COMPARISON OF COST AND PROFITABILITY OF ORGANIC AND CONVENTIONAL STRAWBERRY SEEDLING GROWING MEDIA

Vecdi DEMIRCAN[1], Nurgul F. TUREMIS[2], Hulya SAYGI[3], Aysegul BURGUT[2], Kamil EKINCI[1]

[1]Suleyman Demirel University, Agriculture Faculty, Department of Agricultural Economics, Agricultural Machinery and Technologies Engineering, Isparta-Turkey, Email: vecdidemircan@sdu.edu.tr
[2]Cukurova University, Agriculture Faculty, Department of Horticulture Science, Adana-Turkey
[3]Cukurova UniversityVocational School of Yumurtalık, Adana- Turkey

Corresponding author: vecdidemircan@sdu.edu.tr

Abstract

In this study, it was aimed to compare organic and conventional strawberry seedling cultivation media in terms of cost and profitability. This study was carried out in the Apricot Research Institute in Malatya province, Turkey. Albion and Sweet Charlie varieties were used in the experiment. The production costs of Albion and Sweet Charlie strawberry varieties were calculated in different growing media. Calculation of the production costs of the fresh plug strawberry seedlings was done in two steps. First, the production costs of strawberry runner plants were calculated, then the production costs of fresh plug strawberry seedlings were found. According to the results of the research, the cost of a runner plant was found to be the highest for the Albian Biodecal application, while the lowest was detected for Sweet Charlie Control application. According to different applications, the cost of strawberry branch plant was determined as 0.376, 0.341, 0.273, and 0.235 TL/unit for Albian Biodecal, Albian Control, Sweet Charlie Biodecal and Sweet Charlie Control applications, respectively(1 USD=3.02 TL in 2016, average). When the production costs of Albion and Sweet Charlie strawberry seedling obtained from Biodecal application were compared with the sale price, it can be said that production cost was lower than sale price for all the organic growing media (except for IT (Imported Turf) growing medium for Albion strawberry seedling obtained from Biodecal application), but in the conventional growing media, production costs was found to be higher than the sale price. Similar results have been found for the strawberry seedlings obtained from the control application. When organic applications were compared with each other, it was determined that KP (1:1 ratio local turf: perlite) was the growing medium which had the lowest production cost for Albion strawberry seedling obtained from Biodecal application, OE (1:1 ratio local turf: perlite + ecoflora providing 50 mg kg^{-1} potassium) for Sweet Charlie strawberry seedling obtained from Biodecal application, KP for Albion strawberry seedling obtained from control application and OE for Sweet Charlie strawberry seedling obtained from control application.

Key words**:** *strawberry seedling, organic, conventional, cost, profit margin*

INTRODUCTION

Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved (IFOAM,2017) [5].

Organic agriculture has been spreading rapidly in the world in recent years and global organic food market is also growing. Turkey is a typical example to countries that develop their organic agriculture based on export potential. Majority of the organic agriculture in Turkey is exported. Domestic market is also growing rapidly. The share of Turkey in the world organic food market is quite low even though it has proper ecological conditions for organic production and high export potential (Demiryurek, 2011) [2].

Organic agriculture in Turkey started unsystematically during 1985-1986 based on the development of organic agriculture in the world and the organic product demand from abroad after which it developed parallel to the developments in the world related with the

consumption of healthy foods as well as the issuing of the "Organic Agriculture Law" in 2004. In 2014, the number of organic production plants reached to 71,472, cultivation area reached to 842,216 (350,239 hectares of natural collection area) hectares, number of products reached to 208 and annual production reached about 1,642,235 tons. However, the inputs used in production are completely foreign country based. Turkey holds an important place especially in the production and foreign trade of healthy goods for the restructuring world food conjuncture. However, continuity of production depends on the more effective use of domestic resources for the development of technique and technologies used for the inputs of production. This is possible via the sustainment of the cooperation between university and the private sector as well as investments in R&D. The fact that inputs used in organic agriculture in Turkey are dependent on foreign countries is the main factor that limits the development and popularization of production (GTHB, 2017a; GTHB, 2017b) [3, 4].

The objective of this study was to compare organic and conventional strawberry seedlings growing media in terms of production cost and profit margin. To this end, the inputs, costs and seedling prices used in organic and conventional strawberry seedling cultivation were determined after which it was examined which production system is more profitable. It is expected that the study could provide valuable data to policy makers, producers who makes organic strawberry production and institutions that make publications on agriculture in this subject. In addition, the fact that there is no previous study comparing organic and conventional strawberry seedling growing media with regard to cost and profit margin.

MATERIALS AND METHODS

Two different strawberry varieties (Sweet Charlie and Albion) were used in the study (Figure 1). Production costs in different growing media for the Albion and Sweet Charlie strawberry varieties were calculated in the experiment area. The production costs for fresh plug strawberry seedlings were calculated in two stages. Firstly, the production costs for strawberry runner plants were calculated. A greenhouse area of 30 m^2 was used for each application. Afterwards, the production costs were calculated for fresh plug strawberry seedlings according to different growing media. An experiment area of 1 m^2 was used for each medium. A total of 84 plants were planted for Albion-Biodecal, Albion-Control, Sweet Charlie-Biodecal and Sweet Charlie-Control applications for each medium.

The production of strawberry runner plants was carried out at the Çukurova University Department of Horticulture, Application and Research Field. Strawberry main plants were planted in March as frigo seedlings. The medium for planting was comprised of 9:9:1 ratio of Local Turf: Perlite: Ecoflora fertilizer compost (Figure 2). In addition to, T-22 application was made for each area.

The experiment was set up as 5 repetitions with 25 plants in each repetition. Bacteria based Biodecal fertilizer and pure water as its control was used in the trials. Biodecal application: the plants were left to wait for 15 minutes in Biodecal solution during planting after which they were planted. Afterwards, it was applied once every 15-20 days. Control application: the main plants were left to wait in pure water for 15 minutes after which they were planted.

Fresh plug strawberry seedling was produced following the production of strawberry runner plants. Fresh plug strawberry seedling production was carried out via the trials at the Ministry of Food, Agriculture and Livestock Fruit Growing Research Institute Directorate. The trial was carried out in organic cultivation with a total of 6 applications comprised of 5 different medium and 1 control specified in Table 1. The abbreviation for the growing media is given in Table 1.

Sweet Charlie is a short-day variety which is early fruiting and sweet. This variety that is suited for summer planting is also resistant against anthracnose. The outer color of the fruit is brick red, whereas the interior is red. The fruits are average in size, fruit shape is

cylindrical, flat conical or conical (Aybak,2000; Turemis and Agaoglu, 2013) [1,6]. Albion is a day-neutral variety that is well adapted to cool and temperate regions. Its most important property is the extraordinary fruit quality and the fruit size is the same in all seasons. Albion variety is a mixture comprised of the fine properties of Aromas and Diamente varieties. Post-harvest fruit strength is longer than those of both varieties. Its fruit structure is suited well to fruit picking (Turemis and Agaoglu,2013).

Fig. 1. A view of Albion and Sweet Charlie strawberry varieties

Fig.2. A view of planting

The cost factors were grouped as variable and fixed costs. Variable costs are those that depend on the production volume. They occur as production continues. Fixed costs do not depend on production amount. These costs will remain regardless of whether the production is continued or not. The costs for the materials used were calculated by taking the market prices into consideration. Daily wages paid to workers in the region were taken into consideration when calculating the labor costs. Capital interest was calculated by applying half of the interest rate (8%) applied by TR. Ziraat Bank to agricultural production credits. General administrative expenses were calculated as 3% of the total variable costs.

Table 1. Potted fresh seedling media

1. KP medium (1:1 ratio local turf: perlite)
2. KK medium (1:1 ratio local turf: clinoptilolite)
3. IT medium (Import turf)
4. OB medium (1:1 ratio local turf: clinoptilolite + biofarm providing 50 mg kg^{-1} potassium)
5. OE medium (1:1 ratio local turf: perlite + ecoflora providing 50 mg kg^{-1} potassium)
6. Cnv medium (Import turf + N containing chemical fertilizer)

RESULTS AND DISCUSSIONS

Strawberry runner plant production costs for Albian-Biodecal, Albian-Control, Sweet Charlie-Biodecal and Sweet Charlie-Control applications are given in Table 2. It was determined as a result of the calculations carried out that the highest cost for a runner plant was for the Albian-Biodecal application whereas the lowest cost was determined for the Sweet Charlie-Control application. Indeed, the strawberry runner plant cost with regard to different applications were determined as 0.376,0.341,0.273, and 0.235 TL/unit for Albian-Biodecal, Albian-Control, Sweet Charlie-Biodecal and Sweet Charlie-Control applications, respectively. The reason why production cost was lower for the Sweet Charlie-Control application was that the number of runner plants was greater in comparison with other applications. Runner plant production amounts were determined as 1100, 1152, 1516, and 1672 for Albian-Biodecal, Albian-Control, Sweet Charlie-Biodecal and Sweet Charlie-Control applications, respectively (Table 2).

After the production costs for runner plants were calculated for Albian-Biodecal, Albian-Control, Sweet Charlie-Biodecal and Sweet Charlie-Control applications, production costs for fresh plug strawberry seedlings were calculated for six different media.

Table 2. Strawberry runner plant production costs

Cost items (TL)	Applications			
	Albian Biodecal	Albian Control	Sweet Charlie Biodecal	Sweet Charlie Control
Ecoflora	50.00	50.00	50.00	50.00
Perlite	70.00	70.00	70.00	70.00
Turf	55.17	55.17	55.17	55.17
Medium preparing labor	25.00	25.00	25.00	25.00
Main plant cost	68.75	68.75	68.75	68.75
Main plant planting labor	12.50	12.50	12.50	12.50
Bacteria fertilizer	10.35	0.00	10.35	0.00
Biodecal application labor	10.00	0.00	10.00	0.00
Liquid manure	0.21	0.21	0.21	0.21
Liquid manure application labor	10.00	10.00	10.00	10.00
Runner plant cut labor for main plant	25.00	25.00	25.00	25.00
Greenhouse rent	60.00	60.00	60.00	60.00
Electricity	9.00	9.00	9.00	9.00
Water	7.50	7.50	7.50	7.50
Total production costs	413.48	393.13	413.48	393.13
Runner plant production (number)	1100	1152	1516	1672
Runner plant production cost (TL/number)	0.376	0.341	0.273	0.235

1 USD=3.02 TL in 2016 (average)

Production costs obtained via Biodecal application for the Albion strawberry seedling in different media are given in Table 3. As can be seen from the Table, whereas the medium with the lowest production cost was KP, the medium with the highest cost was IT. Fresh plug strawberry seedling cost was 0.73TL/unit for KP medium, 0.74TL/unit for OE medium, 0.85 TL/unit for OB medium,0.86 TL/unit for KK medium,0.95 TL/unit for Cnv medium and 1.12 TL/unit for IT medium. The reason why the costs for the seedlings produced in IT medium was greater might be due to the lower efficiency in comparison with other media. When seedling production costs and seedling sales prices were compared according to different media, it was observed that seedling production costs were lower than the seedling sales prices in all media except Cnv and IT. Organic strawberry seedling sales price was taken as 1 TL/unit and conventional seedling sales price was taken as 0.6 TL/unit. Since the price of conventional seedling sales price was lower in comparison with those of the organic seedlings, cost was determined to be greater than sales price. However, it was observed that the organic seedlings produced in KP medium were more advantageous than seedlings produced in other media. Indeed, the profit margin or the strawberry seedling produced in KP medium was determined as 0.27 TL/unit and the ratio of the profit margin to the sales price was determined as 27 %.

The production costs for Albion strawberry seedling obtained via control application are in Table 4. When the seedling production costs for different media were examined, it was observed that the lowest cost was obtained from the KP medium (0.66 TL/unit), whereas the highest production cost was obtained from the Cnv and OB media (0.84 TL/unit). It was determined that the production costs for the Albion strawberry seedling obtained via control application was lower in comparison with seedling prices for all media, however it was determined that the production cost for the seedling produced in the conventional media was greater than the seedling sales price. Therefore, it was determined that KP was the most advantageous medium with regard to profit margin.

Production costs for Sweet Charlie strawberry seedling obtained via Biodecal application are given in Table 5. As can be seen from the table, whereas the medium with the lowest seedling production cost was OE, the medium with the highest production cost was determined as OB. Seedling production cost was determined as 0.63 TL/unit for OE medium, 0.67 TL/unit for KP medium, 0.74 TL/unit for IT medium, 0.79 TL/unit for Cnv medium, 0.81 TL/unit for KK medium and 0.87 TL/unit for OB medium. When the seedling production costs for different media were compared with seedling sales prices, it was determined that seedling production cost was lower in comparison with the seedling sales price in all media except Cnv medium. It

was determined that the profit margin was the highest for Sweet Charlie strawberry seedlings produced via Biodecal application, whereas the medium with the lowest profit margin was determined as OB.

The production costs for the Sweet Charlie strawberry seedlings obtained via the control application with regard to different media have been given in Table 6. Whereas the seedling production cost produced in all media excluding the conventional media were lower than the sales cost, it was calculated that the seedling production cost was greater than the seedling sales price for the conventional media.

Table 3. The production costs of Albion strawberry seedling in different growing media obtained by Biodecal application

Cost item (TL)	**Media**					
	KP	KK	IT	OB	OE	Cnv
Runner plant production cost	31.58	31.58	31.58	31.58	31.58	31.58
Local turf	1.23	1.23	0.00	1.23	1.23	0.00
Import turf	-	-	12.00	-	-	12.00
Clinoptilolite	-	12.00	-	12.00	-	-
Perlite	1.75	-	-	-	1.75	-
Chemical fertilizer	-	-	-	-	-	3.00
Biofarm	-	-	-	0.013	-	-
Ecoflora	-	-	-	-	0.017	-
T22	2.00	2.00	2.00	2.00	2.00	2.00
Mycorrhiza	1.00	1.00	1.00	1.00	1.00	1.00
Medium preparing in viols	2.00	2.00	2.00	2.00	2.00	2.00
Runner plants planting	5.00	5.00	5.00	5.00	5.00	5.00
Viol costs	5.25	5.25	5.25	5.25	5.25	5.25
Bacteria fertilizer	0.72	0.72	0.72	0.72	0.72	0.72
Bacteria fertilizer application labor	2.00	2.00	2.00	2.00	2.00	2.00
Water	0.22	0.22	0.22	0.22	0.22	0.22
Irrigation labor	2.00	2.00	2.00	2.00	2.00	2.00
Electricity	0.27	0.27	0.27	0.27	0.27	0.27
Revolving fund interest	2.20	2.61	2.56	2.61	2.20	2.68
A. Total variable costs	57.22	67.88	66.60	67.89	57.24	69.72
Administrative costs	1.72	2.04	2.00	2.04	1.72	2.09
Greenhouse rent	1.00	1.00	1.00	1.00	1.00	1.00
B. Total fixed costs	2.72	3.04	3.00	3.04	2.72	3.09
C. Total production costs (A+B)	59.94	70.92	69.60	70.93	59.96	72.81
Potted seedling production (number)	82	82	62	83	81	77
Potted seedling production costs (TL/number)	0.73	0.86	1.12	0.85	0.74	0.95
Potted seedling price (TL/number)	1.00	1.00	1.00	1.00	1.00	0.60
Profit margin (TL/number)	0.27	0.14	-0.12	0.15	0.26	-0.35
Profit margin/seedling price*100 (%)	27.00	14.00	-12.00	15.00	26.00	-58.33

Table 4. The production costs of Albion strawberry seedling in different growing media obtained by Control application

Cost itam (TL)	**Media**					
	KP	KK	IT	OB	OE	Cnv
Runner plant production cost	28.64	28.64	28.64	28.64	28.64	28.64
Local turf	1.23	1.23	-	1.23	1.23	-
Import turf	-	-	12.00	-	-	12.00
Clinoptilolite	-	12.00	-	12.00	-	-
Perlite	1.75	-	-	-	1.75	-
Chemical fertilizer	-	-	-	-	-	3.00
Biofarm	-	-	-	0.013	-	-
Ecoflora	-	-	-	-	0.017	-
T22	2.00	2.00	2.00	2.00	2.00	2.00
Mycorrhiza	1.00	1.00	1.00	1.00	1.00	1.00
Medium preparing in viols	2.00	2.00	2.00	2.00	2.00	2.00
Runner plants planting	5.00	5.00	5.00	5.00	5.00	5.00
Viol costs	5.25	5.25	5.25	5.25	5.25	5.25
Bacteria fertilizer	-	-	-	-	-	-
Bacteria fertilizer application labor	-	-	-	-	-	-
Water	0.22	0.22	0.22	0.22	0.22	0.22
Irrigation labor	2.00	2.00	2.00	2.00	2.00	2.00
Electricity	0.27	0.27	0.27	0.27	0.27	0.27
Revolving fund interest	1.97	2.38	2.34	2.38	1.98	2.46
A. Total variable costs	51.33	61.99	60.72	62.01	51.35	63.84
Administrative costs	1.54	1.86	1.82	1.86	1.54	1.92
Greenhouse rent	1.00	1.00	1.00	1.00	1.00	1.00
B. Total fixed costs	2.54	2.86	2.82	2.86	2.54	2.92
C.Total production costs (A+B)	53.87	64.85	63.54	64.87	53.89	66.75
Potted seedling production (number)	82	82	81	77	80	79
Potted seedling production costs (TL/number)	0.66	0.79	0.78	0.84	0.67	0.84
Potted seedling price (TL/number)	1.00	1.00	1.00	1.00	1.00	0.60
Profit margin (TL/number)	0.34	0.21	0.22	0.16	0.33	-0.24
Profit margin/seedling price*100 (%)	34.00	21.00	22.00	16.00	33.00	-40.00

Table 5. The production costs of Sweet Charlie strawberry seedling in different growing media obtained by Biodecal application

Cost item (TL)	**Media**					
	KP	KK	IT	OB	OE	Cnv
Runner plant production cost	22.93	22.93	22.93	22.93	22.93	22.93
Local turf	1.23	1.23	-	1.23	1.23	-
Import turf	-	-	12.00	-	-	12.00
Clinoptilolite	-	12.00	-	12.00	-	-
Perlite	1.75	-	-	-	1.75	-
Chemical fertilizer	-	-	-	-	-	3.00
Biofarm	-	-	-	0.013	-	-
Ecoflora	-	-	-	-	0.017	-
T22	2.00	2.00	2.00	2.00	2.00	2.00
Mycorrhiza	1.00	1.00	1.00	1.00	1.00	1.00
Medium preparing in viols	2.00	2.00	2.00	2.00	2.00	2.00
Runner plants planting	5.00	5.00	5.00	5.00	5.00	5.00
Viol costs	5.25	5.25	5.25	5.25	5.25	5.25
Bacteria fertilizer	0.72	0.72	0.72	0.72	0.72	0.72
Bacteria fertilizer application labor	2.00	2.00	2.00	2.00	2.00	2.00
Water	0.22	0.22	0.22	0.22	0.22	0.22
Irrigation labor	2.00	2.00	2.00	2.00	2.00	2.00
Electricity	0.27	0.27	0.27	0.27	0.27	0.27
Revolving fund interest	1.85	2.26	2.22	2.27	1.86	2.34
A. Total variable costs	48.22	58.88	57.61	58.90	48.24	60.73
Administrative costs	1.45	1.77	1.73	1.77	1.45	1.82
Greenhouse rent	1.00	1.00	1.00	1.00	1.00	1.00
B. Total fixed costs	2.45	2.77	2.73	2.77	2.45	2.82
C. Total production costs (A+B)	50.67	61.65	60.33	61.67	50.69	63.55
Potted seedling production (number)	76	76	82	71	80	80
Potted seedling production costs (TL/number)	0.67	0.81	0.74	0.87	0.63	0.79
Potted seedling price (TL/number)	1.00	1.00	1.00	1.00	1.00	0.60
Profit margin (TL/number)	0.33	0.19	0.26	0.13	0.37	-0.19
Profit margin/seedling price*100 (%)	33.00	19.00	26.00	13.00	37.00	-31.67

Table 6. The production costs of Sweet Charlie strawberry seedling in different growing media obtained by Control application

Cost item (TL)	**Media**					
	KP	KK	IT	OB	OE	Cnv
Runner plant production cost	19.74	19.74	19.74	19.74	19.74	19.74
Local turf	1.23	1.23	-	1.23	1.23	-
Import turf	-	-	12.00	-	-	12.00
Clinoptilolite	-	12.00	-	12.00	-	-
Perlite	1.75	-	-	-	1.75	-
Chemical fertilizer	-	-	-	-	-	3.00
Biofarm	-	-	-	0.013	-	-
Ecoflora	-	-	-	-	0.017	-
T22	2.00	2.00	2.00	2.00	2.00	2.00
Mycorrhiza	1.00	1.00	1.00	1.00	1.00	1.00
Medium preparing in viols	2.00	2.00	2.00	2.00	2.00	2.00
Runner plants planting	5.00	5.00	5.00	5.00	5.00	5.00
Viol costs	5.25	5.25	5.25	5.25	5.25	5.25
Bacteria fertilizer	-	-	-	-	-	-
Bacteria fertilizer application labor	-	-	-	-	-	-
Water	0.22	0.22	0.22	0.22	0.22	0.22
Irrigation labor	2.00	2.00	2.00	2.00	2.00	2.00
Electricity	0.27	0.27	0.27	0.27	0.27	0.27
Revolving fund interest	1.62	2.03	1.98	2.03	1.62	2.10
A. Total variable costs	42.08	52.74	51.46	52.75	42.10	54.58
Administrative costs	1.26	1.58	1.54	1.58	1.26	1.64
Greenhouse rent	1.00	1.00	1.00	1.00	1.00	1.00
B. Total fixed costs	2.26	2.58	2.54	2.58	2.26	2.64
C. Total production costs (A+B)	44.34	55.32	54.00	55.33	44.36	57.22
Potted seedling production (number)	81	83	81	79	84	81
Potted seedling production costs (TL/number)	0.55	0.67	0.67	0.70	0.53	0.71
Potted seedling price (TL/number)	1.00	1.00	1.00	1.00	1.00	0.60
Profit margin (TL/number)	0.45	0.33	0.33	0.3	0.47	-0.11
Profit margin/seedling price*100 (%)	45.00	33.00	33.00	30.00	47.00	-18.33

When the organic media were compared among themselves, OE medium was determined to be the most advantageous medium. Profit margin for the OE medium was determined as 0.47TL/unit,0.45TL/unit for the KP medium,0.33TL/unit for the KK and IT media,0.30TL/unit for the OB medium and -0.11TL/unit for the Cnv medium. The number of plants obtained was the maximum for the OE medium and minimum for the OB medium.

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CONCLUSIONS

In conclusion, it was determined that the cost for a strawberry runner plant was the highest for the Albian Biodecal application and lowest for the Sweet Charlie Control application. The reason why production cost was lower for the Sweet Charlie Control application was that the number of runner plants obtained from unit area was greater in comparison with other applications. Whereas the KP medium had the lowest production cost for the Albion strawberry seedling produced via Biodecal application, IT was determined as the medium with the highest production cost. When a comparison was made with regard to profit margin, KP was determined to have the highest profit margin (0.27TL/unit). The highest profit margin for the Albion strawberry seedling produced via control application was obtained from the KP medium. It was determined that OE was the medium with the highest profit margin for the Sweet Charlie strawberry seedlings produced in different media via Biodecal and control applications, whereas OB was determined as the medium with the lowest profit margin.

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CIRCULAR ECONOMY IN ROMANIA: AN INDUSTRIAL SYNERGY IN THE AGRI-FOOD SECTOR

Dumitru Florin FRONE[1], Simona FRONE[2]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, Email: ffrone@hotmail.com
[2]Institute of National Economy, Romanian Academy, 13, Calea 13 Septembrie 050711 Bucharest, Romania: Email: frone.simona@gmail.com

Corresponding author: ffrone@hotmail.com

Abstract

As a feature of the green economy, circular economy proposes the re-use of resources used in products whose shelf life has come to an end or which have lost their usefulness to construct new objects, the same quality or even better. The circular economy model may be the ideal solution for relaunching sustainably the European economy which has suffered in recent years (2008-2012). In the circular economy, the value of products, materials and resources is maintained in the economy for as long as possible and the generation of waste minimised. In this paper we shall stress on issues of eco-innovation promoting the circular economy in Romania. One of the most important concepts for the new paradigm of circular economy and resource efficiency improvements is the industrial symbiosis, implemented in eco-innovation parks (EInvP) developed to optimize economic and environmental efficiency of the involved companies and communities. In practice using industrial synergy as an approach to commercial operations – using, recovering and redirecting resources for reuse – means resources remain in productive use in the economy for longer. We analyse here a successful good practice of industrial synergy in the agri-food sector implemented within the ECOREG EInvP of Suceava County. The conclusions point to the important economic, social and environmental benefits to raise awareness for regional eco-innovation and circular economy prospects in Romania.

Key words**:** *green economy, circular economy, regional metabolism, eco-innovation, industrial synergy*

INTRODUCTION

The green economy is called to implement a more systemic and holistic socio-economic mechanism taking into consideration the sustainable management of the environmental and economic assets, so as to preserve the ecosystem services and to ensure the increased welfare of the planet (Frone D.F., Frone S., 2015) [5].

A green economy aims at sustainable management of environmental resources, based on the belief that our biosphere is a closed system with finite resources and a limited capacity for self-regulation and self-renewal.

As a feature form of the green economy, circular economy proposes the re-use of resources used in products whose shelf life has come to an end or which have lost their usefulness, to construct new objects, the same quality or even better.

The circular economy model may be the ideal solution for relaunching sustainably the European economy which has suffered in recent years (2008-2012).

The European Commission will assist the Member States, regions and local authorities in strengthening their circular economy approach through targeted outreach (EC COM/2015/0614 final) [4].

In this respect, the main objective of the paper is a grounding and analysis of some concepts, trends and issues for the implementation of the circular economy in the EU and Romania, as well as for the sustainable regional economic development.

This is possible with the implementation of the industrial synergy within eco-innovation parks, a concept that has been analysed in previous research and will be exemplified in the paper. In this paper, with the theoretical and empirical approaches employed there is argued again on the need of using industrial synergy as an approach to commercial operations, since using, recovering and

redirecting resources for reuse means resources remain in productive use in the economy for longer. In this context, the paper presents an analysis of the implementation of a successful good practice of industrial synergy in the agri-food sector, applied within the ECOREG eco-innovation park (EInvP) of Suceava County [13].

MATERIALS AND METHODS

First, there are introduced and explained some of the most important concepts and principles that are characteristic for the green and circular economy, with a recall of previously analysed issues and trends.

The strategic objectives and principles of the circular economy and among them, of the industrial symbiosis are conceptually highlighted and also analysed, within the case study based on the official reporting from the ECOREG pilot project.

Within the empirical approach of the case-study there is presented the complex industrial synergy developed around the SC PRODINCOM Company – Suceava, by:

-Identifying the economic and environmental drivers in this industrial synergy;

-Describing and analysis of the indicators and features of industrial synergy within the eco-innovation park ECOREG, for the case study;

-Analysis and synthesis of the environmental, economic and social benefits of the IS;

-Several computations in tables for a dynamic analysis of the main environmental and economic indicators.

RESULTS AND DISCUSSIONS

Conceptual and methodological issues

In (Frone D.F., Frone S., 2015) [5] it was introduced and analysed the global resource nexus model, as very suggestive for the model of circular economy and also for the topic of industrial symbiosis.

The green economy is designed for a more systemic and holistic socio-economic mechanism taking into consideration the sustainable management of the environmental and economic assets, so as to preserve the ecosystem services and to ensure increased welfare of the planet.

The circular economy is a form and a paradigm of the green economy, involving the reuse or recycling of material resources used in products whose life has come to an end or which have lost their usefulness, to construct new objects, of the same quality or even better.

Industrial symbiosis (IS), as part of the industrial ecology field of research, focuses on the flow of materials and energy from local and regional economies.

The industrial symbiosis traditionally engages separate industries in a collective approach to a competitive advantage involving physical exchange of materials, energy, water, and/or by-products as well as services and infrastructures shared at the industrial park scale to reduce environmental impact and overall production cost (Massard, 2011) [12].

The factors for industrial symbiosis are collaboration among actors (in sharing and recycling of resources) and the synergistic possibilities offered by geographic proximity (Chertow, 2000) [2].

In this respect, the process of recycling can take two ways: down-cycling and upcycling. As will be exemplified further on in the case-study, there are interesting industrial synergy facilities of down-cycling or upcycling the waste materials or the by-products.

A particularly useful and innovative concept for the ecological and circular economy is the regional metabolism. Also, it opens the possibility of describing in detail the links between ecosystem services auditing and economic sectors they support (Frone S., Constantinescu A., 2015) [6].

The dynamic nature of all elements of an integrated ecosystem approach brings attention to the complex issue of regulating the system of regional metabolism. Considering, on the one hand, the alarming situation of environmental degradation and on the other hand, the need to maintain economic growth, its functioning is ensured primarily by eco-innovation.

The eco-innovation has the ability to maintain a balance between ecosystem services and the intrinsic economic circuits, adjusting also, by geared technical means, both the renewing of

resources according to the assimilative capacity of the environment and the transactions that include ecosystem services into the economic cycle.

In previous papers we have focused on the theoretical and methodological features of the eco-innovation as a driver of sustainable economic development (Frone S., Constantinescu A., 2014) [7], and further on the role of eco-innovation parks (EInvP) as vectors of transition to a green economy (Frone Simona, 2015) [8].

In the present paper we aim to analyse more the role of the eco-industrial and eco-innovation parks as regional metabolisms and industrial ecosystems, by grouping several SME-s in a certain area in order to let them share some technological eco-innovation facilities, as well as to put them in a relation of industrial synergy, leading to waste recovery and recycling as a resource, eventually improving the resource efficiency and productivity at the microeconomic as well as the sectoral and regional scale.

Industrial synergy in eco-innovation parks promoting a circular economy

According to the definition of the Competitiveness and Innovation Framework Programme of the European Union, eco-innovation is "any form of innovation aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment or achieving a more efficient and responsible use of natural resources, including energy" (EC COM, 2006) [3].

In the study that analyses conceptually and empirically the role of eco-innovation parks as vectors of a green economy (Frone Simona, 2015) [6], the term eco-innovation park (EInvP) is introduced and used to define both eco-industrial parks and eco-innovative areas combining residential and industrial activities. EInvP are optimized from an environmental point of view (e.g., piloting installations and processes that incorporate environmental technologies and services) and are open for continuous improvement (e.g., collaboration with institutions of research and development).

In this section, the case-study analysis of an industrial synergy from the ECOREG (a pilot EInvP in the Romanian Suceava County) aims to provide evidence for the actual dimension and realization in these categories of green and complex environmental, economic and social benefits provided by the EInvP. Our research recommends the study of the EInvP as regional metabolisms, since as stated in (Frone S., Constantinescu A., 2015) [6] the ultimate purpose of the regional metabolism is eco-efficiency, which may indicate the quality of the entire process and on the other hand, represent a guarantee for the willingness of business and community to restore the health of our habitats.

Such regional metabolisms are inspired by the advent of the new theory of Industrial Ecology (IE) designed to enable transformation of traditional model of industrial activity in a more comprehensive model by which regional economies can be assembled in an industrial ecosystem composition, so the residues of some companies can be used as inputs for others. In addition, industrial ecosystems can be organized around product or material supply chains and/or in defined geographical areas (Frone Simona, 2016) [8].

Important from the view point of the current research is the key feature of the eco-innovation park in which material flow exchanges (or industrial symbioses) generally also encompass other eco-criteria, in particular energy efficiency, waste and water management, so leading to an almost exponential growth in the local resource-efficiency, for all the clustered companies. This inner circular mechanism of the EInvP closing-the-loop of resource use in a region deserves further attention due to the outstanding green economic growth impact. The role of creating and developing eco-industrial parks, namely EInvP is not limited on their potential of increasing the resource efficiency but also to implementing and making work the new modern synergic and circular business models, with industrial symbiosis.

To foster eco-innovation in eco-industrial parks, several tools have been developed to analyse data on material and energy flows.

Most focus on supporting the identification of potential networking and industrial symbiosis (Grant G.B. et al., 2010) [11].

As case study, according to the official reporting (nisp-ecoreg.ro) ECOREG [13] was a pilot project aimed at testing the applicability of Industrial Symbiosis in Romania. This entails reuse of resources and by-products used in one production cycle into another, thus creating mutually beneficial partnerships between companies in various sectors.

The most important feature of the ECOREG is ***the industrial symbiosis as eco-innovation implemented at the regional scal***e. It is supported by the numerous industrial synergies (200) identified in the area (Frone Simona, 2017) [10].

We analyse such an agri-food industrial synergy in the following, namely the one identified and implemented between:

(a)The SC PRODINCOM Company – Suceava, a slaughterhouse and meat processing SME in the Suceava County. (b)A cluster of agri-food companies that generate animal waste and had problems with the management of this waste. Among others companies: SC RUX (an animal farm having 500+ cows, situated in Veresti, 15km S of Suceava City); SC COZURAX (wheat mill, bakery, dairy products, milk processing – a company situated in Ilisesti, the Suceava County); SC TEORUX (an animal farm in Ilisesti – Suceava County); PRODINCOM itself; other small meat producers (there are more than 130 SMEs having this object of activity registered in the Suceava County, having from 10 to 2000 animals).

There should be first acknowledged the environmental issue leading to this industrial synergy. According to (A Pattern of Cooperation for Better Animal Waste Management, 2011) [1] the common problem of the partners is the animal waste (carcasses, expired animal or dairy products, waste generated by the slaughterhouse, etc.).

Animal waste constitutes a hazardous waste that, if not disposed properly, can constitute a source of discomfort (smell) and health hazard for the inhabitants living nearby the meat and dairy processing companies (insects breeding on the organic waste are vectors that could spread infections, illnesses).

Table 1. Main technical details of the PRODINCOM incinerator

Feature	Value	Remarks and comments
Incinerator capacity	1,000-1,500 kg/day, depending on the properties of animal waste	The capacity of incinerator exceeds the actual capacity of PRODINCOM. It processes solid organic waste from PRODINCOM as well as from several animal processing companies in the Suceava County. Small meat producers occasionally send their animal waste to PRODINCOM. In this way, the extra available capacity transforms the incinerating unit in a profit centre.
Operational temperature	800-1,200ºC	This ensures a correct processing of all kind of organic waste
Hot water generation	Yes	The incinerator comes with a shell and tube heat exchanger that generates all the hot water needed by PRODINCOM Company. In this way, animal waste producers get rid of their waste in a proper manner and PRODINCOM turns it in an environmentally friendly, sustainable energy source for its own technologies
Hot water parameters	60ºC 0.5 m3 /hour	Hot water is also used for all technological processes and to heat the PRODINCOM premises (offices, workshops) *No additional fossil fuels are needed!*
Ash	Landfilled	Ash resulting from the incinerator is not a hazardous waste. Analysis shows that *it may be used as a fertilizer*
Extra jobs created	3 extra jobs	Additional employees will feed the incinerator, discharge the ash, and monitor the operational parameters.

Source: Table 1, pg.2 in (A Pattern of Cooperation for Better Animal Waste Management, 2011) [1]

The animal waste is a constant problem for all farms and meat processing in the Suceava County as there are no incinerating facilities available at a reasonable distance. Besides, PRODINCOM had a history of conflicts with the Suceava County Environmental Guard (fees paid for poor waste management).

The eco-innovation solution identified by the ECOREG team was the installation of an *organic waste incinerator* at PRODINCOM that could help the company and other similar businesses to get rid of their animal waste.

With financial support in the Norwegian –

Romanian Cooperation Agreement, the ECOREG team has helped PRODINCOM to buy a state of the art incinerator, featuring some important properties (Table 1) including the possibility of recovering the heat generated by the animal waste incineration.

The environmental, economic and social benefits of the ECOREG [13] industrial synergy for animal waste hosted by PRODCOM are very significant (Table 2):

(i)Environmental Benefits include: at least 430 tons of hazardous waste diverted from landfill and used to generate valuable energy (figure refer to the period Jan – Nov 2011, of the ECOREG Project. Representative values are in the range 28-50 tons waste processed per month); the Carbon Dioxide generated by the incinerator does not come from fossil fuel so it does not add to the existing CO2 amount in the Earth atmosphere – approx.15 tons of CO2 from fossil fuels is no more emitted; PRODINCOM and partners using the incinerator comply to strict environmental regulation in EU / Romania and align the companies involved in the synergy to EU similar ones; the ash produced is a valuable fertilizer; virgin resources saved include about 5,000 litres of Diesel fuel (replaced with animal waste from various sources)

(ii)Economic Benefits include: savings since no more fossil fuel needed by PRODINCOM for hot water production. The area occupied by the Diesel storage vessel becomes available for other uses, and the pumping and piping network system become redundant and may be used in other part of the company; 15,000-20,000 RON saved by PRODINCOM (the cost are taken form the accounting book and represents cost of Diesel for preparing hot water as recorded in 2008, 2009); for the about 430 tons of waste processed in the incinerator during the ECOREG project period (Jan-Nov 2011), the companies would have to pay, if processed at a different incineration facility a total cost of approx. 121,000Euros) while the cost of incinerating the waste at PRODINCOM is estimated at 20 % of this figure (practically no transport fees and reduced incineration fees). So the savings amount at 80% of the figure above i.e., 96800Euros (this figure refers only to the period of the ECOREG Project); no more fees paid to the Environmental Guard, no taxes paid for the waste generated (transport, landfill, processing)

(iii)Social Benefits include the following: the Incinerator creates 3 new jobs at PRODINCOM; having a proper animal waste management system is a must for SME that wish to sell their products in the EU countries. The incinerator sustains, in this way, the agri-food business of SMEs in the Suceava County; a pattern of cooperation among various companies emerged in the Suceava County.

Table 2 Main environmental, economic and social benefits of the PRODINCOM cluster animal waste industrial synergy

	Type	**Value and characteristics**
1.	Economic Benefits	150-200 lei /ton for waste transport to a different incinerator, saved; 1,000 lei/ton for incinerating the waste at other location, saved Cost of LPG* saved =15,000 Lei/an
2.	Environmental Benefits	No waste to landfill 15 tons CO2 less emitted from LPG replaced
3.	Social Benefits	3 new jobs

Source: Table 1, pg.3 in (A Pattern of Cooperation for Better Animal Waste Management, 2011) [1]
LPG = Liquefied Petroleum Gas

Companies using the incinerating facility at PRODINCOM are no longer adversaries but members of a win-win partnership.

The synergy sustainability is really high since the animal farming and dairy production are traditional businesses and will last forever in the Suceava County.

The industrial synergy presented is fully sustainable and needs only the input from the users of the incinerator.

The replication potential is also good. Clusters of SMEs in the animal product business exist and may still appear all across Romania, as animal farming is a part of Romanian history and culture.

The experience and results of the cluster that uses the incinerator at PRODINCOM would help all interested in replicating the eco-innovative solution of industrial symbiosis implemented by the ECOREG.

Problems or issues encountered refer only to the fact that a part of R&D was necessary to be implemented. Therefore, the research institute ECOIND (an institute of national and international interest in the field of environmental research and services, with over 30 years of experience) was involved in the eco-innovation park ECOREG and has provided analytical work for characterizing the water and ash at PRODINCOM.

CONCLUSIONS

For the green and circular economy, eco-innovation is based on centralizing knowledge on material and energy flows as an efficient tool to foster a transition from a linear industrial system to a closed-loop system mimicking biological ecosystems.

In this paper there are analysed and highlighted some of the objectives, features and principles of the circular economy as they are implemented through industrial synergies in these very eco-innovation parks.

The example of agri-food industrial synergy implemented by the ECOREG is only one within the total of 114 synergies implemented in the area of the project (Suceava County, Romania).

Since in Romania over 95% of the waste is landfilled, there are still high opportunities for developing the circular economy in Romania. As exemplified in our paper, some bottom-up civil society and private sector initiatives have indeed identified the existence of opportunities in this sector.

In a green market economy, the interest of economic operators to establish a synergy is still firstly financial, each industrial manager aiming to increase resource efficiency of its business and find a market for its wastes and/or by-products. The ECOREG Project was therefore promoted by highlighting the potential economic benefits of joining the programme in order to boost the interest of industry. This approach was also required in Suceava as result of the limited availability of economic operators participating in environmental projects, which most of them perceived as time demanding and costly.

Nevertheless, it is also stated in the testimonial from the Environmental Protection Agency Suceava that:

„The ECOREG project's economic success is due to the means for the economic operators to increase efficiency while the environmental importance is even greater because this project uses models from the wild where in natural ecosystems there is no waste. Once a product becomes waste it is not thrown away polluting the environment but becomes a new product that can be used by consumers, saving exhaustible natural resources and also avoiding environmental pollution. So the life cycle of products was changed, from "cradle to the grave" to the "cradle to cradle".

Despite numerous constraints and over a period of economic crisis (2009-2011), the implementation of the ECOREG project proved successful in setting up an Industrial Symbiosis network, in other words in implementing an eco-industrial park at the county level involving circular economy.

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ECO-INNOVATION PARK PROMOTING THE GREEN ECONOMY IN ROMANIA

Dumitru Florin FRONE[1], Simona FRONE[2]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, Email: ffrone@hotmail.com
[2]Institute of National Economy, Romanian Academy, 13, Calea 13 Septembrie 050711 Bucharest, Romania, Email: frone.simona@gmail.com

Corresponding author: frone.simona@gmail.com

Abstract

In the efforts to develop a sustainable, low carbon, resource efficient and competitive economy and ultimately the green economy in the European Union, circular economy is an important conceptual and practical approach with essential contribution. Latest developments in eco-innovation in Romania are those dedicated to implementing the circular economy, as a way to increase the waste recycling and the resource productivity (one of the lowest in the European Union). In this respect, the main objective of the paper is a theoretical and methodological grounding and analysis of some concepts, trends and issues required for the implementation of the green economy in the EU and Romania, as well as for the sustainable regional economic development. The role of creating and developing eco-industrial parks, namely eco-innovation parks EInvP is not limited on their potential of increasing the resource efficiency but also to implementing and making work the new modern synergic and circular business models. In the paper we shall refer to some successful and pioneering circular economy enterprises or industrial eco-systems working in Romania, as good practices and pilot projects. The conclusions and recommendations refer to the importance of spatial eco-innovation represented by the industrial symbiosis as a high form of circular economy.
Key words**:** *green economy; circular economy; eco-innovation park; industrial symbiosis; synergy*

INTRODUCTION

The theory of green growth presents an alternative to the conventional economic paradigm of resource exploitation and is built around a concept of growth that integrates the sustainable use of natural resources, including greater energy and resource efficiency and improved natural capital as the drivers of growth.

Decoupling growth from resource use and unlocking new sources of sustainable growth needs therefore coherence and integration in the policies that shape our economy and our lifestyles. A revamping of the economy to become resource-efficient is a necessary, but still not sufficient condition to achieve transition towards the green economy.

As may be also followed in the paper, the green economy requires step changes in resource efficiency, investment in clean technologies, the development of alternative products, services and materials, and the ability to obtain value from the unavoidable waste (UNEP, 2012) [20].

There is explained in more detail the meaning and the features of eco-innovation for the circular economy and of the industrial symbiosis, focusing on the concept of waste and resource recycling.

In this respect, the main objective of the paper is a theoretical and methodological grounding and analysis of some concepts, trends and issues required for the implementation of the green economy in the EU and Romania, as well as for the sustainable regional economic development. This is possible with the implementation of the industrial synergy within eco-innovation parks, a concept to be analysed and exemplified in the paper.

In this paper, with the theoretical and empirical approaches employed there is argued more on the need to acknowledge and better understand the concept and aim of the circular economy (a form of the green economy) designed to close the loop in product life cycles by keeping as many resources in the economy as possible, thereby reducing waste and promoting sustainability.

In this context, the paper presents a short

analysis of the implementation of a pilot eco-innovation park as application of industrial ecosystems principles to regional development in Suceava County (ECOREG), in order to put into evidence the fact that it is an important vector promoting the green economy in Romania.

MATERIALS AND METHODS

The methodology used below is based on:
•Clarification and definition of the main methodological and operational concepts;
• Description of economic and environmental drivers in the process of eco-innovation;
• Analysis and synthesis of the characteristics and mechanisms of industrial synergy within the eco-innovation park, both for the theoretical model as well as for the case study;
•Analysis and synthesis of the strategic objectives for a circular economy in the European Union;
• Adjacent calculations, with tables and graphics, for a dynamic comparative analysis of the trends of main eco-innovation indicators.

RESULTS AND DISCUSSIONS

Theoretical and methodological background

The new paradigms of production and consumption call more and more for a higher resource-efficiency, a concept that underpins all the valuable ideal concepts of economy and development: sustainable development, the green economy and the circular economy, as well as the strategies dedicated to their objectives (Frone S., Constantinescu A., 2015) [9].

From the purposes of our paper here, important concepts (to be analysed further on) are the green industry and the circular economy. The green industry is considered a rapidly expanding and diverse sector that covers all types of services and technologies that help to reduce negative environmental impacts and resource consumption.

Still synergic ally related to a resource-efficient economy, but even more demanding is the concept and model of the circular economy**.** The strategic approach "Towards a Circular Economy" (COM(2014) 398) promotes a fundamental transition in the EU, away from a linear economy, for resources to be not simply extracted, used and thrown away, but put back in the loop so they can stay in use for longer. This approach also sets out measures driving a more efficient use of resources and waste minimization.

As suggested in (Frone D.F., Frone S., 2015) [8] the global resource nexus model is very suggestive for a green (circular) economy model and especially for our topic, since the importance of the sustainable management of natural resources and of their increased resource-recovery and efficiency is better acknowledged.

A form feature of the green economy, circular economy proposes the re-use of resources used in products whose shelf life has come to an end or which have lost their usefulness, to construct new objects of the same quality or even better. The circular economy model may be the ideal solution for relaunching sustainably the European economy which has suffered in recent years (2008-2012).

The principles of a circular economy support ideas and mechanisms for increased competitiveness and economic growth in the European Union, by: creating new business and jobs opportunities; transforming and revamping the processes of consumption for better efficiency; the correct management of resources.

Therefore, the European Commission has launched in December 2015 the ambitious **Closing the loop – An EU action plan for the circular economy (**COM/2015/0614 final) [3]as a package of measures to develop the circular economy. It is believed that by stimulating sustainable activity in key sectors and new business opportunities, the plan will help to unlock the growth and jobs potential of the circular economy.

Nevertheless, although the action plan focusses on “action at EU level with high added value”, implementing the circular economy will still require “long-term involvement at all levels, from Member States, regions and cities, to businesses and

citizens". Member States (including Romania) are invited to play their full part in EU action, integrating and complementing it with national action.

Although the main principle of the circular economy at EU and global level, recycling is no more taken as a simple action of diverting some materials form landfill. It is more and more important to know exactly what kind of recycling is achieved, to judge if it is the best recycling solution (Frone Simona, 2017) [12].

Thus, the green economy goals of recycling are:

- to prevent wasting potentially useful materials;
- to reduce consumption of fresh raw materials;
- to reduce energy usage;
- to reduce air pollution and water pollution;
- to lower greenhouse gas emissions as compared to virgin production.

As will be exemplified further on, there are interesting industrial synergy facilities of recycling the waste materials or the by-products. In this respect, the circular economy requires an innovative approach to production and consumption that offers the savvy entrepreneur significant opportunities (EC Panorama, 2016) [4].

In the paper will be argued that the Eco-Innovation Parks and the industrial symbiosis within provide such an innovative approach to production and consumption that really increases the business, innovation and development opportunities for all the green-aware enterprises and authorities in a region.

The EC action plan for the circular economy **(**COM/2015/0614 final) actually states that „it is important to promote innovative industrial processes. For example, industrial symbiosis allows waste or by-products of one industry to become inputs for another. In its revised proposals on waste, the Commission proposes elements to facilitate this practice, and will engage with Member States to help ensure a common understanding of the rules".

Eco-innovation issues and trends

With global resource scarcity and environmental degradation presenting growing challenges for business, along with related market and regulatory pressures, companies are facing a need to think more strategically about the sustainability of their business.

According to the definition of the Competitiveness and Innovation Framework Programme of the European Union, eco-innovation is "any form of innovation aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment or achieving a more efficient and responsible use of natural resources, including energy" (EC COM, 2006) [2].

Eco-innovation is any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle. Eco-innovation can help transform the green challenges into new market opportunities, since it is the development and application of a business model, shaped by a new business strategy, which incorporates sustainability throughout all business operations based on life cycle thinking and in cooperation with partners across the value chain (UNEP, 2014) [19].

The majority of the eco-innovation studies have focused on incremental innovations such as green products and eco-efficiency improvements. Systemic and transformative change is also reflected lately in the growing number of case studies analysing innovative solutions based on new systemic thinking like "cradle to cradle" and "industrial symbiosis".

„Industrial symbiosis differs from more commonplace efforts to 'green' industry in that it fosters cooperation between firms as opposed to focusing on action at the level of the individual firm. By cooperating businesses can improve their combined environmental performance by measures that will also increase profit margins" (Gibbs, 2008) [14].

After a more detailed conceptual analysis of the spatial (regional) eco-innovation happening in the Eco-Innovation Parks and involving cooperation in industrial synergies, such an industrial symbiosis case-study will be also analysed further in this paper (in the next section).

The eco-innovation scoreboard Eco-IS with its composite Eco-innovation index demonstrates the eco-innovation performance

of a country compared with the EU average and with the EU top performers. The graph in Figure 1 was based on the EU 28 Eco-IS for the year 2013, while in Figure 2 the graph was based on the EU 28 Eco-IS for the year 2015.

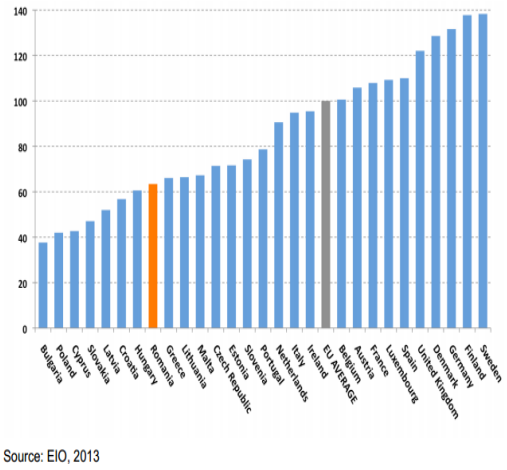

Fig..1 EU28 Eco-innovation scoreboard 2013 composite index

In this context, according to the latest EIO Country Profile (EIO, 2015) [7], Romania ranks 18th in the Eco-Innovation Scoreboard (Eco-IS), obtaining a score of 87.1. This indicates it is still below the overall EU-28 average score by 13% (2015, see Figure 2). However, dealing with the most recent issues and trends it is encouraging that our country has advanced three positions since 2013, from the previous rank of 21 (in Figure 1) to the current rank.

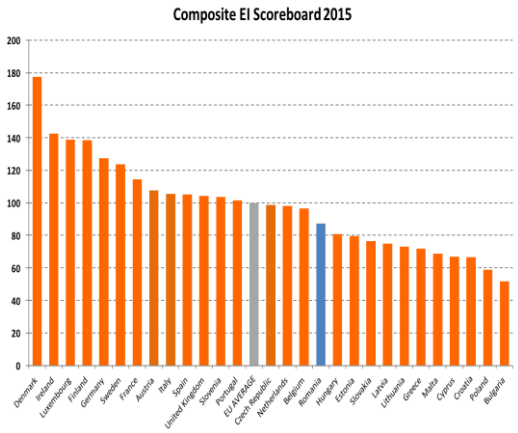

Fig.2. EU28 Eco-innovation scoreboard 2015 composite index

While some issues of poor or inefficient resource management and low propensity to invest and cooperate for sustainable production and consumption were signalled in a previous paper (Frone Simona, 2016) [11], it is important to point out that the last EIO Country Profile report on Romania (EIO, 2015) [6] specifically raises the issues of barriers and drivers to circular economy and the targeted eco-innovation in Romania.

Another important aspect was that the Romanian SMEs were less likely to adopt measures to improve their resource efficiency in comparison to the EU average and had a low propensity to collaborate. These are important challenges for a systemic transformation agenda in the European Union such as the circular and green economy.

Also in this respect, according to the most recent report (EIO, 2015) [7] Romania's eco-innovation system can be broadly characterised in terms of push and pull factors acting in opposition. It may be stated that there is still:

-low level of investment in basic infrastructure and framework conditions for recycling, waste management and resource efficiency;

-low input into R&D from the public and private sectors.

However, confirming the findings that eco-innovation activities are on the rise trend in Romania (EIO, 2013) [6], there are islands of eco-innovation at the grass-roots level that have gradually accumulated. These have the potential to reach critical mass, and possibly have positive spill over effects on further fields of economic activities in time, but they generally need larger-scale investment and support to have a significant impact.

The EU Cohesion funding is an important source of public investment in Romania, fostering eco-innovation and green reforms. The Environment Sectoral OP 2007-2013 funded the majority of the environmental infrastructure investments. For example, by the end of 2015, it supported projects related to diminishing GHG emissions in the energy sector by investing €237 million in energy production from non-polluting sources; provided €2.2 billion to projects related to modernising water and wastewater treatment facilities; and €500 million to projects in the

waste management sector.

Indeed, as a conclusion of previous research, Romania's ability to provide efficient infrastructure and environmental services, both nationally and locally, is an important factor in stimulating and supporting sustainable economic development (Frone Simona, Frone D.F., 2012) [13].

From the viewpoint of the green economy, we resume in the paper research on the importance of investment in infrastructure, eventually for fostering the regional scale eco-innovation able to provide for eco-innovation parks and industrial ecosystems promoting the circular and green economy.

Eco-innovation park promoting the green economy in Romania

The term eco-innovation park is used to define both, eco-industrial parks and eco-innovative areas combining residential and industrial activities. Eco-innovation parks (EInvP) are optimized from an environmental point of view (e.g., piloting installations and processes that incorporate environmental technologies and services) and are open for continuous improvement (e.g., collaboration with institutions of research and development

The main conclusion of the approach in (Frone Simona, 2015) [10] was based on a regression model showing that in the 16 European countries of the analysed sample there is a positive correlation between the number of existing eco-innovation parks (EInvP) and the national level of resource productivity (as macroeconomic indicator of the resource-efficiency). Also important is the key feature of the eco-innovation park in which material flow exchanges (or industrial symbioses) generally also encompass other eco-criteria, in particular energy efficiency, waste and water management, so leading to an almost exponential growth in the local resource-efficiency, for all the clustered companies

Another aspect is that the role of creating and developing eco-industrial parks, namely eco-innovation parks EInvP is not limited on their potential on increasing the resource efficiency (Frone Simona, 2017) [12], but also to implementing and making work the new modern synergic and circular business models.

To foster eco-innovation in eco-industrial parks, several tools have been developed to store and analyse data on material and energy flows. Most tools focus on supporting the identification of potential networking and industrial symbiosis.

An "Industrial symbiosis engages diverse organisations in a network to foster eco-innovation and long-term culture change. Creating and sharing knowledge through the network yields mutually profitable transactions for novel sourcing of required inputs and value-added destinations for non-product outputs, as well as improved business and technical processes"(Lombardi & Laybourn, 2012) [16].

The theory of Industrial Ecology (IE) enabled transformation of traditional industrial activity in a more comprehensive model by which regional economies can be assembled in an industrial ecosystem composition, so the residues of some companies can be used as inputs for others. In addition, industrial ecosystems can be organized around product or material supply chains and/or in defined geographical areas.

As a case study, we shall analyse here the main features, objectives and outcomes of the pilot Romanian EInvP named Application of Industrial Ecosystems Principles to Regional Development (ECOREG) in Suceava County, according to the official reporting (nisp-ecoreg.ro). ECOREG was a pilot project aimed at testing the applicability of Industrial Symbiosis in Romania. This entails the reuse of resources and by-products used in one production cycle into another, thus creating mutually beneficial partnerships between companies in various sectors.

The objectives of the project correspond to the local, regional and national sustainable development requirements, since there are: environmental, economic and social objectives. The environmental objectives were actually the most important: a reduction in raw material consumption, energy, utilities, by 2-5 %for all units through implementing innovative tools and instruments; reduction of waste generation and pollutant emissions by 5-20% for all units; the conversion of

wastes/by-products into resources (secondary materials); the significant reduction of environmental impact at the level of industrial units.

ECOREG is modelled on NISP, the world's only national industrial symbiosis programme (UK) which demonstrated that industrial symbiosis has the potential to significantly reduce industrial and commercial waste and comprehensively lessen the adverse environmental impacts of business. The ECOREG project used actual business opportunity as the mechanism for encouraging resource efficiency and its holistic approach is actively dealing with all resources including water, energy, materials, logistics, assets and expertise.

The ECOREG project was implemented with financial support of the European Union, in the period 1st February 2009 – 1st October 2011, in the Suceava County, Romania. The total project budget was of 880 700 Euro. ECOREG was funded by the European Commission through the LIFE+ programme as part of its package to help businesses to improve resource efficiency and reduce waste.

The most important feature of the ECOREG is ***the industrial symbiosis as eco-innovation implemented at a regional scal***e. It is supported by the numerous industrial synergies (200) identified in the area, out of which 114 actually implemented (nisp-ecoreg.ro).

We analyse such an industrial synergy in the following case study, namely the one identified and implemented between:

(i)SC RITMIC SRL**,** a SME based in Ilisesti, 18 km E from Suceava, dealing, among others, with collecting wooden waste (sawdust, chops, branches, etc.), conditioning it and selling it as bio-fuel (wooden briquettes) and

(ii)SC IASIMOLD SRL, another SME located near the Moldovita Commune, Suceava County, some 100 km W from Suceava, in a beautiful landscape. The company exploits wood and completes the first stages in processing timber, producing large quantities of sawdust and wooden waste, a heavily polluted material with no economic value.

The synergy created works like that: the sawdust and wooden debris produced by SC IASIMOLD SRL are collected by S.C. RITMIC SRL's trucks, transported and directed to the wooden debris processing unit of SC RITMIC SRL in Ilisesti. The sawdust and wooden debris are turned into briquettes and sold at a price of 400 RON/ton (95 Euros/ton) at the facility gate; the same briquettes are sold in supermarkets at a price of 850 RON/ton (200 Euros/ton).

The life cycle analysis of the final product should be done in order to certify the circular economy system created:

-Raw material for the briquettes comes from an insidious waste that currently pollutes the forests' outskirts and river valleys in the Suceava County as well as in other Romanian Counties.

-The processing technology is environmentally friendly, uses biomass (wooden chips) as energy source and the only waste produced is the (benign) carbon dioxide that comes from the biomass burnt.

-No additives (adhesives, binders) are used in the technology that could add some inorganic or organic load to the final product and increase its environmental impact;

-During their life time the briquettes do not produce any environmental hazard and their combustion produces benign carbon dioxide and small quantities of ash that can be used as fertilizer.

There are important economic, environmental and social benefits of this industrial synergy identified and exploited in the ECOREG EInvP of Suceava, as we shall highlight below:

(i)The economic benefits are significant, since SC RITMIC SRL obtains the raw material it needs to sustain its business at a bargain price (cost of transportation and of manipulation has the major share in cost breakdown); SC LIAMOLD SRL gets rid of the wooden debris from production space;

(ii)The environmental benefits of this industrial symbiosis are even more interesting, especially considering the saved virgin forests in the area, as well as the biomass energy potential and the avoided CO_2 emissions (Table 1).

Table 1. Estimated environmental benefits of the industrial synergy SC IASIMOLD SRL - S.C. RITMIC SRL

Characteristics	Value	U.M.
Volume of biomass involved in synergy	380	m^3
Virgin forest resources saved	0.437	Ha
Methane gas saved by the biomass produced	35,625	m^3
Total harmful CO_2 emissions avoided	25.5892	Tons
Persistent Organic Pollutants (POPs) emissions avoided	100.32	micrograms

Source: Own selection and computation from ***Adding Value to Wooden Waste (5), ECOREG Project Case Study No 5, 2010 [1]

(iii)The social benefits are also notable since the synergy keeps the actual jobs in both organizations and contributes to their social role. For customers, the synergy adds important quantities of renewable biomass fuel to the market, at a convenient price, saving households money.

(iv)Last but not least, the sustainability of this industrial synergy is high, since as the price of oil and gas will increase, biomass becomes the alternative at hand. Still, forest management in Romania does not fully comply with international and EU rules for sustainability, since large quantities of wood are cut illegally, jeopardizing the virgin forest natural heritage of Romania (Platon V. et al., 2016) [17]. In the next years, the cost of raw wood could raise, once sustainable forest management policies are implemented.

(v)An important feature is the replication potential of this industrial ecosystem synergy between these SMEs in the Suceava county, also in other regions of Romania. The project description mentions that: "the synergy is a good and straightforward solution for improving the energy of small communities and limited geographic areas. It may be replicated in small communities across 28% area of Romania covered by forests."

The synergy presented and analysed above, between the SC IASIMOLD SRL and S.C. RITMIC SRL is only one of the many industrial synergies working in the ECOREG project. ECOREG may be considered an actual eco-innovation park, since it is a spatial, regional application of eco-innovation with rich environmental, economic and social benefits for all the companies and organisations involved, as well as for the people and natural environment in that area of Suceava County.

In an overall outlook, the ECOREG project has led to the following main quantitative outcomes (nisp-ecoreg.ro):

-over 200 economic and social units from various fields and industrial sectors have been included in a regional symbiotic network;

-568 resources flows and 200 synergies were identified; 114 synergies were completed, involving 13 waste categories;

-The quantity of waste involved in the synergies was of over 530.000 t of waste, out of which: 30,000 t of construction and demolition waste; over 500,000 t wood waste; 232 t of animal and food waste; 25 t plastic waste; 20 t waste electrical and electronic equipment.

-A surface of over 2,500 ha of forest was preserved, following the replacement of wood raw materials with other types of wastes;

The reduction in GHG emissions with more than 130,000 t of CO_2, following the replacement of virgin materials with alternative resources.

CONCLUSIONS

For the green and circular economy, eco-innovation is based on centralizing knowledge on material and energy flows as an efficient tool to foster a transition from a linear industrial system to a closed-loop system mimicking biological ecosystems.

After having previously claimed that eco-innovation and eco-innovation parks are the vectors of transition to a green economy and their importance (Frone Simona, 2015) [10], in this paper there are analysed and highlighted some of the objectives, features and principles of the circular economy as they are implemented through industrial synergies in these very eco-innovation parks.

The eco-innovation and especially the regional eco-innovation of an industrial symbiosis will bring increased

competitiveness and better management of resources over their whole life cycle, for all the economic entities and partnerships which are part of the industrial ecosystem. The conclusions of this research paper reiterate that planning, implementing and development of eco-industrial and eco-innovation parks is mostly needed in Romania, in view of a sustainable economic development and a path of green growth.

It was only after Romania's accession to the European Union and with the Cohesion funding support, that adoption of the environmental acquis and of the know-how and good practice of the EU member states, as well as of the Strategy 2020 has enabled the implementation of ECOREG, a pilot project of industrial symbiosis in the Suceava County.

As the main case-study of circular economy, we have shortly analysed this Romanian project as a pilot eco-innovation park enabling the promotion of a circular economy system and a green growth in the N-E region. The official European web-site for the project description has concluded that ECOREG project „demonstrated major environmental benefits, as a result of developing a sustainable approach to waste and resource management. This will help Romania to recycle more of its waste, in line with EU policy. ECOREG recycled 530,000 t of waste, which would otherwise have gone to landfill, using less than €500,000 (€0.88/t)".

An important recommendation for our objective of promoting the green economy and increasing resource efficiency by industrial symbiosis is applying material flow analysis on planned activities leading to the identification of solutions to foster resource efficiency prior to the settlement of the EInvPs' tenants.

The policies and strategic approaches to implement the green economy by fostering eco-innovation in developing eco-industrial (eco-innovation) parks in Romania will make the subject of future research.

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COMPARATIVE ANALYSIS OF THE IMPORT AND EXPORT OF SORGHUM AND BARLEY MADE IN THE LIGHT OF PRE-ACCESSION AND POST-ACCESSION TO THE EUROPEAN UNION

Gabriela GIMBĂȘANU, Ruxandra Ana MICU, Ionuț Daniel PETRE

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: gimbasanugabriela@yahoo.com

Abstract

Increasing climate change as well as the evolution of agricultural prices have led to important changes in the structure of crops cultivated predominantly in Romanian farms. If in the past the Romanian agricultural producer does not have a great deal of openness to the new technologies, as well as to new crops like sorghum and rapeseed ten years ago, it is noticed that, with Romania joining the EU, 2007, things they changed. By increasingly contacting European farmers with a much better yield per hectare, but also opening up to new technologies and the attractive price of oil crops, Romanian farmers have begun to focus their attention on far more attractive crops than In terms of sales prices and the application of new technologies to help them achieve high output to cope with European competition. By interpreting the statistical data provided by the National Institute of Statistics and Eurostat, a comparative analysis of the import and export of sorghum and barley was carried out in the light of the pre-accession and post-accession EU production to observe whether these crops provide a high level of profitability and if it is justified to cultivate them on extended surfaces. Although there is still much to be done in this area, we see that investing in high performance technologies and equipment, in quality inputs and hybrids, is a way of generating production levels comparable to those recorded at European level.

Key words*: sorghum, barley, rapeseed, production, area, sale price*

INTRODUCTION

Regarding the evolution of the agricultural production context and taking into account the increasingly important environmental challenges, sorghum culture has important advantages over the cultivation of maize, especially in those farms where droughts and heat show their presence every year. The sorghum can be harvested either as a whole plant or in the form of beans with the most diverse uses. [1, 2]

Sorghum culture is not so widespread in Romania despite its many uses, being used in both human and animal food, but also for the production of energy biomass.

With a low input of inputs, sorghum provides for both quantitative and qualitative feed supplies, especially in difficult pedoclimatic conditions, when water resources are difficult. In view of these considerations, sorghum can be a variant of corn crop replacement, especially in those areas where there is no possibility of crop irrigation, where the level of maize production is relatively low. [3,5]

The research has enabled over time the development of a wide range of feed sorghum hybrids allowing for several classifications that have been made to make it easier to choose the most adapted hybrids for each situation and for each type of recovery. We meet one-harvested sorghum hybrids that need 100 to 140 days of vegetation and multiple harvest hybrids that are used either for mowing or for grazing, where the first harvest takes place approximately 45-60 days after Sown and under the category of multiple harvest hybrids such as Sudan grass or sorg x Sudan hybrids.

Over time, the development of fodder sorghum hybrids has made it possible, in the case of different pedoclimatic situations, to find a feed to adapt to pedoclimatic constraints and to meet the animal feed utilization goals. The feed sorghum is rich in digestible vegetable fibers and can be an excellent supplement to corn silos in the food ration, maintaining a high level of production

without significant changes.
Compared to sorghum culture, due to the increased exploitation price, rapeseed has rapidly expanded in Romania, where farmers have reduced the areas for maize or sunflower crops. Due to insufficient information, the prices for the three crops analyzed were not fully presented. Neither barley culture is negligible in Romania, where until recently grain and barley were the only cultures established in the autumn. However, the disappearance of the beer factories, as well as the diminution of the livestock, resulted in the reduction of barley-bearing areas, especially after Romania's accession to the European Union. [4]
Barley has remained a crop that occupies extensive areas only on those farms located in the immediate vicinity of a brewery, a venue offering the highest level of price.
In this paper we will carry out a comparative analysis of the three crops of barley, rapeseed and sorghum on production, cultivated area and the recovery price in order to identify whether these three crops provide a high level of profitability at farm level and whether it is justified Their cultivation on extended surfaces.

MATERIALS AND METHODS

The statistical data provided by the National Institute of Statistics in Romania, as well as the Eurostat international data base, on the surfaces cultivated with barley, sorghum and rapeseed, the recorded productions, as well as the value of the imports and exports to the crops are also used. Barley in the pre-accession and post-accession period (of Romania to the European Union), at the level of Romania and at the level of the big producing countries, thus determining the evolution trends of these indicators. These, combined with theoretical aspects extracted and learned from the literature, allowed to determine trends of evolution of these indicators. The methodology consisted of descriptive analysis of data and comparative analysis, the results being tabulated.

RESULTS AND DISCUSSIONS

The comparative analysis carried out on barley, sorghum and rapeseed crops will allow to formulate assumptions that will lead to important changes in the structure of crops found at farm level in Romania.
As we can see, until the moment of Romania's accession to the European Union, barley culture was very extensive in our country, while rapeseed occupies an area almost four times smaller in 2001. In 2007, The area planted with rapeseed has increased substantially, from 110,110 hectares in 2006 to 364,919 hectares in 2007, exceeding the barley area.

Table 1. Comparative analysis of the area planted with barley, sorghum and rape in the pre-accession and post-accession periods of Romania to the European Union (hectares)

Specification	2000	2001	2006	2007	2008	2013	2014	2015	2015/2000 (%)	2015/2007 (%)
Barley	214,623	316,648	131,528	130,895	161,952	269,637	303,969	266,658	24.24	103.72
Sorghum	1,602	6,213	740	1,058	8,014	21,668	18,845	13,486	741.82	1,174.67
Rape	68,412	82,395	110,110	364,978	364,978	276,596	406,705	367,885	437.75	0.81

Source: Data processed National Institute of Statistics, date of access: 25.02.2017; [6]

After Romania's accession to the European Union, the surface cultivated with rape has constantly evolved, far exceeding the area allocated to barley crops. At the level of 2015, 266,658 hectares of barley and 367,885 hectares of rape were cultivated in Romania, with 37.96% more. According to the data provided by the National Institute of Statistics, the largest area planted with rapeseed was in 2014, when it reached an area of over 400,000 hectares, while in the year 2000 the rape crop occupied an area of only 68,412 hectares, while the area occupied by barley was three times higher.
Analyzing comparatively the area planted with rape in 2015 compared to the year 2000, there is an increase of 5.37 times, whereas for barley the cultivated area registered an

increase of 24.24%. In 2015 compared to 2007, the area cultivated with barley recorded an increase of 103.72%, while the surface cultivated with rapeseed registered an insignificant increase (0.81%).

In terms of sorghum culture, the area cultivated in Romania is still at a low level. As it can be noticed, in 2006 in our country there was cultivated an area of only 740 hectares, and in 2007 it reached just over 1,000 hectares cultivated with sorghum. The most significant area cultivated with sorghum was recorded in 2013, when just over 20,000 hectares of sorghum were cultivated. In 2015, the area cultivated with sorghum was 13,486 hectares, eight times larger than the area cultivated in the year 2000 and 12.74 times higher than the area cultivated in 2007.

Analyzing the three cultures, rape is the one that occupies the largest surface, followed by barley and then sorghum. The evolutions recorded by the three crops are significant, especially when it comes to sorghum, but also rape. This demonstrates that Romanian farms are beginning to adapt to market requirements and choose cultures that provide a high level of profitability and significant production.

Table 2. Analysis of areas cultivated with sorghum at European level in the main producing countries of the European Union (1,000 hectares)

Specification	2008	2009	2010	2011	2012	2013	2014	2015	2016
European Union (28 countries)	-	-	114.19	117.03	-	-	158.08	138.51	127.73
%	100	100	100	100	100	100	100	100	100
Bulgaria	1.8	0.7	3.54	2.84	5.3	4.34	6.71	6.82	5
%	-	-	3.10	2.43	-	-	4.24	4.92	3.91
Greece	0.12	0.3	0.04	0.22	0.14	0.2	1.83	2,86	2.86
%	-	-	0.035	0.188	-	-	1.158	2.065	2.239
Spain	6.8	7.5	7.14	8.48	7.73	8.97	7.29	8.38	8.96
%	-	-	6.25	7.25	-	-	4.61	6.05	7.01
France	37	58	47.65	43.44	42.15	51.25	62.97	53.7	45.67
%	-	-	41.73	37.12	-	-	39.83	38.77	35.76
Italy	38.6	39.9	40.73	41.73	37.1	51.07	51.91	43.37	43.46
%	-	-	35.67	35.66	-	-	32.84	31.31	34.02
Hungary	3.9	2.8	3.16	5.33	4.43	5.33	4.58	4.58	4.91
%	-	-	2.77	4.55	-	-	2.90	3.31	3.84
Austria	-	-	1.17	1.11	1.19	1.94	2.8	2.92	2.26
%	-	-	1.02	0.95	-	-	1.77	2.11	1.77
Romania	8.01	6.12	10.28	13.08	19.99	21.67	18.85	13.49	13.12
%	-	-	9.0	11.2	-	-	11.9	9.7	10.3

Source: Eurostat database processing, date hits: 25.02.2017; [6]

In 2016, at a European Union level of 28 states, sorghum culture occupies an area of 127,730 hectares, and the main cultivation countries of sorghum are: France (45,670 hectares), Italy (43,460 hectares) and Romania (13,120 hectares). Smaller areas of sorghum are grown in Spain – 8,960 ha, Bulgaria – 5,000 ha, Hungary – 4,910 hectares, but also Greece and Austria.

The first three countries of sorghum cultivation in the European Union - France, Italy and Romania cover an area of 102,250 ha, representing 80.05% of the total area cultivated with sorghum at European level.

Bulgaria and Hungary are also sorghum cultivators, but they are not an important player on the European market because both countries fail to bring together the area cultivated by our country.

In relation to the total area cultivated with sorghum, Romania, by hectare, covers between 9 and 10% of the total area. That is, while France cultivates 35.76% of the total area cultivated with sorghum at European level and Italy cultivates 34.02% of the total European area.

Table 3. Comparative analysis of the production of barley, sorghum and rape during the pre- and post-accession periods of Romania to the European Union (tonnes)

Specification	2000	2001	2006	2007	2008	2013	2014	2015	2015/2000 (%)	2015/2007 (%)
Barley	560,618	1,056,032	337,070	231,918	577,178	930,515	1,085,573	1,071,960	91.21	362.22
Sorghum	1,479	5,584	1,331	1,193	20,899	49,829	51,543	31,728	2,045.23	2,559.51
Rape	76,126	101,789	175,050	361,500	673,033	666,097	1,059,121	919,473	1,107.83	154.35

Source: Data processed National Institute of Statistics, date of access: 25.02.2017; [6]

Production data reveals that yields per hectare have increased steadily with Romania's accession to the European Union, largely due to the farmers' access to modern technologies, but also because they have had access to favorable varieties and hybrids, through the production level to the specific pedoclimatic conditions in a permanent change.

At 2015, the total barley production amounted to 1.07 million tonnes, while the production of sorghum was 31,728 tonnes, 33 times less than that of wheat. Rape production in 2015 was just under 1 million tonnes, 16.58% less than barley production.

Analyzing comparatively the data provided by the National Institute of Statistics in 2015 it is observed that compared to 2000 the production of barley grew by 91.21%, while the production of sorghum and rape had significant evolutions, the production being of 21 Times larger for sorghum and 12 times higher for rape. This reflects the fact that farmers have invested in technology to record increases in yields for the three crops, but also that the areas allocated for barley, rape and sorghum have increased quite a bit over 2000.

Table 4. Average yield on barley, sorghum and rape during the pre-accession and post-accession periods of Romania to the European Union

Average production	2000	2001	2006	2007	2008	2013	2014	2015
Barley	2.61	3.34	2.56	1.77	3.56	3.45	3.57	4.02
Sorghum	0.92	0.90	1.80	1.13	2.61	2.30	2.74	2.35
Rape	1.11	1.24	1.59	0.99	1.84	2.41	2.60	2.50

Source: Data processed National Institute of Statistics, date of access: 25.02.2017; [6]

Regarding the average production recorded at country level, this trend has been steady since 2000 and so far. As can be seen, if at the 2000 barley crop there was an average production of 2.61 tons / ha, in 2015 the average production almost doubled, reaching 4.02 tons / ha. And in the sorghum crop there was an important evolution, so that if in 2000 the average production did not exceed one tonne per hectare, in 2015 the average sorghum production reached 2.35 tons / ha. Also, rapeseed has experienced a significant increase in yield per hectare, so that if in 2000 the average yield was 1.11 tonnes / ha, in 2015 it was twice as high, reaching 2.50 tons / ha.

As regards the level of production recorded at European level for sorghum crops, it can be seen that at 2016 the production of sorghum in France was 232.200 tonnes, while Italy, which cultivated a smaller sorghum area with 5.08% achieved the largest production at European level – 315,680 tonnes. At European level, total sorghum production was 689,860 tonnes.

If, from the point of view of the surface cultivated with sorghum, Romania ranks third in terms of production, our country ranks fourth, being downgraded by Spain, which although cultivated an area of 8,960 hectares in 2016 with 46.42 %

Less than the area cultivated in Romania, the yield per hectare was much better. With a total production of 53,100 tons of sorghum, Spain surpassed our country, which managed to harvest a production of 28,870 tons in the year 2016, two times less than the production of Spain.

Reporting the production of sorghum registered in the main producer countries in total European Union production, it is noted that in France the total harvested production represents 33.66% of the total European sorghum production, while the Italian

production represents 45.76%. Regarding the situation in Romania, the production of sorghum registered in 2016 covers 4.18% of the sorghum production registered in the European Union with 28 member countries.

In terms of yield per hectare, it can be seen that Italy, Spain and France have the most significant average yields per hectare.

Table 5. Analyze European sorghum production in the main producing countries of the European Union (1,000 tonnes)

Specification	2008	2009	2010	2011	2012	2013	2014	2015	2016
European Union (28 countries)	-	-	608.86	673.9	-	-	940.09	728.68	689.86
%	-	-	100	100	-	-	100	100	100
Bulgaria	3.4	1.8	8.61	5.55	10.8	11.63	18.35	17.04	10.7
%	-	-	1.41	0.82	-	-	1.95	2.34	1.55
Greece	0.15	0.17	0.12	0.84	0.76	0.66	6.22	10.27	10.2
%	-	-	0.02	0.12	-	-	0.66	1.41	1.48
Spain	22.4	32.3	36.56	38.64	27.38	44.85	47.66	50.34	53.1
%	-	-	6.00	5.73	-	-	5.07	6.91	7.70
France	230.6	309.9	262.61	280.74	239.19	278.54	395.62	277.8	232.2
%	-	-	43.13	41.66	-	-	42.08	38.12	33.66
Italy	224.6	243.4	271.44	287.82	157.81	316.92	368.78	294.22	315.68
%	-	-	44.58	42.71	-	-	39.23	40.38	45.76
Hungary	13.6	7.6	7.85	16.62	12.44	14.45	19.47	15.53	9.23
%	-	-	1.29	2.47	-	-	2.07	2.13	1.34
Romania	20.9	14.44	18.68	39.7	37.48	49.83	51.54	31.73	28.87
%	-	-	3.07	5.89	-	-	5.48	4.35	4.18

Source: Eurostat database processing, date of access: 25.02.2017; [6]

Table 6. Average yield on sorghum crops registered at European level in the main producer countries of the European Union (100 kg / ha)

Specification	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bulgaria	-	-	24.32	-	20.20	26.65	27.36	24.98	21.30
Greece	12.43	5.67	32.49	38.66	53.01	32.76	33.90	35.91	35.63
Spain	-	-	40.79	46.59	53.41	55.29	68.32	60.10	59.26
France	-	-	55.11	64.56	57.00	54.37	63.00	51.65	50.84
Italy	-	-	66.65	68.98	42.81	60.98	71.06	69.20	67.58
Hungary	-	-	10.09	29.56	18.60	-	42.51	33.94	18.80
Romania	26.08	23.59	18.16	30.35	18.75	23.00	27.35	23.53	22.00

Source: Eurostat database, hits date: 25.02.2017; [6]

Thus, at the level of 2016 Italy recorded an average production of 6.7 tonnes / ha, Spain recorded a production of 5.9 tonnes / ha, and France had an average yield of 5.08 tonnes / ha. In Romania, the average sorghum production recorded in 2016 was 2.2 tons / ha, three times lower than the average production recorded in Italy.

Analyzing the value of barley and sorghum imports from Romania during the period 2005-2015, the share of these two crops is of little importance. Thus, as far as barley is concerned, the value share of this crop in total imports is more important from 2011, reaching a peak in 2015 when it represents 1.32% of the total value of Romania's import. As regards sorghum, the imported quantity is not significant, as it can be seen, at the level of 2015 it represented 0.02% of the total import value.

As far as the export value of barley and sorghum is concerned, neither is the weight of these crops extremely important.

Thus, during the analyzed period, the two cultures did not undergo significant changes, a sign that neither the surface nor the production had changed in the analyzed period.

At 2015, the value of grain exports to the European Union accounted for 1.27% of the total export value.

Table 7. Analysis of the import of barley and sorghum from Romania in the period 2005-2015 (million euro)

Import value	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total import value	32,568	40,746	51,322	57,240	38,953	46,869	54,952	54,703	55,317	58,522	62,962
%	100	100	100	100	100	100	100	100	100	100	100
Barley	2.65	30.72	105.21	339.26	56.67	144.78	350.75	325.63	451.45	199.46	837.12
%	0.0081	0.0754	0.2050	0.5927	0.1455	0.3089	0.6383	0.5953	0.8161	0.3408	1.3296
Sorghum grains			14.91	0.798	0.377	0.531	11.93	20.47	17.01	0.986	10.63
%			0.03	0.00	0.00	0.00	0.02	0.04	0.03	0.002	0.02

Source: Data processed National Institute of Statistics; [6]

Table 8. Analysis of the export of barley and sorghum from Romania in the period 2005-2015 (million euro)

The value of the export	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Value of total export (million euro)	22,255	25,850	29,549	33,725	29,084	37,360	45,292	45,069	49,562	52,466	54,596
%	100	100	100	100	100	100	100	100	100	100	100
The amount of grain exports out of the total EU	67.124	83.35	93.66	143.726	365.231	434.195	505.613	574.012	501.26	674.891	691.192
%	0.30	0.32	0.32	0.43	1.26	1.16	1.12	1.27	1.01	1.29	1.27
Barley	30.205	12.07	26.743	110.537	60.579	95.512	146.537	155.569	224.058	228.485	299.2
%	0.14	0.05	0.09	0.33	0.21	0.26	0.32	0.35	0.45	0.44	0.55
Sorghum grains	:	:	:	:	1.434	0.709	1.269	4.297	1.494	4.313	3.758
%	:	:	:	:	0.0049	0.0019	0.0028	0.0095	0.0030	0.0082	0.0069

Source: Data processed National Institute of Statistics; [6]

As it can be noticed, prior to Romania's accession to the EU, the grain trade in the intra-Community countries was at a low level. Only after 2009 grain trade begins to increase, oscillating between 1.27-1.29%.

CONCLUSIONS

As can be seen from the analysis of barley, rape and sorghum crops in terms of areas and productions recorded in the pre-accession and post-accession periods to the European Union, there are significant changes between the two analyzed periods.

If during the pre-accession period of Romania to the European Union the area cultivated with barley was much larger, the yield per hectare was quite low, with Romania's accession to the European Union the area cultivated with barley decreased, but there was an increase in the evolution yield

In terms of rapeseed crops, the cultivated area recorded a significant increase immediately after 2007. This development, both of the areas planted with rape and the yield per hectare, can be explained by the fact that in recent years the Rape has recorded significant developments, which has led to the increase in the area planted for rapeseed.

As far as the sorghum crop is concerned, it is scarcely spread at European level, totalizing 127,730 hectares, and the main three producer countries are France, Italy and Romania, cultivating an area of 102,250 ha, representing 80,05% of the total cultivated area With sorghum at European level.

Despite the fact that Romania ranks third in the European Union as regards the area cultivated with sorghum, the average production per hectare places our country in fifth place, with an average production of 2.2 tons / ha, at the level of the year 2016.

The average yield per hectare should be improved both for sorghum and barley or rape crops, because despite the fact that these crops occupy significant areas at European level, the non-performing farms determine Romania's quaint position on the level of production.

Investing in cutting-edge technologies, high-quality inputs and hybrids, as well as high performing machines are a way to achieve production levels comparable to those recorded at European level.

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EVOLUTION OF MILK PRODUCTION IN REPUBLIC OF MOLDOVA AND THE ROLE OF QUALITY MANAGEMENT IN INCREASING THE COMPETITIVENESS OF MILK PROCESSING COMPANIES

Artur GOLBAN, Rita GOLBAN

State Agrarian University of Moldova, 42 Mircești Street, Chișinău, Republic of Moldova, Email: golban.artur@yahoo.com

***Corresponding author*:** golban.artur@yahoo.com

Abstract

Achieving the success in business, in conditions of hard competition from the local and international enterprises is connected with the notion of competitiveness. To be competitive in modern society, means to obtain a sustainable advantage compared to competitors by higher productivity and on this basis, regarding the cost, diversity, quality and permanently renewing the offer of products, thus ensuring higher profits of the organization. As we mentioned, the quality, is one of the elements, which takes a special place in ensuring the competitiveness of a product, together with other important factors as the price and the managerial system. The quality of a product determines the level of competitiveness of this product. In this scientific research is analyzed the quality management as a factor of increasing the competitiveness of milk production from the Republic of Moldova. The production of milk represents one of the most important sectors from the agriculture of the Republic of Moldova, which is mainly in households, where it is produced more than 95% from the total volume of milk. In agricultural enerprises is produced approximately two percent from the total volume of milk.The basic purposes of this investigation is: to analyze the evolution of milk production in Republic of Moldova; to highlight the role of the quality management in increasing the competitiveness of milk production; to describe the quality factors and their role in increasing the competitiveness of milk production.

***Key words*:** *milk production, competitiveness, quality management*

INTRODUCTION

Milk represents an important animal origin food product. It is the most complete and easily asimilated by the organism foodstuff, being one of the most important food product from the human's nutrition, especialy in the period of growth, because it contains all the necessary substances for the normal growth and development of the organism. The most evident proof is that the newborns live and develop normally, only with milk, long time after their birth (Golban, 2015a) [2].

Also, the milk, is called the „white blood" or the „health spring", by its high value and it is strictly necessary in the feeding of the sick persons, old people and those who work in the toxic environment.

The fact that the milk is the most complete food product is reflected in more than one hundred nutritive substances necessary for the human's life, namely: over 20 amino acids, over 10 fatty acids, sugars-lactose, 25 vitamins, over 45 mineral elements, enzymes and other substances.

The caloric value of the milk and of the milk products is very high:one liter of cow milk contains 640-680 calories, one liter of sheep milk contains 1,400 calories. Compared to other food products, the nutritive value of one liter of milk, calculated in calories, is also very high, being equal to: 0.600 kg of beef; 0.750 kg of veal; 0.400 kg of pork; 8-9 eggs; 0.500 kg of fish (Golban, 2015b) [3].

Thus the milk production has a high importance for the national economy of the Republic of Moldova, being one of the most important sectors of the country's agriculture.

More than ninety five percent from the total volume of the milk production is in households, and only a little volume of milk is produced in agricultural enterprises.

In order to increase the competitiveness of milk production, it is necessary to improve the quality management while producing the milk, both in households as well as in

agricultural enterprises.

The main purpose of this scientific research is to reveal the biggest role of quality management in increasing the competitiveness of the milk products, to familiarize the reader with: *„what does it mean – quality management?"; „what can we do to ensure the quality of milk production?"; „what are the management quality strategies" in order to increase competitiveness of milk production.*

It should be taken into account that implementing the quality management systems are very expensive, but „non – quality", costs much more and leads to the decrease of the competitiveness of products, being very harmful to any agricultural producer (Porter, 1990; Stanciu, 2003; Kotler et al., 2006) [8,10,11].

In opinion of J.M. Juran, the quality management is defined by its functional aspects, which contains 3 main processes: ***„quality planning";„quality control"*** and ***„quality improvement"***(Juran et al, 1980) [5]. These 3 processes represent the steps which need to be passed for obtaining high quality products.

In this context, the paper present an analysis of the milk production from the Republic of Moldova and the role of quality management and its factors in order to increase the competitiveness of milk production.

MATERIALS AND METHODS

In order to realize the scientific investigations were used the data from the National Bureau of Statistics [15] of the Republic of Moldova, Ministry of Agriculture and Food Industry, National Bank of Moldova and other economic sources concerning the quality management, competitiveness of enterprises, production.

As research methods were used: analysis and synthesis, induction, deduction, comparative method, logical analysis, graphical method.

RESULTS AND DISCUSSIONS

In 2016, in Republic of Moldova was registered an increase of the global agricultural production, compared to 2015, by 32%, constituting 118.6%, being determined by the increase of the vegetal production, by 26.0% and the increase of the animal production, by 3.1% (Fig. 1).

In 2016 was registered an increase compared to 2015, of the vegetal production from the total agricultural production by 4%, constituting 72% (NBS, 2016). The animal production decreased in 2016 compared to the previous year by 4%, constituting 28%, out of which the production of livestock and poultry – 16.0%; milk – 7.9% (decreased by 1.5% compared to the previous year); eggs – 2.9%.

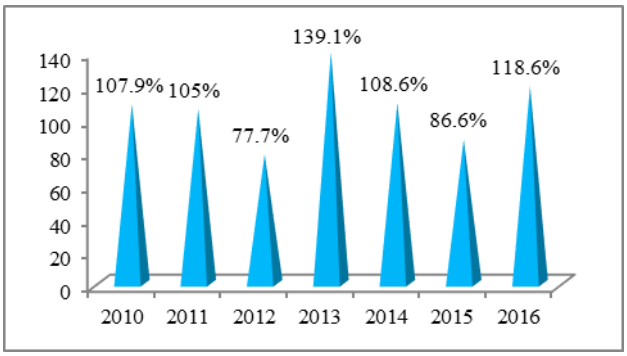

Fig. 1. The indices of the agricultural production in the Republic of Moldova during the period 2006-2012 (the previous year =100%)

Analyzing the agricultural production by categories of households, we can reveal that 42 % from the total volume of the agricultural production were obtained in the agricultural enterprises, 19% in peasant farms, 39% in the population households (Fig. 2).

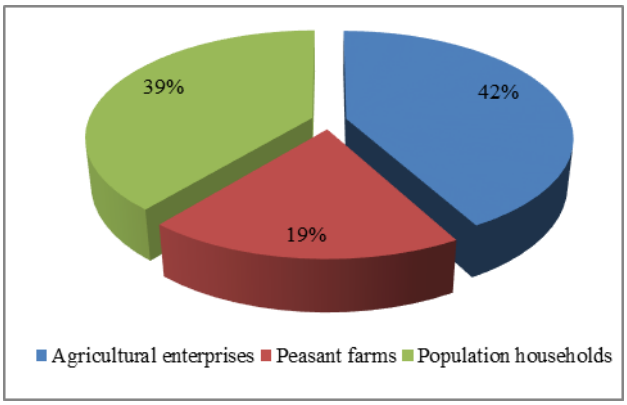

Fig.2. Distribution of the agricultural production by categories of households, 2016 (%)

From the total animal production, the production of milk represents one of the most

important.

Thus, from the analyze of the dynamics of the milk production during 2006-2016 (Fig.3), it is revealed that it decreased continuously, namely: in 2016 the production of milk constituted 513 thousand tonnes, which is less than in 2015 by 7 tonnes, and compared to 2014 it represents a decrease by 12 tonnes. In 2016 the share of the milk production from the total agricultural production constituted 7.9%, which is less than in 2014, by 1.5% (NBS, 2016).

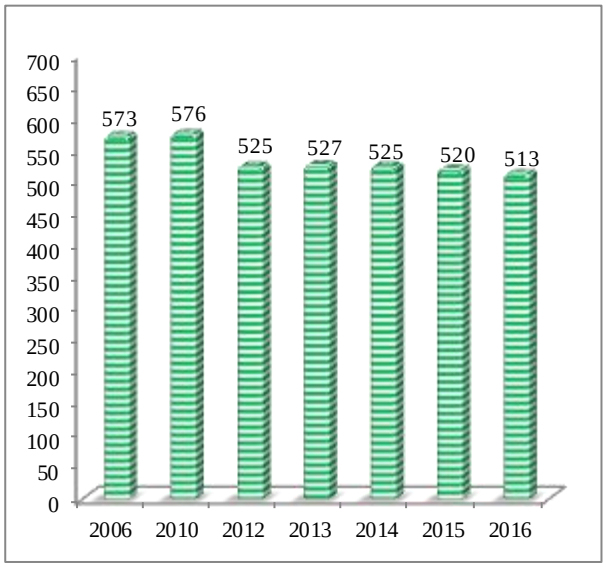

Fig. 3. The dynamics of the milk production in all categories of agricultural producers during 2006-2016, (thousand tonnes)

The most important volume of the milk production is produced in population households – 95%, while in agricultural enterprises is produced – 5% (Fig. 4).

The reason why the dynamics of the milk production is negative during the last years is the fact that the livestock of cows continuously decreased in the last years in all categories of agricultural producers.

Thus in 2016 the livestock of cows constituted 128 thousand capita in all categories of agricultural producers, which represent a decrease, compared to the previous year by 2 thousand capita, and a decrease compared to 2010 by 33 thousand capita (Fig. 5).

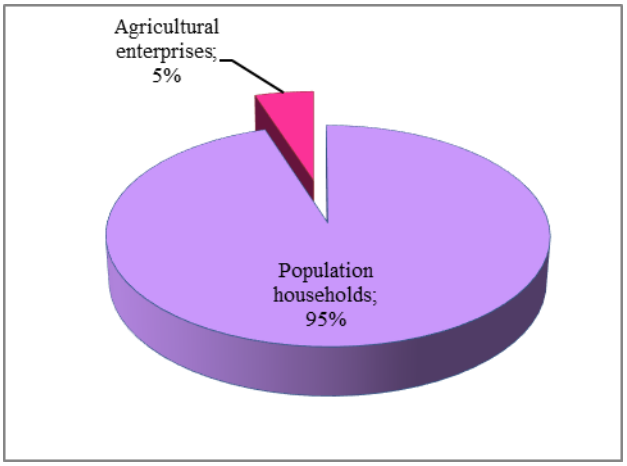

Fig. 4. The structure of the milk production by categories of agricultural producers, 2016

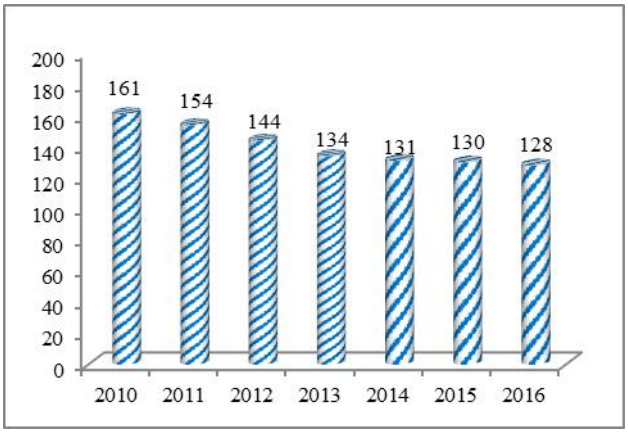

Fig. 5. The dynamics of the livestock of cows in all categories of producers during 2010-2016, (thousand capita)

The local production of milk and milk products is facing a high competition from the milk products imported from Ukraine, which in 2016 exported in Moldova 50.4% (2.7 mln USD) from total exports of milk, being followed by Georgia – 26.3% (1.4 mln USD) and Libya – 8% (0.4 mln USD) (Infotag, 2017).

In May, 2016, the Government of Moldova introduced restrictions to a large number of products originated from Ukraine, among which there were the milk products, establishing certain quotas, whose exceedance taxed at 10-20%. The decision was taken at the local producers' initiative, to protect the local market, being valid till the end of 2016.

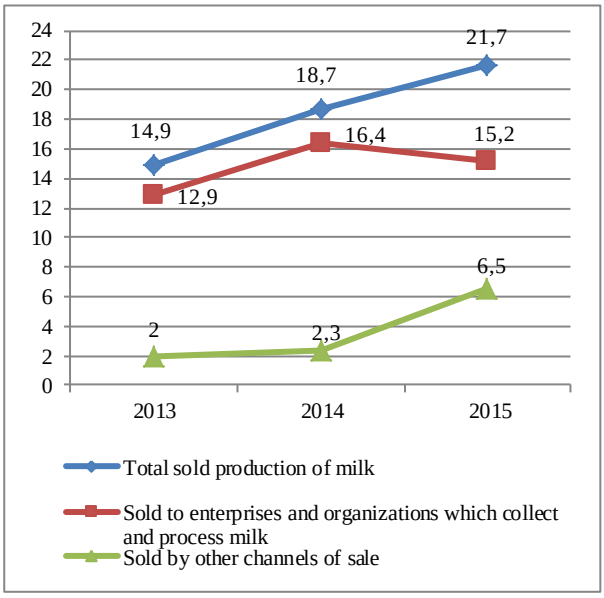

Fig. 6. Sale of milk production by type of enterprises during 2013-2015, (thousand tonnes)

Analyzing the Fig. 6 regarding the sale of milk production by type of enterprises during the 2013-2015, we can reveal that the total sold production of milk in 2015 constituted 21.7 thosand tonnes, out if which the biggest volume of milk production was sold to enterprises and organizations which collect and process milk – 15.2 thousand tonnes, which represent a decrease compared to the previous year by 1,2 thousand tonnes and by other channels of sale – 6.5 thousand tonnes, which represent an increase by 4.2 thousand tonnes, compared to the previous year.

As we observe the biggest volume of milk production was sold to the enterprises and organizations which collect and process milk.

Table 1. The evolution of milk production produced by agricultural enterprises and farms in territorial aspect during 2013-2015, tonnes

Region \ Years	2013	2014	2015	Deviation of 2015 with	
				2013	2014
Chişinău Municipality	153	307	198	+45	-109
North	**6,521**	**8,656**	**9,874**	**+3,363**	**+1,218**
Center	4,046	5,145	5,009	+963	-136
South	2,640	2,656	2,309	-331	-347
UTA Găgăuzia	2,652	4,834	5,484	+2,832	+650
Total	**16,012**	**21,598**	**22,874**	**+6,862**	**+1276**

Analysing the evolution of milk production produced by agricultural enterprises and farms in territorial aspect during 2013-2015 it is revealed that in 2015 the total production of milk constituted 22,874 tonnes, which represent an increase compared to 2013 by 6,682 tonnes and compared to 2014 by 1,276 tonnes (NBS, 2015). In territorial aspect we can observe that the biggest volume of milk production produced by agricultural enterprises and farms is concentrated in North Region of the country, where in 2015 was produced 9,874 tonnes of milk production, which represent and increase by 1,218, compared to the previous year, being followed on the second place by UTA Gagauzia, where the milk production constituted 5484 tonnes, which represent an increase by 650 tonnes compared to the previous year, and on the third place is the Center Region, with a total production of milk in 2015 equal to 5,009 tonnes, which decreased by 136 tonnes compared to 2014.

As it was mentioned above, the biggest volume of milk production in 2015, was produced by the agricultural enterprises and farms from the North Region, namely the rayons: Glodeni – 1,717 tonnes; Ocnita – 1,653 tonnes; Drochia – 1,572 tonnes; Fălești – 1,228 tonnes; Florești – 1,106 tonnes.

The biggest milk processing enterprises are: JLC SA, compania“Alba”; compania “Lapmol SRL”;compania “Lactis SA”; “Fabrica de brînzeturi din Cahul”; “I.M. Heuvelland SRL”; “Incomlac SA”, etc. [12, 13,14]

Within these enterprises an important role is dedicated to the quality management.

The “father of quality management”, is Joseph M. Juran, which said that: “quality is a problem of all” (Juran, 2000) [7]. The contribution of J.M. Juran in the development of the quality management is expressed in the fact that in his opinion quality must be improved continuously.

He defined the quality management by its functions in terms of “quality trilogy” (Juran, 1986; Constantinescu, 2002) [1, 6].

In his opinion the quality management is composed of three important management processes: *quality planning; quality control; quality improvement* (Fig. 7).

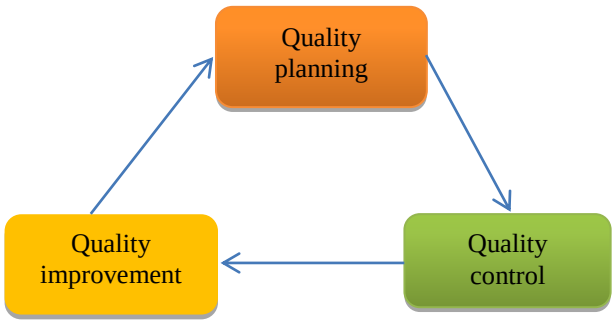

Fig. 7. The "quality trilogy" proposed by J.M. Juran

Briefly we will resume the "quality trilogy" below:

Thequality planning contains the following activities:
-the establishment of the quality objectives;
-the client's identification
-discovering the client's needs
-development of the product's characteristics
-development of the process's characteristics

The quality control contains the following elements:
-choosing the subjects to be controlled
-choosing the measure unit
-establishment of objectives
-measurement of performances
-interpretation of differences
-actions towards differences

The improvement of quality refers to:
-Proving of the necessity of improvement
-Projects identification
-Organization of working teams
-The reasons diagnosis
-Remediation of the malfunctions
-Fight against the resistance to change.

In this sense at each milk processing enterprise are realised permanently actions of improving the quality of milk production.

In this sense, Incomlac SA permanently supervise the manufacturing stages of production, which comprises (Incomlac, 2017) [12]:

1. Input control of raw materials, components, package, tare for production;
2. Control of technological process in all manufacturing stages;
3. Microbiological and physico-chemical control of final products;
4. Control of the sanitary condition of the enterprise.

Within Incomlac SA exists special laboratory with equipment to continuously monitoring the quality of milk products.Incomlac SA is the first enterprise which passed the international quality management certification ISO-9001:2000.

In the same time the company JLC SA also has the main objective to improve the quality of milk products, which includes (JLC, 2017):

1. Incoming control of the raw material, ingredients and materials;
2. Manufacturing control;
3. Control of the finished products;
4. The microbiological control of the raw material, ingredients, manufacturing and finished products;
5. Control of packages;
6. *Control of sanitary conditions of the enterprise.*

But according to some studies (Ignat, 2013) [4], not all the milk processing enterprises have the certification according to the international quality management standards (ISO). From this point of view, this represents an obstacle to export the milk products on the international markets, influencing in a negative way the competitiveness of the milk products. Most of the milk processing enterprises included in their future development plan the international quality management certification.

Another factor which influences negatively the competitiveness of the milk products is the unstable and insufficient insurance with qualitative milk as raw material. It doesn't exist a stable insurance of enterprises with milk production at competitive prices.

Another factor which influences negatively the competitiveness of milk products from Moldova is the country reputation especially from the "big bank theft", which doesn't inspire confidence in the quality of Moldavian products, although the products from Moldova are more qualitative and the prices on the export markets are much lower compared to those of competitors.

In the context of the above mentioned, the primary national interest of the Republic of Moldova is to develop a quality based competitive economy, able to cope with

current trends in international trade – globalization and liberalization of the food markets

The Republic of Moldova expressed its opinion to adhere to the European Union, where was elaborated the European Quality Promotion Policy. In order to be compatible with the European products, the Moldavian products must comply with the EU regulations and principles in the domain of quality.

The quality policy of the agri-food products must be oriented at least in two directions (Litvin, 2011) [9]:

-increasing the competitiveness of the economic agents by increasing the quality level of their products;

-increasing the effectiveness of the legislative and institutional framework regarding the protection of the rights and interests of the consumers.

Thus the milk products quality improvement represents an important objective at the state level, in conditions when many of the processing enterprises doesn't obtained the international quality management certification, in this context influencing in a negative way the exports of milk products, thus decreasing their competitiveness on foreign markets.

There must be improved: the legislative frame working order to ensure the quality improvement of milk products; ISO certification of processing enterprises, which will lead to higher exports on foreign markets, thus increasing the competitiveness. High number of individual producers who commercialize milk to the processing enterprises, determine high costs of transactions, in this sense being necessary to propose alternative solutions of commercialization milk, in order that the trade to be more organized and to decrease the costs, in this sense, increasing the profitability.

CONCLUSIONS

The performed investigations give us the possibility to formulate the following conclusions:

1)Milk, as it is called "the white blood", represents an important food product of animal origin which is produced mostly (more than 95%) in households and a little part in the agricultural enterprises.

2)The dynamics of the milk production in all categories of agricultural producers during 2006-2016 reveals that milk production during the analysed period was continuously decreasing, from 573 thousand tonnes in 2006 to 513 thousand tonnes in 2016. The significant decrease of the milk production was determined by the decrease of the livestock of cows in all categories of producers: during 2010-2016, this indicator decreased from 161 thousand capita in 2010 to 128 thousand capita in 2016.

3)The highest volume of milk production is sold to enterprises and organizations which collect and process milk (in 2015 – 15.2 thousand tonnes) and little quantity of milk is sold by other channels of sale (in 2015 - 6.5 thousand tonnes)

4)According to the "father of quality management" – Mr. Joseph M. Juran, the quality management is composed of three important management processes: *quality planning; quality control; quality improvement.* In this sense, all the processing enterprises take measures to improve the quality of milk production, but a barrier in increasing the competitiveness of the milk processing enterprises is that not each enterprise has international quality management certification – ISO. Only those enterprises who have international certification can export milk products, in this way being competitive on the foreign markets, the rest can sell their products only on the local market.

5)The Republic of Moldova must improve its legislative framework regarding the quality of production to be in compliance with the EU requirements in the field of quality, thus developing a quality based economy, which will indispensable contribute to increasing the competitiveness of the agri-food products from Moldova.

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BAKERY PRODUCTS CONSUMPTION AND CONSUMERS' AWARENESS IN URBAN AREAS OF ISPARTA CITY, TURKEY

Hulya GUL[1], Fidan Merve KART[1], Mevlut GUL[1], Metin Göksel AKPINAR[2]

[1] Suleyman Demirel University, Engineering Faculty, Food Engineering Department, Faculty of Agriculture, Department of Agricultural Economics, 32260 Isparta, Turkey,
[2] Akdeniz University, Faculty of Agriculture, Department of Agricultural Economics, 07070 Antalya, Turkey

Corresponding author: fmervekart@gmail.com

Abstract

The purpose of this study was to determine bakery products consumption, preference, purchasing behaviour and the factors affecting the consumer. The data for this study were obtained by the survey method with 288 households in Isparta. The purchase frequency of bread was determined that daily while for biscuit products it was 15 days and for pasta, wafers and cake was monthly. Consumers have stated that they prefer bakery products as a tasty and satisfying snack. Monthly consumption of biscuits, pasta, wafers and cakes was calculated as 433.44, 913.45, 110.33 and 144.47 grams per person, respectively. Bread consumption was calculated as 188.79 grams per day. Sweet biscuits were more preferred by consumers. It was detected that the price of bakery products is related to the income of households. As of the survey date, the average monthly income of the families was calculated as 3,061.89 TRL and average income per person was calculated as 779.10 TRL. Spending of bakery products for households was found to be 27.16 TRL. When the price of bakery products associated with income of households, these products were seen as reasonable and practical products. Although the education level of consumers varied, bakery products was preferred by every age group of consumer as a conventional taste whether it is a healthy food or not. The rate of consumers who found bakery products moderately safe was 58%. One of the most influencing factors on consumers to purchase bakery products was determined as healthy production conditions and all the shopping facilities of sellers.

Key words**:** *bread, biscuit, cake, pasta, household*

INTRODUCTION

The food production-consumption chain is one of the most important issues of today, as food, which is the basic necessity of human life, is of critical importance in terms of community health [14]. Bakery products and their derivatives have an important place in the food consumption all over the world. Bread, pasta, bulgur, biscuits, cakes and breakfast cereals are the most consumed industrial cereal products. Bakery products constitute 65% of food industry in Turkey [18].

Biscuits are a shelf-stable product because of their low moisture content, were first used by sailors, soldiers, patients and travellers but today they are consumed almost by every age-group and in every meal. Because of the increasing demand, as in many countries, there have been important developments in biscuit industry in Turkey as well, a lot of biscuit types with rich composition started to be produced [9]. Bread with its high nutritional value, a neutral aroma, availability and cheapness is the basic food source in bakery products. Another bakery product, pasta; with its properties such as nutritious, delicious, cheap, easy to prepare, long shelf life is the most consumed food after bread. Italy is the world's largest producer with 3,326,750 tons and 32% share. Italy is followed by USA with 12%, Brazil with 11% and Russian Federation with 6%. Turkey is in the 5th place in world pasta production and its share in production is 5.1% (TURKSTAT, 2015).

The overall objective of this study was to evaluate the bakery products consumption, purchasing behaviours and brand dependency levels of consumers in city centre of Isparta province, Turkey. Determination of consumer preferences and requests in bakery products is important for the bakery industry. By the aid of research results; bakery industry can be

developed, reshaped their production strategy and also they can expand their product range in the direction of consumer preferences.

MATERIAL AND METHODS

Material of the study was established through cross-section data collected from the resident families of urban part of Isparta by surveys. Survey that was used in the study was developed by the help of other studies with similar aims as it fits the purpose of the study. In marketing researches, for different population sizes and tolerance levels in practice, assuming specific confidence limits and specific population variations, different sample sizes were being used [12]. With the assumptions of at least 75% of the urban resident families were consuming bakery products and this average 50% rate can be mistaken by ±0.05 (that was to say 0.70 and 0.80) and with the assumption of these limits were 95% reliable, sample size for the research was calculated with the help of the formula below [13].

$$n = \frac{N*p*q}{(N-1)\,\sigma^2_{px} + p*q}$$

According to this form, the sampling volume

n : Sample size

σ^2_{px} : Variance of probability (with 95% confidence interval and 5% error margin)

N : Urban population of Isparta city

p : The likelihood of the event being investigated (in this study it was assumed that the bakery products consumption rate at the bars was 0.75)

q : The likelihood of the event being investigated (in this study it was assumed that the rate of bakery products was 0.25). According to this, sample size for the city of Isparta was calculated as 288 households. This sample size was increased by approximately 5% and 288 households was interviewed. Data were collected through specially prepared surveys in personal interviews. By taking into consideration the socio-economic development levels in the city centre, survey study was conducted in 44 neighbourhoods. Sample number was divided proportionally with the population of the neighbourhoods. Surveyed households were chosen circumstantially. Survey included 48 questions about product choices of consumers, consumption of bakery products, purchasing prices, frequency of purchasing, factors that determines the purchasing decision, channels of purchasing, reasons of preference, brand loyalty levels, frequency of habit of reading the information on the package, judgments about health-wise reliability, socio-economic features etc. Average revenues of households was based on in the division of consumers into groups, it's analysed in 3 groups as can be seen from Table 1. In income grouping, minimum wage and average of 2 employments in every household was assumed. At that point, income groups were defined as household with income less than 1,782 TRL "1st (I) group" (44.9%), households with income between 1,783-3,565 "2nd (II) group" (30.11%), households with income between 3566 TRL and more "3rd (III) group" (25%).

Table 1. Sample Distribution

Income groups	Income level (per month-TRL)	N	Rate (%)
I	1,782 TRL and less	129	44.79
II	1,783-3,565 TRL	87	30.11
III	3,666 TRL and above	72	25.00
	Total	288	100.00

RESULTS AND DISCUSSIONS

Demographic characteristics of consumers

It should be emphasized that the income levels and distribution of the consumers will create big differences in purchasing power. Household income groups were formed in this study because consumer behaviours may be different according to income groups. It was determined that the socio-economic variables related to consumers were influential on consumption and purchasing judgments and decisions related to products. For this reason, various socio-demographic characteristics of the consumer and their families in the research area were examined primarily and these values were given in Table 2. The 47.22% of the interviewed individuals were female and 52.78% were male. About 15.97% of the individuals were in the 18-24 age

group, 26.74% in the 25-34 age group, 23.96% in the 35-44 age group, 25.69% in the 45-54 age group, 6.94% in the 55-64 age group and 0.69% were 65 years of age or older. 66.31% of the interviewed individuals were married, 28.81% were single, 2.43% lost their husband/wife and 2.43% were divorced. It was found that 19.10% of the interviewed individuals worked in the public sector, 21.53% in the private sector, 13.19% of the interviewed individuals worked in their own workplace and 10.07% of the interviewed individuals were also in paid employment. It was determined that 20.83% of the interviewees were housewives, 7.64% were retired and 7.64% were unemployed. Individuals interviewed increased in car ownership, homeownership, computer and internet ownership according to their income status.

It was determined that the household size was 3.93 persons. The 21.29% of the households were in the 18-24 age group, 20.76% were in the 45-54 age group, 13.69% were in the 35-44 age group, 13.07% were in the 25-34 age group, 7.77% were in the 15-17 age, 8.04% were in the 55-64 age group, 7.24% were in the 7-14 age group, 5.39% were in the 0-6 age group and 2.74% were over 65 years old. The period of residence in Isparta urban area was approximately 25 years.

Table 2. Some properties of interviewed individuals

Properties	**I**	**II**	**III**	**Total/ Average**
Age (year)	38.50	37.40	36.93	37.78
Educational status (year)	10.85	11.61	13.61	11.77
Gender (Woman, %)	55.91	39.08	41.67	47.22
Gender (Man, %)	44.19	60.92	58.33	52.78
Household size (person)	3.98	3.79	4.01	3.93
Number of woman in the household*	2.00	1.83	2.08	1.97
Number of man in the household*	1.98	1.97	1.93	1.96
Number of working individuals*	1.25	1.54	2.25	1.59
Number of working man individuals*	0.98	1.26	1.26	1.14
Number of working woman individuals*	0.26	0.28	0.99	0.45
Marital status				
Married (%)	65.11	67.81	66.66	66.31
Single (%)	27.13	28.73	3..94	28.81
Divorced (%)	3.87	1.14	1.38	2.43
Widow (%)	3.87	2.29	-	2.43
The distribution of population in households				
0-6 years (%)	6.04	5.15	4.50	5.39
7-14 years (%)	7.41	6.67	7.61	7.24
15-17 years (%)	8.58	6.67	7.61	7.77
18-24 years (%)	22.03	17.27	24.57	21.29
25-34 years (%)	10.92	17.58	11.76	13.07
35-44 years (%)	13.06	15.76	12.46	13.69
45-54 years (%)	20.08	18.18	24.91	20.76
55-64 years (%)	7.80	10.91	5.19	8.04
65 years (%)	4.09	1.82	1.38	2.74
House owner (%)*	58.91	71.26	76.39	67.01
Car owner (%)*	44.19	77.01	73.61	61.46
Computer owner (%)*	79.07	93.10	95.83	87.50
Internet owner (%)*	62.02	78.16	88.89	73.61
Internet hosting period (year)*	3.02	4.02	6.63	4.23

*: There was statistical differences between income groups and variables indicated as *.
Source: Own computation.

In the study, as of the survey date, the average monthly income of the families was calculated as 3,061.89 TRL and the average income per person was calculated as 779.10 TRL. It was found that food expenditure was increasing in absolute terms, depending on income groups, falling proportionately. Education, income and food expenditure were directly proportional with each other. This situation was found statistically significant.

The frequency of purchasing bakery products and brand dependency

In the scope of the study, brand dependency level of biscuit, pasta, bread, waffle and pastry products was also investigated. Consumer preference for bakery products were evaluated in four groups according to the brand loyalty ratings as described by Kotler [11]. In bakery products; those who always choose the same brand, or those who buy a brand are "absolute", 2 or 3 brands are "strong", those who prefer certain brands for a certain period of time are "middle", those who does not prefer a particular brand or prefer frequently change brands are the "independent" defined as consumer mass [1, 11].

When brand loyalty levels of consumers were evaluated according to Table 3; biscuit brand dependency was found to be strong. As a matter of fact, the share of brands with strong brand dependency (2 and 3 brands) was 47.57%. The rate of those who always buy the same (one) brand was 36.46%. Meanwhile, 9.72% of consumers were consumers with certain brand preferences for a certain period of time. The ratio of independent consumers who do not have a particular brand was 6.25%. In the same way, it was determined that brand-dependency was strong in other bakery products. The ratio of those who always prefer the same brand in bread was 43.06%, the ratio of those who prefer two or three brands was 28.13%, the ratio of those who prefer certain brands at certain times was 10.07% and the ratio of those who do not have brand preference was 18.75%. The ratio of those who always prefer the same brand in pastry-cake products was determined as 34.38%, the ratio of those who prefer two or three brands was 22.57%, the percentage of those who prefer certain brands in certain times was 15.63% and the rate of those who do not have brand preference was determined as 27.43%. In brand dependency ratios for pasta, 39.93% of those who always prefer the same brand and 38.19% of those who prefer two or three brands. The percentage of those who preferred certain pasta brands at certain times was 11.46%. The rate of non-branded pasta was 10.42%. When purchasing wafers and varieties, the percentage of consumers who always prefer the same brand is 38.54%. The proportion of those who prefer two or three brands was 36.46%. The percentage of those who preferred specific brands for a certain period of time was 7.64% and the percentage of consumers who did not have brand preference was 7.64%.

Table 3. Brand dependency level in purchase of bakery products (%)

	Bread	Cake	Macaroni	Wafer	Biscuits
Prefer the same brand	43.06	34.38	39.93	38.54	36.46
Prefer 2 or 3 brands	28.13	22.57	38.19	46.18	47.57
Prefer specific brands for specific periods	10.07	15.63	11.46	7.64	9.72
Brand is changing	18.75	27.43	10.42	7.64	6.25
Total	100.00	100.00	100.00	100.00	100.00

Consumption of bakery products

Table 4 summarizes the types and consumption of bakery products consumed by consumers in the research area. It was determined that the maximum per capita consumption was on bread with monthly 5,663.7 g (188.79 g x 30 day). Consumption of biscuit per person per month was 433.44 g, consumption of wafers was 110.33 g, consumption of pasta was 913.45 g and consumption of cake was 144.47 g According to TUSAF [20] Sector Report, it is stated that Turkey consumes 319 g of bread per person. Ünal [21] found that per capita bread consumption was 356 g in the Black Sea Region, 391.2 g in the Thrace, Marmara and Aegean regions, 407.2 g in the Central Anatolian Region, and 442.4 g in the South and South Eastern Anatolia Regions. Demircan et al. [4] found that per capita daily bread consumption amounted to 429 g in Isparta. Gül et al. [7] determined that per capita consumption by 233.46 g per person per day in Adana province, 178 g per person per day consumption in Isparta province by Gül and Gül [8], 175 g in work done by Yurdatapan [22] and Ekmekçi Bal et al. [6] found that in the central province of Tokat, bread consumption was 291.95 gr per person

per day. According to TPIA's 2014 [19] data, household consumption of pasta is 7.5 kg per month. Yurtsever [23] found that 97.7% of consumers consumed pasta and 55.3% preferred spaghetti-type pasta in the study conducted by consumers in the province center of Tekirdağ.

In this study, it was determined that the ratio of consumers' consuming biscuits was 97.17% and non-consuming biscuit families was 2.82%. The consumption rates of other bakery products were as follows; bread consumption rate was 99.65%, pasta consumption rate was 99.30%, wafer consumption rate was 95.43% and cake consumption rate was 89%. Consumers stated that products are not reliable, hygienic conditions are inadequate and health problems as reasons for not consuming bakery products.

Table 4. Bakery products consumption

Bakery types	I	II	III	Average
Biscuits (g per month per person)	355.74	507.85	482.73	433.44
Wafer (g per month per person)	115.81	114.78	95.15	110.33
Macaroni/paste (g per month per person)	925.13	848.26	971.30	913.45
Cake (g per month per person)	129.00	151.09	164.20	144.47
Breads (g per day per person)	192.50	202.67	166.30	188.79

In the questionnaire survey, it was determined that francala bread type was the first place with 44.96%. This was followed by 13.75% of Isparta bread, 7.75% of whole wheat bread, 0.78% of pita bread, 5.43% of rye bread, 15.50% of yufka and 11.63% of home bread consumption (Table 5). In the study conducted by the Tanık [16] in the central province of Tekirdag, 78% of the consumers consume francala bread, 14% eat pide, 7% eat whole wheat and 1% eat rye bread. Yurdatapan's [22] study of the central province of Edirne was also the first choice of francala bread consumers (41%). Dölekoğlu Özçiçek et al. [5] found that 87.9% of the consumers in Adana, 90.6% in Mersin and 75.7% in Antalya preferred francala bread in their work in Adana, Mersin and Antalya. Ekmekçi Bal et al. [6] found that francala bread type took the first order (70.59%) in bread consumption in the center of Tokat province. Demircan et al. [4] determined that Isparta bread was the most consumed bread in Isparta with 46.2%.

Table 5. Consumption of bread types

	I	II	III	Total
Francala	44.96	51.72	52.78	48.96
Isparta bread	13.95	16.09	13.89	14.58
Whole wheat bread	7.75	6.90	13.89	9.03
Pita	0.78	0.00	0.00	0.35
Rye	5.43	4.60	1.39	4.17
Yufka	15.50	14.94	9.72	13.89
Home bread	11.63	5.75	8.33	9.03

Ranking of influential factors in the first place in the preference of bakery products was given at Table 6. Consumers prefer biscuits and waffle products to be delicious at the beginning, the second is a product that is practically and immediately consumable, the third is a satisfying, the fourth is a satisfying habit, the fifth is nourishing, then the price has come to be found. At the beginning of the reasons of preference of the pasta, it was determined that it is delicious, it is a habit in the second place, it is practical in the third place, it is satisfactory in the fourth place, it is nurturing in the fifth place and finally the price is reached. In the first place in the preference of the pasta products again taste, then habit, practicality, satiety, price and nutrition factor was determined. The preferred reasons for consumers for bread were to be satisfying, habit, delicious and satisfying, price and practicality.

Today, with the increase in the labour force participation rate of women, biscuits and cake products have begun to come between the preferred products. Being practical, being delicious is a factor attracting consumers. It was found that being delicious is effective in the purchase of every age group. It was determined that men consumed more pasta and waffle products in the study. This situation was also statistically significant. It was found that there was a negative correlation between education factor and consumption of bread and biscuits. This situation was statistically significant. It was determined that non-homeowner and non-computer individuals consumed pasta more. The relationship between these variables was

statistically significant.

Table 6. Ranking of influential factors in the first place in the preference of bakery products

	Biscuits*	Wafer*	Pasta*	Cake*	Breads**
Price	3.19	3.16	3.00	3.07	6.60
Being practical	3.78	3.89	3.42	3.20	0.69
Being nutritive	3.41	3.73	3.20	3.05	16.67
Being filling	3.73	4.06	3.22	3.17	45.14
Being delicious	4.13	4.14	4.24	3.95	16.67
Habit	3.44	3.42	3.69	3.24	25.69

*Scale: 1. "Not important at all" 2. "Not important" 3. "Somewhat important" 4. "Important" 5. "Very important"
** Proportional distribution

It was determined that the primary factors in the consumers' decision to purchase biscuit products were quality, price-quality, followed by brand and additive.

Purchase channels

Purchasing channels of consumers for biscuits, bread, pasta, wafer and cakes were given at Table 7. As can be seen from the Table 7 it was determined that consumers prefer to buy biscuit products from markets (88.54%). It was determined that grocery store followed this with 24.12% of consumers. The 14.11% of the pasta purchase areas preferred grocery store, 94.09% of the markets. It was determined that 19.44% of the wafers were grocery stores and 87.15% preferred markets. Baker was important in bread purchase channels (66.66%). The 25.34% of the bread purchase areas preferred grocery stores and 47.91% preferred markets. About 60.41% of those who buy cakes preferred bakery product stores. Promotional factors such as product variety, promotions, and the ability to make all purchases from the same place played an important role in the fact that baked goods such as biscuits, pasta, wafers and bread were preferential to the purchasing channel. Gül et al. [9] found that the markets were predominantly in the purchasing channel of consumers (89.75%) in the study on the consumers of Isparta province for biscuits and the most important factor was the price sensitivity of consumers. Ekmekçi Bal et al. (2013) stated that 80.51% of the consumers in the Tokat province were buying bread from the market. Tanık [16] found that 27% of the consumers in Tekirdağ were bought from the market and 43% were bought from the baker. Demir and Kartal (2012) stated that 45% of consumers in Konya bought bread from the market. Markets are on the forefront of biscuits (91.95%), pasta (95.8%), bread (57.5%) and wafers (89%) in bakery products purchased by consumers. In the preference of cakes purchasing channels, it was determined that bakery products-pastry (68.50%) was the frontline.

Table 7. Purchasing channels (%)

	Biscuits	Bread	Pasta	Wafer	Cake
Grocer	24.12	25.34	14.11	19.44	1.04
Market	88.54	47.91	94.09	87.15	17.01
Bakery	1.04	66.66	0.69	0.69	24.30
Patisserie	0.00	14.58	0.00	0.00	60.41
Market place	0.00	0.00	1.73	0.00	0.00
Himself at home	0.00	5.20	2.08	0.00	20.13

Factors affecting purchase decision of bakery products can be seen from The Table 8. Among the factors that have the biggest impact on consumers in the preference of bakery products' purchasing channel were the fact that the conditions of the store are healthy and that all the shopping can be done. In addition, it was important that the consumer's purchasing channel was close to where he was, that he could find the desired products, and that there was a good relationship between the quality price.

It was determined that quality was the most important factor affecting purchasing behaviour of bakery products. In the second place, it was found that the price-quality level, the brand in the third place, the fourth was the product does not contain the additive and the price factor in the seventh place (Table 8).

Purchasing frequency of consumers

The average purchasing frequency of bakery products was also examined. The 3.82% of the interviewed individuals were in one week, 22.22% in fifteen days, 29.86% in one month, 20.49% in two to three months, 20.14% bought biscuits every six months. However, it was determined that 2.43% of the individuals did not consume biscuits and 1.04% did not purchased.

It was determined that 9.72% of the

respondents bought wafers a week, 26.04% every fifteen days, 21.88% monthly, 17.71% every two to three months and 13.89% every six months. 9.72% did not consume wafers. 1.04% of the interviewees did not buy wafers. Bread buying frequency was usually the daily.

Table 8. Factors affecting purchase decision of bakery products

	Biscuits	Wafer	Pasta	Cake
Quality	4.31	4.32	4.32	4.05
Level of price and quality	3.92	3.96	3.97	3.75
Brand	3.89	3.92	3.95	3.63
Additive free	3.77	3.86	3.60	3.55
Itself	3.71	3.70	3.70	3.48
The benefits	3.75	3.84	3.65	3.48
Price	3.65	3.54	3.48	3.40
Family	3.63	3.59	3.62	3.40
Organic	3.55	3.68	3.34	3.27
Income level	3.50	3.50	3.46	3.32
Suitability of the product	3.50	3.64	3.56	3.41
Odour	3.50	3.57	3.41	3.31
Packaging	3.48	3.35	3.43	3.38
Colour	3.40	3.41	3.28	3.18
Advertising, promotion	2.98	2.84	2.94	2.67
TV (audio-visual)	2.83	2.74	2.85	2.63
Friends	2.61	2.56	2.56	2.41
Properties of seller	2.64	2.74	2.55	2.58
Media	2.51	2.45	2.49	2.40
Social group	2.36	2.25	2.31	2.18
Internet	2.25	2.25	2.30	2.24

Scale: 1. "Not important at all" 2. "Not important" 3. "Somewhat important" 4. "Important" 5. "Very important"

On the other hand, 9.72% of the interviewed individuals were found not consuming bread and 1.04% said that they did not buy it.

In consumption of pasta, 3.13% of the interviewed individuals were buying one week, 8.68% of them were bought every fifteen days, 16.67% of them were monthly, 30.90% of them were every two to three months and 37.15% was buying every six months. About 2.78% of them did not consume pasta and 0.69% of them did not buy pasta.

The 19.44% of the interviewees were found to have bought one week, 3.13% to 15 days, 3.13% to monthly, 9.03% to every two to three months and 31.25% to buy cakes every six months. About 24.31% of them did not consume cakes and 9.72% did not buy cakes.

Judgments on the reliability of bakery products

Food reliability; to protect food from biological, chemical or physical hazards and contamination that may occur during the food chain and to prevent food damage to consumer health [15]. It is estimated that foodborne illnesses cause approximately 76 million poisonings per year, 325 thousand hospital treatments and 5 thousand deaths.

However, ordinary consumers and producers do not consider foodborne illnesses to be a serious health problem and do not know what to do to prevent them or take precautions to prevent them [2]. In this context, the consumers who were interviewed were also asked about the reliability of bakery products and the findings are given in Table 11.It was judged for biscuits that 54.16% of the consumers had a "medium" and 14.23% were "very reliable". The 44.10% of the interviewed individuals were judged for breads to be "moderately reliable" and 29.51% were "very reliable". About 39.93% of the respondents said that pasta was "moderately reliable" and 41.36% were "very reliable". The 50% of the consumers had the judgment that the wafers were "medium" and 11.45% were "very reliable". And finally, 42% of the consumers in the cake products were "moderate", and 12.15% were "very reliable". Food-borne risks lead to serious health problems in all layers of the society, which leads to lower work efficiency and economic losses. This leads to a more cautious approach to food products, especially processed products. The news and the programs are affecting people. It encourages people to be wary of problems and diseases caused by food products. This is affecting the purchase and consumption of ready-made food.

Consumers' levels of knowledge about quality and food safety systems were also measured (Table 9). Turkey has met with the concept of quality after the second half of the 1980s [1]. With the dissemination of the ISO 9000 quality standards, which was published by the International Standards Organization (ISO) in 1987 and the European Union countries preferring the products of companies that implement these standards, studies on this issue have started to be carried out in Turkey

as well [10]. The aim of ISO is to promote quality and standardization all over the world, to cooperate in scientific, technological and commercial activities, to provide international circulation of products and services. ISO standards for food safety management system are called "ISO 22000" [1]. Another quality assurance system, Hazard Analysis and Critical Control Points (HACCP), is a system developed to prevent diseases that can be caused by food items and programmed controls to ensure that the production is made in full [17].

In the study, consciousness about the certificates (TSE, ISO, and HACCP) [21] that help consumers to evaluate the quality of food products was determined. According to this, it is determined that TSE is known by approximately 94.10% of the people interviewed within the scope of the survey and that the ISO standards are the most well-known standard after TSE (60.07%).

Table 9. Consumers' knowledge of some standards (%)

	I	II	III	Average
TSE *	90.70	94.25	100.00	94.10
ISO*	53.49	54.02	79.17	60.07
HACCP *	10.85	24.13	34.72	20.83
TS 2383	13.95	13.79	12.50	13.54

*: There was a statistical difference between the income groups and the variables indicated by *.

It was determined that the HACCP certificate and TS 2383 standard, which have an important place in terms of food safety, are least known standards by the households interviewed. It was determined that 20.83% of the households of HACCP and 13.54% of TS 2383 were recognized. It was also found that the awareness of these standards was increasing parallel to the income level (Table 9).

About 42.29% of the consumers did not know which company was controlling the bakery products sold in the market to be harmful to human health.

CONCLUSIONS

Consumption, preferences and judgments of baked goods were investigated in the sample of Isparta city centre in the study. The data were obtained from 288 consumers using the survey method.

According to research findings, it was determined that 2.43% of consumers did not consume biscuit products, 2.78% of pasta and varieties, 9.72% of wafers, 1.39% of bread and 24.31% of pastries and species were not consumed. It was found that 1.04% of the interviewed individuals were biscuits, wafers, bread, 0.69% pasta and 9.72% did not buy cake. The consumers surveyed found that the frequency of biscuit purchases was once a week to fifteen days, the frequency of pastry purchases was once a week, the frequency of purchasing wafers was fifteen days, and the frequency of purchasing pasta was once a month. Brand addiction can be said to be strong for such products. The nutritious, satisfying, delicious and consumer habits are highly influential on the consumption of bakery products. More grocery stores were on the front line in the purchase channels of bakery goods outside the cake and bread. Facilitated factors such as product diversity, promotions, and the ability to make all purchases played an important role in the sales channel preference. The most important criteria in choosing the purchasing channel of the consumers are; Hygiene, the environment where all the shopping can be done. The main factors affecting consumer preferences in baking goods consumption were flavour, satiety and habit. However, it was determined that consumers had a "medium confidence" judgment in bakery products. Due to developing technology and rapidly changing living conditions, there will be significant changes in consumer preferences. For this reason, firms operating in the bakery sector need to take into account consumer incomes and preference trends in creating product components.

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MARKETING STRUCTURE AND PROBLEMS OF SOUR CHERRY FARMERS: AFYONKARAHISAR AND KONYA PROVINCE EXAMPLE

Mevlüt GÜL, Huriye ÖKTEM

Süleyman Demirel University, Agriculture Faculty, Department of Agricultural Economics, 32260 Isparta, Turkey, Email: mevlutgul@sdu.edu.tr

Corresponding author: mevlutgul@sdu.edu.tr

Abstract

The purpose of the study was to examine the marketing structure of sour cherry, to reveal the marketing problems of the sour cherry in the region and to give suggestions to improve the sour cherry production in the region and Turkey. The main material of this study was the primary data to be obtained by survey method from the farmers who produced sour cherry in Sultandağı and Çay districts of Afyonkarahisar and Akşehir and Doğanhisar districts of Konya province. In addition, data was obtained from intermediaries in the marketing channel. Stratified sampling method (Neyman Method) was used to determine the number of samples to be surveyed. The sample size represented the main population was calculated as 138 farmers. Afyonkarahisar province is in the first place with a share of 22% in Turkey sour cherry production. Konya follows Afyonkarahisar with a share of approximately 16%. In the region, 63.04% of farmers was conventional production and 36.96% of them was organic production. The most important problem that producers face with the sour cherry cultivation was the low price. The prices of the sour cherry were determined by the companies. Most of the sour cherry producers sell commissions. The most powerful factor in choosing sour cherry cultivation was the preferred industrial product. Consumption as fresh was very low. The most important threat to sour cherry production in the region is the climate. The frost occurred during the flowering period reduces the yield. The following improvements can be suggested for the production of sour cherry to a better position: increasing the number of facilities processing in the region, increasing the awareness of farmers about producer organization.

Key words**:** *sour cherry, marketing margin, channel, Turkey*

INTRODUCTION

Turkey is one of the richest countries in Europe and the Middle East in terms of plant cover, with up to 10,000 plants (Ölmez, 2005) [31].

Sour cherry grows easily in almost every region of Turkey. Commercial production of sour cherry is in limited areas of favourable climatic conditions. The main cherry-makers are Afyonkarahisar and Konya.

Although sour cherry is well grown in temperate climates, it is also resistant to very low and high temperatures and is adaptable to climate changes. The sour cherry resembles as an apple in terms of its resistance to cold. Cherry is very resistant to winter frost (Özbek, 1978) [32].

It was determined that cherry and sour cherry occur between the Caspian Sea and the Black Sea, as well as the best development in the Mediterranean or temperate climate (Webster and Looney, 1996) [43].

The sour cherry systematically belongs to the Rosales team, the Rosaceae family, the Prunoideae subfamily and the Prunus genus (Özbek 1978) [32].

The sour cherry is very resistant to winter colds. They are less likely to suffer damage from late spring frosts than from cherry blossoms. It can be grown without irrigation even in regions where annual rainfall is around 400 mm (Ağaoğlu et al., 1997) [2].

In Turkey, sour cherry is generally grown on mahlep seedling rootstocks (Prunus mahaleb). Much of the mahlep seedling rootstocks are yellow mahleps. The reason for this is that the yellow-coloured mahleps have less problems than the black-coloured ones based on the graft incompatibility. On the other hand, seeding of Prunus avium are also used in sour cherry cultivation (Özbek, 1978, Akça, 2000).

The sour cherry is a fruit with a sour stalk, obtained from the sour cherry trees (Prunus cerasus L.), a member of the Rosaceae family. The sour cherry is evaluated for processing

products such as fruit juice, syrup, jam, marmalade, compote and liquor more than table (Iezzoni, 2008) [22].

The interest in sour cherry juice in the world scale is quite low. The main reason for this is that the sour cherry is not well known and the positive effects of sour cherry juice especially on nutrition and on human health are unknown. As a matter of fact, the content and antioxidant richness of anthocyanins in many fruit juices such as blueberries, black grapes, and blue berries are mentioned (Borowska et al., 2005, Mac Donald, 2005) [11,27]. There are limited studies on sour cherry about these types.

However, a great deal of technical research on sour cherry juice has been made and is being made. There are some studies about the determine the general chemical composition and variability of sour cherry juice (Ekşi et al., 1980, Erbas, 1981, Toht-Marcus et al., 1993, Velioğlu and Yıldız, 1996) [16, 18, 38, 39]. There is also a significant number of studies on the color and stability of anthocyanins in sour cherry juice (Cemeroğlu et al., 1994; Will and Dietrich, 2006; Bonerz et al., 2007) [10,13,44]. Studies have also been carried out on the importance of antioxidant activity in sour cherry juice and the prevention of healthy nutrition and disease prevention (Meyer, 1999; Kang et al., 2003; Borowska et al., 2005; Ataie-Jafari et al., 2008) [8, 11, 23, 28, 31]. There is also an increase in the number of researches on phenolic compounds and especially anthocyanins of sour cherry juice (Wang et al., 1997; Wang et al., 1999; Burkhardt et al., 2001; Kim et al., 2005; Šimunić et al., 2005; Kirakosyan et al., 2009; Damar, 2010) [12, 14, 24, 25, 37, 41, 42].

The sour cherry is very low in fresh use and is used predominantly in the industrial sector. Fruit juice, jam and frozen product use is more common. Sour cherry is one of the most important raw materials for fruit juice sector. Sour cherry juice has a high demand both in the domestic market and in exports. Öktem and Gül (2016) [30] reported that 0.16% of the fresh sour cherry produced in Turkey is subject to export. They stated that the exports of fresh and fresh use of sour cherry are very limited. According to Öktem and Gül (2016) [30], 37.7% of the sour cherry produced in Turkey is used in the fruit juice industry. They also reported that the share of sour cherry juice in the total amount of fruit used in the industry was 8.9%.

In Turkey, technical studies related to sour cherry, cherry juice and breeding have been made predominantly. It can be said that there is not adequate study on the economic aspect of sour cherry breeding.

In this study, it was aimed to reveal the problems related to marketing of sour cherry farmers and intermediaries in Turkey. In other words, it was aimed to determine the marketing structure of sour cherry, to introduce marketing channels, to identify the problems in these channels, and to suggest solutions in the case of Afyonkarahisar and Konya illustrations.

MATERIALS AND METHODS

The data used in the research were provided from the producers in the villages of Sultandağı, Çay, Akşehir and Doğanhisar districts where the production of sour cherry is intense in Afyonkarahisar and Konya provinces. The number of sample farmers surveyed was determined by stratified sampling method (Neyman Method). Accordingly, the sample number was calculated as 138 farmers. Besides, the information obtained from the 20 broker / trader and 2 processing factories in the region constituted the data obtained from the intermedia. The data were included the 2016 production season.

Farmers in sour cherry production were divided into four groups according to their frequency distribution, taking into account the size of the sour cherry planting area. (The first (I) layer refers to the sour planting area of 1.0-4.99 decares, the second (II.) layer is 5.0-9.99 decare planning area, third (III.) layer is 10.0-14.99 decares, the fourth (IV.) layer represents 15.0 decares and more sour cherry planting areas.

According to this; 65 farmers from the first layer, 29 from the second, 10 from the third, and 34 farmers from the fourth layer were

interviewed. In line with the calculated sample size, farmers from the mainland were selected randomly.

Data collection method

The survey was conducted by interviewing farmers and intermediaries who produce sour cherries in a face-to-face interview technique.

The questionnaire was prepared considering the marketing issues and problems of farmers and intermediaries in the study area. Questionnaire was made up of (i) sour cherry information, (ii) marketing structure, and (iii) marketing problems sections.

Evaluation of data

The data obtained in the study were coded using the statistical package program and frequency distributions were generated.

SWOT analysis was performed for sour cherry production in the region. SWOT analysis is a technique used by enterprises or organizations surveyed to determine the strengths and weaknesses of the process or situation and the opportunities and threats that arise from the outside. With the application of this technique, it is possible to develop plans and strategies to minimize the effects of threats and weaknesses on the basis of existing strengths and opportunities, taking into account internal and external factors (Akkaya, 2015). These aspects of the industry were sought to be investigated in accordance with the information obtained from farmers and intermediaries.

RESULTS AND DISCUSSIONS

The average age of the sour cherry producing farmers in the studied regions was calculated as 46 years, and their education level was about 9 years. The household size in the region was determined to be 4 persons. It was found that farmers were engaged in plant production for 19 years. Farmers' sour cherry production experience was 17 years in the first group, 20 years in the second group, 25 years in the third group and 18 years in the fourth group and 19 years in the average. The average number of sour cherry's orchard was 2.4 pieces. The first group in the study area had 3.5 decares sour cherry planted areas, the second group had 7.6 decares, the third group had 11.7 decares and the fourth group had 22.8 decares. The average sour cherry planted area was 9.7 decares. It was estimated that the farmers sold 19.6 tonnes of sour cherry in the average. The sale price of sour cherry was 1.5 TRL. It was determined that the yield of sour cherry was higher in the third group (2.3 tons) than the others. The sour cherry yields was varied from 1.9 to 2.3 tons in the farms groups. It was determined that the fourth group of farmer had the highest relative profit. This value was 1.8 in the average (Table 1).

Table 1. Various information about farmers

Features	**Farms groups**				**Average**
	I	II	III	IV	
Farmer age (years)	45.8	46.8	49.5	44.9	46.1
Farmers' education level (year)	8.3	8.6	9.7	8.9	8.6
Household size (person)	3.9	4.5	4.2	4.3	4.2
Farmer's experience in plant production (years)	17.6	19.9	24.6	18.2	18.7
Farmer's experience in sour cherry production (years)	17.1	19.9	24.6	17.4	18.3
Number of sour cherry garden's (pieces)	1.4	2.2	2.7	4.4	2.4
Sour cherry planted area (decare)	3.5	7.6	11.7	22.8	9.7
Sour cherry production (ton)	6.5	14.8	26.5	46.6	19.6
Per kilogram sour cherry sale price (TRL)	1.7	1.4	1.5	1.5	1.5
Per decares sour cherry yield (ton)	1.9	2.0	2.3	2.0	2.0
Relative profit	1.4	1.5	1.8	2.0	1.8

1 decares equal 0.1 hectares and 1 Euro equal 3.343611 TRL (Turkish Liras)

Akçay et al. (1999) [4] estimated that the highest relative profitability rate was 2.55 in the sour cherry in the studies of production costs and profitability of peaches, apples and

sour cherry grown in Tokat Central district. The authors found that yield per tree was 30.91 kg and yield per decares was 1,331.3 kg for sour cherry. According to the authors, it was profitable to produce cherry in Tokat province.

Özüdoğru (1998) [33] determined the value of a sour cherry orchard of Çubuk district of Ankara by using income method and market price method. The author found that the capitalization interest rate was 5% in the sour cherry orchard.

Altın (2006) [6] calculated that the yield of sour cherry for Tokat province center was 1,473 kg per decares. He calculated cost as 0.396 TRL and 0.645 TRL of the selling price for one kilogram sour cherry. He calculated relative profit of sour cherry to be 1.63. The author reported that there is no effective market system in the area and should be production and marketing efforts to increase the income of farmers.

Radosavljević (2008) [34] examined Serbia's marketing chain for sour cherry and raspberries. The author argued that the trade of fresh and frozen fruit for Serbia is complex and fragmented as farmers' market, processing industry, trading companies and intermediaries. He suggested that in order to increase quality, production, profitability and exports, it was necessary to maximize cooperation between producers, processors, wholesalers and retailers.

Sredojević et al. (2011) [35] investigated the competitiveness of investments in cherry and sour cherry production within the framework of Serbia's new program. They reported that some problems for cherry and sour cherry in Serbia such as land fragmentation, low technical knowledge and technological level, insufficient cooperation among producers, ambiguous selling prices, and slow implementation of standards.

Vukoje et al. (2013) [40] reported that the fruit processing sector in Serbia focused primarily on the production of fruit juices, alcoholic beverages, composters, aromas, jams and marmalades. They also analysed the cost effectiveness of dry sour cherry production in their work. The authors reported that raw sour cherry (60.2%) is the most important cost element in dry sour cherry production cost structure. This was found to be followed by energy costs with labour share of 22.7% and 3.5% share.

Aydemir (2006) [9] defines marketing as the process of planning, designing, pricing, distributing and promoting products, services and ideas to provide changes that satisfy individual and institutional objectives. He stated that marketing is not an after-production but also an action that starts before production and during production, pre-sales, sales moment and after sales. Aydemir (2006) [9] stated that the marketing starts with the quantity and quality of the farmer producing the product, and includes product preparation, standardization, warehousing and transportation activities in the process and finally stated that the marketing includes all activities in the process until the consumer.

Mucuk (2004) [29] defines marketing as the process of planning and implementing "development", "pricing", "promotion" and "distribution" of goods, services and ideas that meet the needs in order to fulfil the responsibilities to achieve business objectives.

According to Kotler (2009) [26], marketing is a business function that determines unmet needs and demands, identifies and measures their size, possible profitability, determines which target markets the organization can best serve, and decides on appropriate products, services and programs to serve these selected markets, and a function that requires everyone in the organization to think and serve the customer.

AMA (2013) [1] defined that marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large.

The cherry sales patterns of the farmers in the study area were examined. The 50% of the farmers realized the sale on future after production. About 45.7% of the interviewed individuals made the sale in cash after the production of sour cherry. The 3.6% of them made the sale both futures and cash.

The vast majority of the cherry farmers in the region surveyed sold sour cherries in July-

August. While 20.6% of producers sold their products in July, 79.4% of them sold their products in July and August. The most important factors for the farmers to sell the sour cherry immediately after the production was that the cherry is a perishable product, the farmers do not have storage facilities and need cash.

Farmers in the research area mainly provided information on sour cherry market from exporting firms (56.5%). The 32.6% of the farmers were provided from the commission, 3.6% from the Chamber of Agriculture, 2.9% from the other farmers, 1.4% from the District Agriculture Directorates, 1.4% of them provided from the media. Market information sources were also diversifying as the sour cherry planting areas increases and also the share of commissioners in the source of information was increased.

Sour cherry sales channels of farmers in the study area were given in Table 5. About 97.1% of the farmers in the region sold their products to the commissioner. Therefore, the most important distribution channel of sour cherry was the commissioners. The 2.1% of sour cherry growers sold wholesaler-trader and 0.7% of them to factory. The sales channel was also diversified on the farm groups.

Table 2. Sour cherry sales channels in farms

Features	Farms groups				Average
	I	II	III	IV	
Wholesaler/merchant N	0	0	2	1	3
%	0.0	0.0	20.0	2.9	2.2
Broker/commissioner N	65	29	7	33	134
%	100.0	100.0	70.0	97.1	97.1
Factory N	0	0	1	0	1
%	0.0	0.0	10.0	0.0	0.7
Total N	65	29	10	34	138
%	100.0	100.0	100.0	100.0	100.0

All of the producers in the research area stated that the price of sour cherry was determined by the companies.

Marketing channels are very important in terms of general economic structure as well as producers and intermediaries in any product market (Emeksiz et al., 2005) [17]. Güneş (1996) [20] defined the marketing channel as the way in which products came from within their production and the way they deal with various events such as processing, storage, packaging, and recycling.

Farmers operating in agriculture are usually small size with limited marketing opportunities. These limited opportunities can be avoided with the effectiveness of marketing channels. Farmers can easily access markets outside of local markets and market information. On the other hand, products are not as they are, but are processed in various stages and processed by various intermediaries to reach the consumer. In this way, both the added value of the product is gained and the products of the consumer are delivered in the desired manner (Emeksiz et al., 2005) [17].

The sour cherry marketing channels in the region were given in Figure 1. The producers can sell to the wholesale brokerage, wholesaler-trader, factory and exporter company. The broker and the wholesaler-trader markets to the whispering factory and exporting company that the manufacturer receives. The factory and the exporting company are the retailers, and the retailer is the final consumer (Figure 1). Therefore, added value is created in different marketing channels, which increases the economy.

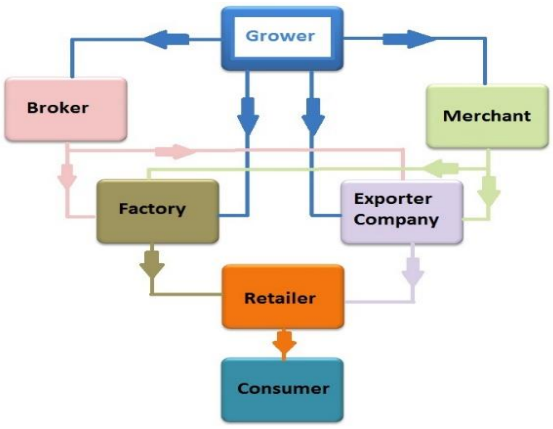

Fig. 1. Sour cherry marketing channel structure

The 17.4% of the surveyed farmers received information about sour cherry production. Therefore, participation in education-publication activities related to sour cherry

was low.

The 63% of farmers produced sour cherry with conventional agriculture and 37% of them with organic agriculture. The organic farming rate increased as the farmer's sour cherry planted area increased.

The most important factor in choosing organic agriculture for some sour cherry growers in the region was the preference for organic produce by fruit processing plants in the region. These companies promote organic farming. These companies in the research area provide the farmers with organic farming and counselling support in the fight against disease and harm. At the same time, these companies also provide farmers with pesticide, inputs suitable for organic farming and assistance in implementation. Therefore, the sour cherry farmers in the region can reduce the cost of spraying, pesticide and labour. An important factor in preference organic farming of sour cherry producers is these opportunities provided by the processing company.

Gül and Akpınar (2006) [19] point out that Turkey needs to closely monitor the developing factors in the world production and trade in terms of sustainability of the important position in world fruit production. They also stated that establishment similar product associations or consortia, as well as the application of branding and integrated pest management, are of importance in terms of sustainability. Gül and Akpınar (2006) [19] stated that national and international markets should be taken into consideration in the fruit species produced. They also stated that necessary infrastructure such as controlled-atmospheric cold storage and packaging facility should be established in order to ensure supplied to desired level and quality throughout the year.

Altın (2006) [6] determined that 80-85% of the sour cherry grown in Tokat province was sold to the factory. The author reported that processed sour cherry production could be increased by development of technologies for the domestic and abroad market.

Radosavljević (2008) [34] reports that in Serbia, vertically and horizontally integrated sour cherry and fruit marketing systems can have fewer intermediary channels and achieve direct consumer. The author argues that integrated marketing concepts in the country can increase quality, efficiency, profitability and competitive power.

General information about intermediaries

The marketing margin is the difference between the price consumers pay for the product they buy and the price the producers get for the products they produce (Şarapoglu, 2015) [36].

There are different methods for calculating marketing margins. Amir and Knipscheer (1989) found that the most common method is the calculation of wholesale margins and retail margins. The wholesale margin refers to the price difference between wholesalers and producers. According to them, the price paid by the retailer to the wholesaler constitutes wholesale prices. Retail margins are defined as price differences between retailers and wholesalers. They have reported that the price paid by the consumer to the retailer is the retail price.

The intermediaries in the region bought the sour cherry an average of 1.3 TRLs from producer and sold 1.6 TRL averages to the processing companies. Therefore, the marketing margin at the level of intermediaries was 30% for the sour cherry.

The duration of the intermediaries' sour cherry-buying and selling activities was also investigated. Intermediaries operating in the province of Afyonkarahisar were operated duration for 13.5 years in the purchase and sale of sour cherry, while intermediaries in the province of Konya was did this work for 14.8 years (Fig. 2).

It was determined that 95% of intermediates in the region were purchasing sour cherry on behalf of the company and 5% of them had done on behalf of the factory.

The sixty percent of the intermediaries interviewed sold sour cherry to company and factory in Afyonkarahisar province. Twenty five percent of them sold to company and factory in Çanakkale, ten percent of them sold to factory in Bursa.

The intermediaries interviewed purchased 138.57 tons of sour cherry in the province of Afyonkarahisar in 2016. The intermediaries in

Konya purchased 292.14 tons on average.

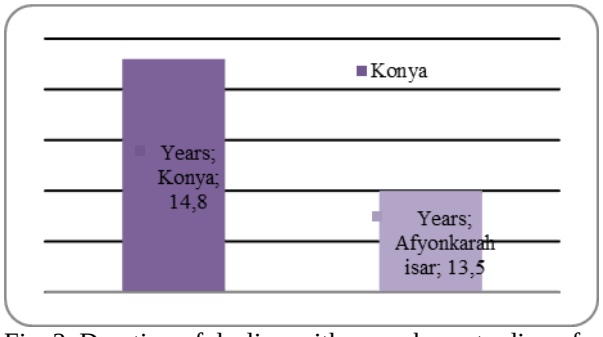

Fig. 2. Duration of dealing with sour cherry trading of intermediaries

It was also investigated how the intermediaries in the studied regions paid the price of the sour cherry they bought to the producers. Seventy percent of the intermediaries paid in the form of futures to the producers in the province of Afyonkarahisar and 30% of them paid in advance. The 80% of them paid in the form of futures to the producers and 20% of them paid in advance in Konya.

The situation of the market researches of the intermediaries was also examined and it was determined that 15% of the intermediaries conduct market research. At this point, it was effective that the majority of the companies interviewed were brokers and that they had to purchase sour cherry on behalf of other companies.

The problems related to cherry production and trade were also examined at the point of view of the intermediaries of the study field and it was mentioned that the most important problem was the prices. Besides, it was expressed in problems experienced with other companies and factories.

SWOT analysis of sour cherry growing

The analysis of the current situation and experience of the business as a whole, while defining the strengths and weaknesses of the business and harmonizing them with environmental conditions is called Interaction (SWOT) Analysis (Dincer, 1994) [15].

The SWOT Analysis is a technique used to identify the strengths and weaknesses of the organization, technique, process, or situation and to identify opportunities and threats originating from the external environment (Gürlek, 2002) [21].

The SWOT analysis of sour cherry production was made in line with the information obtained from producers, brokers, processors and merchants in the region. The strengths, weaknesses, opportunities and threats of the production of sour cherry were determined.

The sector is strong in the region, as the research field is suitable for the sour cherry-growing climate, the marketing of the product is easy, demand as an industrial product and product yield are high.

Weaknesses in the regions were identified as high levels of input prices, the lack of longevity of trees, low sales prices of sour cherry, inadequate technical knowledge in breeding, lack of technical staff, irrigation problems in some areas and increase in diseases and harms.

Opportunities in sour cherry production are determined as the employment of the sour cherry, the creation of added value, the adaptation to the region, the name of the region product.

The threats of frost during flowering, the delay in crop harvesting due to climate change, the presence of insects in the absence of appropriate measures, the lack of storage possibilities of producers, and the lack of processing facilities were identified as threats (Fig. 3).

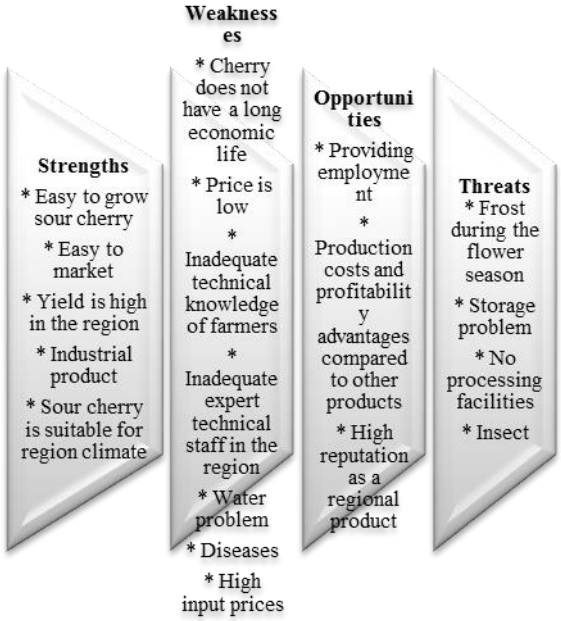

Fig.3. SWOT analysis of the sour cherry industry

CONCLUSIONS

Afyonkarahisar and Konya are the most important places for sour cherry production in Turkey. While Afyonkarahisar took first place in sour cherry production, Konya follows him in second place. Sour cherry is suitable for the region climate due to ecological conditions and its production has increased in these regions. One of the reasons why sour cherry farming is preferred is the raw material for the industry. The harvested product is sold to brokers, traders, factories or processing plants without being subject to any classification. The most important problem experienced by producers in the region is that the sales price of sour cherry is low and the input costs are high. The price of sour cherry is determined by the companies. Therefore, producers can not influence price formation. Sour cherry growers are usually sold their products in July and August.

The commissioners dominated the marketing channel of the sour cherry production. As a matter of fact, 97.1% of the farmers who are interviewed sold their products to the commissioner. Farmers did not sold with cash their products.

In order to better evaluate the product produced in the region, the manufacturer needs to improve its marketing processes and solve its problems in order to obtain profitable and higher quality products. For this it is necessary to organize the producers in the region, to improve the storage infrastructures in the region and to increase the processing facilities.

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TECHNICAL STAFF'S KNOWLEDGE LEVEL ABOUT INTEGRATED PEST MANAGEMENT AND THEIR FEATURES

Mevlüt GÜL[1], M.Göksel AKPINAR[2], Vecdi DEMİRCAN[1], Hasan YILMAZ[1], Tufan BAL[1], Ş.Evrim ARICI[1], Mehmet POLAT[1], Bekir ŞAN[1], Figen ERASLAN[1], M.Çağla ÖRMECİ KART[3], Damla GÜRBÜZ[1], Ş.Gülden YILMAZ[4]

[1]University of Süleyman Demirel, Agriculture Faculty, Isparta, Turkey, Email: mevlutgul@sdu.edu.tr
[2]Akdeniz University, Agriculture Faculty, Antalya, Turkey
[3]EgeUniversity, Agriculture Faculty, İzmir, Turkey
[4]Batı Akdeniz Agricultural Research Institute, Antalya,Turkey

Corresponding author: mevlutgul@sdu.edu.tr

Abstract

Integrated fight is briefly described as the administration and management system of pests and expressed as integrated pest control or integrated pest management. Within this definition it is defined as all of the efforts undertaken in order to keep the pest populations below economically damaging levels in harmony with each other on the use of all the techniques and methods and all factors that play a role in the exchange of populations of pest species with their environment in mind. This study was aimed to determine Ministry of Food, Agriculture and Animal Husbandry technical staff's knowledge level about integrated pest management and their features. Study is contributed by evaluating technical staff general features, ideas on integrated pest management and their observations on farmers to development of program. Main material of the study was gathered from face to face interview of 134 technical staff which work on Ministry of Food, Agriculture and Animal Husbandry Department on Antalya, Denizli, Konya, Karaman, Niğde and Isparta cities which are dominant for apple production. Serving as consultants or pest management department employees were included in the study. Technical staff members have important position by raising awareness of producers' agricultural management. It was determined that the technical staff is aware of the use of pesticides, but their level of knowledge in the pest management approaches such as integrated pest management is not at the desired level. Integrated pest management should be improved, especially in terms of monitoring the new developments taking place in the EU. According to technical staff observations farmers' awareness about the disease and pest management has not at the desired level yet. It is inevitable the necessity of extension to increase producers' knowledge and awareness and implementation more of integrated pest management.

Key words**:** *technical staff, apple producers, adoption level, Turkey, pest control*

INTRODUCTION

The use of drugs that determine adverse effects on human health is restricted in most developed countries. Practices such as biological control and organic agriculture, while providing a new dimension to the agrarian struggle, these methods do not exceed 5% even in the developed countries of the world among pesticide management (Özkan et al.,2003) [9]. This situation caused resistance to pesticides, the emergence of endemic breeds, the emergence of harmful pests, the use of natural balance, and environmental and human health negatively (Toros et al., 1999; Kutlar and Ceylan, 2008) [7,13] and resulted with impulsion of researchers to develop sustainable technologies related to pest management. The late Prokopy (2003) [11] defined integrated pest management (IPM) as '... a decision-based process involving coordinated use of multiple tactics for optimizing the control of all classes of pests (insects, pathogens, weeds, vertebrates) in an ecologically and economically sound manner (Ehler, 2006) [3]. It is an important requirement for the sustainability of world fruit production to closely monitor the developing elements of production and trade. Increasing product associations or council associations on product basis, branding, implementation of

integrated fighting methods is also important in terms of sustainability. It is very important to evaluate the production potential in Turkey in this regard (Gül and Akpınar, 2006) [4].

In 1998, the Ministry of Food, Agriculture and Livestock in Turkey announced the apple integrated technical instruction; the definitions of apple pest, diseases, pest management methods and the periods in which they are harmful are mentioned.

In this study, it was aimed to determine the knowledge levels and general characteristics of the technical staff working in the Ministry of Food, Agriculture and Livestock within the scope of "Integrated Pest Management". Increasing awareness of consumers with increasing levels of income and knowledge will cause changes in production techniques (Gül at al., 2008) [5]. Accordingly, it was aimed to contribute to the development of the program by considering the general characteristics of the technical staff, their thoughts on the IPM and the producer observations.

MATERIALS AND METHODS

In this context, Antalya, Denizli, Isparta, Karaman, Konya and Niğde provinces' technical staffs were taken into the scope of research where intensive cultivation of apple (64 percent of the apple production, 55.1 percent of planted areas, 50.2 percent of the number of trees) in Turkey takes place. Questionnaire forms include open-ended, two-choice, multi-choice questions and 5-point Likert scale questionnaires. The questionnaires included questions about socio-demographic characteristics as well as approaches to chemical use, integrated management, and knowledge of early warning systems and observations of apple producers in the region. The data were analysed as mean, ratio, group and cross tabulation. In the selection of the technical staff, those who deal with the IPM in the plant protection departments and serve as consultants in the villages were taken into the scope of the study. While it is targeted to, collect data from all technical staffs but it is not possible to perform a complete counting for various reasons (in the field or absence). Within the scope of the study, 134 technical staff interviewed which are located in six provinces and their distribution according to the province are given in Table 1. According that; 20.9% of the 134 technical staff interviewed are located in Isparta, 18.7% in Antalya, 17.9% in Konya, 16.4% in Karaman, 13.4% in Niğde and 12.7% in Denizli.

Table 1. Technical staff distribution according to the provinces

	Number of technical staff	Percent (%)
Antalya	25	18.7
Denizli	17	12.7
Isparta	28	20.9
Konya	24	17.9
Niğde	18	13.4
Karaman	22	16.4
Total	134	100.0

Source: Own calculation.

RESULTS AND DISCUSSIONS

Socio-economic Characteristic of Technical staff

It was determined that 72.4% of the technical staff were male and 27.6% were female counsellors. According to the results of the survey, 90.3% of the technical personnel interviewed in the region were Agricultural Engineers, while only 9.7% were Technicians. When the graduated departments of interviewed technical staff were evaluated Plant Protection (28.9%) and Horticulture (28.9%) were the highest and it was determined that these sections were followed by Field Crops and Agricultural Machinery.

Among the technical staff interviewed, it was determined that the Horticulture (30.8%) and Seedling Growing (30.8%) were the first ones when the high school departments occupied by the technicians were examined. When the graduation periods of technical staff working in the region were considered, it was seen that they graduated (54.5%) mainly in the period of 2000 and after. The average age of the technical staff was 35.18 years and it was determined that they had an IPM experience for an average of 5.87 years. It was seen that most experienced technical staffs were located in Denizli, Karaman and Niğde provinces (Table 2).

Table 2.Socio-economic characteristics of technical staff

Gender	**N**	**%**
Female	37	27.6
Male	97	72.4
Occupation status	**N**	**%**
Agriculture Engineer	121	90.3
Agriculture Technician	13	9.7
Agriculture Faculty	N	%
Animal production	1	0.8
Agriculture technologies	1	0.8
Horticulture	35	28.9
Field crops	15	12.4
Agriculture economics	5	4.1
Agricultural structure and irrigation	5	4.1
Animal husbandry	4	3.3
Soil science and plant nutrition	3	2.5
Milk technologies	7	5.8
Agriculture machinery	10	8.3
Plant protection	35	28.9
Vocational School	**N**	**%**
Horticulture	4	30.8
Seedling growing	4	30.8
Field crop	1	7.7
Greenhouse	2	15.3
Organic agriculture	1	7.7
Agricultural management	1	7.7
Graduation year	**N**	**%**
Before 1990	15	11.2
Between 1990-1999	46	34.3
After 2000	73	54.5
Age (year)	**Average**	
Antalya	31.6	
Denizli	40.5	
Isparta	36.1	
Konya	34.7	
Niğde	35.0	
Karaman	35.8	
Total	35.1	
IPM experience (year)	**Average**	
Antalya	4.1	
Denizli	8.1	
Isparta	5.0	
Konya	5.4	
Niğde	7.3	
Karaman	7.5	
Total	5.9	

Source: Own calculation.

Knowledge Levels and Characteristics of Technical Staff on IPM

When the level of knowledge of the technical staff in the agricultural pest management was considered, it was seen that 50% of them know themselves as knowledgeable about the pest management. Those who define themselves as less informed were 3% and those who define themselves as fully informed were 4.5%. Accordingly, it can be concluded that many of the technical staff are knowledgeable about the pest management. When asked about the level of knowledge about the IPM of technical staff, it was determined that 51.5% defines itself as Middle level and 37.3% as Informed. 46.3% of the technical staff interviewed expressed themselves as moderate and 31.3% expressed themselves informed about early warning system (Table 3).

Table 3. Distribution of knowledge levels of technical staff on agricultural pest management, IPM and early warning system (%)

Knowledge level	Low		Moderate		Informed		Fully informed	
	N	%	N	%	N	%	N	%
Pest management techniques	4	3.0	57	42.5	67	50.0	6	4.5
IPM	9	6.7	69	51.5	50	37.3	6	4.5
Early warning system*	19	14.2	62	46.3	42	31.3	10	7.5

Source: Own calculation. *Sum of the item is less than 100 due to one stuff express himself uniformed.

The 51.5% of the technical staff interviewed in the mentioned area stated that they did not participate in the training program (seminars, conferences, courses, etc.) related to IPM. Those participating in the training program on IPM are the main source of in-service training. About 50% of the technical staff participated in the training program (seminars, conferences, courses, etc.) on the early warning system in the elderly. The main source of information on early warning is in-service training (Table 4).

Table 4. Distribution of technical staff to participation on a training program related to agricultural pest management, IPM and early warning system

IPM training participation status	N	%
No	69	51.5
Yes	65	48.5
Training / Education sources		
Agriculture Ministry	58	89.3
University	6	9.2
Research Institute	1	1.5
Early warning system education participation status		
No	67	50.0
Yes	67	50.0
Training / Education sources		
Agriculture Ministry meetings	42	62.7
University	2	2.9
Written sources (journals, brochures etc.)	13	19.4

Source: Own calculation.

Levels of Adoption to the IPM of the producer in their Region According to Technical Staff

IPM approaches are based upon the judicious mix of physical, cultural, biological and chemical control methods, employed to manage and control pests. IPM is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices (Hoyt, 2001; Ofuoku et al., 2008; Ali et al., 2003) [1, 6, 8]. The chemical control method is a form of agricultural pest management used to protect agricultural products from pests and diseases, to ensure quality products and is the most common component that has increased usage since 1940's. The use of pesticides is the most preferred method because of its short duration and its ease of use (Tiryaki et al., 2010) [12]. The term biological control has come to be used in variety of ways. Professor H.S. Smith coined the term in 1919 to apply to the control or regulation of pest populations by natural enemies, i.e. by predators, parasites or pathogens and this is briefly what biological control means (DeBach and Rosen, 1991) [2]. According to the observations of the technical staff apple producers in the study region, prefer mostly chemical control against diseases and pests. This ratio was similar for all provinces that were surveyed. Mechanical and cultural management follows chemical pest management (Table 5).

Isparta, Denizli and Karaman provinces were foregrounds in terms of knowing IPM by the producers according to technical staff observations but in terms of implementation level Isparta, Denizli, Antalya and Karaman provinces were getting to the forefront. Technical staff expressed that early-warning system was more aware and knowledgeable for apple producers in Denizli, Isparta and

Karaman provinces. In terms of compliance of the dates from early-warning system all, the provinces except Konya were forefront (Table 6).

Table 5. Producers' pest and diseases management methods participation level according to technical staff observations

Provinces	Antalya	Denizli	Isparta	Konya	Niğde	Karaman	Average
Cultural control	2.14	2.15	2.55	2.45	2.25	2.62	2.40
Chemical control	4.64	4.77	4.68	4.07	4.17	4.52	4.41
Mechanic control	2.23	2.62	2.50	2.34	2.42	2.76	2.45
Biological control	1.14	1.23	1.36	1.43	1.25	1.62	1.37
Sticky trap	1.59	1.69	2.14	1.59	1.42	1.76	1.70
Predator	1.05	1.00	1.23	1.14	1.00	1.19	1.12

(1:Never (% 0) 2:Rarely (% 1-25) 3:Sometimes (% 26-50) 4:Almost always (% 51-75) 5:Always (% 76-100)

Table 6. Observations of technical staff for implementation of IPM, early-warning system

Provinces	IPM knowledge level	IPM implementation level	Early-warning knowledge level	Early-warning implementation level
Antalya	2.41	2.55	3.00	3.14
Denizli	2.77	2.77	3.62	3.77
Isparta	2.86	3.00	3.50	3.36
Konya	2.36	2.27	2.66	3.02
Niğde	2.17	2.33	3.00	3.25
Karaman	2.71	2.52	3.05	3.95
Average	2.53	2.53	3.04	3.34

(1: None (% 0) 2:Low (% 1-25) 3:Moderate (% 26-50) 4: High (% 51-75) 5:Very High (% 76-100))

According to the observations of the technical staff interviewed in the region, it was considered that the level of knowledge about IPM was low (% 48.5'i). About 34.3% of the technical staff stated that at less than half of the producers know the term IPM. Similarly, 48.5% of the technical staff observed that IPM implementation level was low on apple producers. Observations of the technical staff for the knowledge level of apple producers in the region on the term of early warning were similar to the results of IPM. The 31.3% of the staff found apple producers unconsciousness on early-warning system in the region. Nevertheless, technical staff indicate that the apple producers in the region generally compile the early-warming spraying schedule (Table 7).

Table 7. Observations of technical staff for knowledge and adoption level on IPM and early-warming spraying schedule

	None (%0)		Low (%1-25)		Moderate (%26-50)		High (%51-75)		Very High (%76-100)	
	N	%	N	%	N	%	N	%	N	%
IPM knowledge level	7	5.2	65	48.5	46	34.3	16	11.9	-	-
IPM implementation level	9	6.7	65	48.5	42	31.3	16	11.9	2	1.5
Early-warning system knowledge level	5	3.7	42	31.3	39	29.1	39	29.1	9	6.7
Early-warning implementation level	3	2.2	26	19.4	42	31.3	49	36.6	14	10.4

Deficiencies in IPM, What To Do

It was determined that the rate of visiting IPM orchard was 42.5% more than three times in a month. About 58.2% of the technical staff also stated that this rate was not sufficient for a good IPM mechanism. The 22.4% of the technical staff pointed out that the density of paper work (Table 8).

Table 8. The technical staff's visit frequency of the IPM orchards, and reasons for do not visit

Visit frequency of the IPM orchards (in a month)	**N**	**%**
Once	42	31.3
Twice	19	14.2
Three times	16	11.9
More than three times	57	42.5
Status of finding numbers of visit sufficient		
Sufficient	56	41.8
Insufficient	78	58.2
Reasons for not visiting enough IPM orchards		
High density of paper work	30	22.4
Vehicle / transportation problem	5	3.7
Lack of sufficient staff	26	19.4
Other reason	23	17.2

When the information sources of the integrated technical staff in the region were examined, 56% of the technical staff expressed their own experience was the first information source. Books, magazines, internet and related publications follow this (Table 9).

Table 9. Information sources of technical staff

Information sources	**N**	**%**
Own experience	75	56
Books, magazines	20	14.9
Internet	15	11.2
Other written publications	14	10.4
Producers experiences	3	2.2
Scientific articles	2	1.5
University	2	1.5
Foreign (companies, organizations etc.,)	2	1.5
Ministry, Research institute	1	0.7

When the problems encountered in IPM were analysed with the data obtained from the technical staff, 66.4% of the staff interviewed indicate that the producers do not follow recommended spraying dates. Other problem stated by 26.1 % of the technical staff was that they could not visit enough demonstration orchard in the research area (Table 10).

About 41.8% of the technical staff expressed that the IPM adoption level could be increased by forcing the apple processing industry, the association of apple producers and exporters to become sensitive to the IPM also they have to be included in the extension network with the legal obligation.

Table 10. Problems faced by technical staff in IPM

Problems	**N**	**%**
Do not visit enough demonstration orchard	35	26.1
Producers do not follow recommended spraying dates	89	66.4
Staffs are working in irrelevant departments	9	6.7
Other problems	1	0.7

The 38.1% of the technical staff stated that IPM could be implemented more effectively by organizing training courses and seminars on IPM to producers. In addition to these, technical staff suggested that these listed activities could increase IPM success in national level -Practical and visual educational programs should be launched on IPM at local/national level; -Leading farmer projects must be implemented; -Producers and technical staff have to work together to solve problems by mutual responsibility; -Demonstrations and training programs to be prepared by cooperating with trade associations and apples producers unions. In the study also what to do in order to develop / spread the IPM in the research area was asked to the technical staff. Half of the technical staff highlighted that extension services should be increase. A similar result was found by Parsa et al., (2014), according their study the low level adoption of IPM program was due to insufficient education and technical support. Another suggestion made by 16.4 % of the technical staff was that appropriate pesticides must have IPM licence. They proposed that licences could develop IPM. Also technical staffs suggested that IPM pesticides should be cheaper to spread IPM in the study area (Table 11).

Table 11. What should be done to increase IPM extension services according to technical staffs?

What should be done to increase IPM extension services	N	%
Forcing the apple processing industry, the association of apple producers and exporters to become sensitive to the IPM and included in the extension network with the legal obligation	56	41.8
Organizing training courses and seminars on IPM to producers	51	38.1
Practical and visual educational programs should be launched on IPM at local/national level	15	11.2
Leading farmer projects must be implemented	5	3.7
Producers and technical staff have to work together to solve problems by mutual responsibility	6	4.5
Demonstrations and training programs to be prepared by cooperating with trade associations and apples producers unions	1	0.7
What to do in order to develop / spread the IPM		
Extension services should be increase	67	50.0
Appropriate pesticides must have IPM licence	22	16.4
Traditional methods should be discarded, new methods should be developed	21	15.7
The pesticides used in the IPM should be cheaper	18	13.4
Task descriptions are fully structured, the registration system must be updated	6	4.5

CONCLUSIONS

In this study, technical staff point of view for IPM and farmer evaluated and their relation try to explain. It is hoped that these assessments will contribute to the spread of IPM awareness and level of implementation at the level of producers and related stakeholders. Technical staff are the individuals who are in an important position to guiding producers in the implementation of IPM. According to the study, it can be said that the technical staff is conscious about the use of agricultural pesticides. However, their knowledge about IPM approaches is not at the desired level. IPM should developed especially for the monitoring of new developments in the European Union. According to the technical staff, producers are not aware yet of pest and disease management method at desired level. In order to increase the knowledge and awareness of the producers and to apply the IPM, extension services are inevitable.

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ADAPTATION ECONOMICS TO CLIMATE CHANGE: KEY VULNERABILITIES OF SMALL-HOLDER FARMS

Serkan GURLUK

Uludag University, Agricultural Faculty, 16059 Nilufer, Bursa, Turkey, Email: serkan@uludag.edu.tr

Corresponding author: serkan@uludag.edu.tr

Abstract

The paper aims to present the key vulnerabilities of small-holder farms while adapting prospective climate change conditions. Natural resources' productivity has declined under climate stress. The natural resources that lose their prolificacy negatively affect small-holder farms. Consequently, the agricultural sector will suffer from climate change impacts. The countries which have small-holder farms should be more careful while designing their rural policies. Indeed, small-holder farms lack capacity in management of agricultural risks. This phenomenon has the potential to trigger rural poverty in the medium-term. Many studies carried out on the African Continent indicates that adaptation costs of climate change account for 250-500 billion USD in the years between 2010 and 2050. Climate change adaptation policies are most effective when they are fully integrated within countries' national development strategies. Furthermore, adequate funding and technology transfer to small-holder farms are important in ensuring success of any climate action and initiative. The current paper will give information related with adaptation costs to climate change in various countries of the world. In addition, the paper discusses the possibility of agricultural adaptation policies coming from developed zones of the world.

Key words**:** *climate change, adaptation costs, small-holder farms*

INTRODUCTION

Global warming and the expected climate change will have impact different regions and different economic sectors. High-technologies that will prevent the effects causing climate changes are being researched on one side; on the other side, adaptation strategies have gained importance through time.

The agricultural sector is one of the sectors most in need of adaptation because it is intertwined with nature. Therefore, the rural population engaged in agriculture in various parts of the world will be more affected by climate change. However, there are also enterprises in the agricultural sector that have not yet achieved their industrialization process. Small-holder farms, compared to other types of farms, are the most important ones to adapt to climate change. Historically, they have a very poor capacity to manage risks relative to industrial farms. In case of damage that may occur due to climate, their operating capital can be diminished. This has the potential to trigger poverty in the mid-term.Poor people generally come from rural areas, and they earn insufficient income from agriculture throughout the world. The FAO declares that some 1.2 billion humans are extremely poor and are living in rural areas. Olinto et al., (2013) [13] states that about 750 million of them are related to agriculture as small-holder family farmers. Habtemariam et al., (2017) [6] states that the proportion of farms that are negatively affected by climate change ranged between 51% and 78% in the warm regions while the figures are between 10% and 22% in cool regions. Figures justify a special focus on the threats posed by climate change to their livelihoods and their adaptation to approaching climate change conditions.

In order to improve living standards of small-holder farms and rural people, steps taken now and in the future must take climate change policies into account. Potential consequences should be alleviated to the extent that their livelihoods will survive. This study examines the adaptation costs side of climate change management in the context of agriculture in specific regions of the world.

In this context, the paper aimed to present a few considerations regarding the adaptation of economics to climate change: key vulnerabilities of small holder farms.

MATERIALS AND METHODS

The paper is based on the study of literature regarding the climate change and its impact on agriculture performance.

RESULTS AND DISCUSSIONS

Key vulnerabilities of small-horlder farms

Small-holder farms have some critical characteristics that will, in turn, affect themselves with the impacts of climate change. Firstly, they produce relatively small volumes of produce on relatively small plots of land. This causes a weak return to scale issue on their farms. They may produce an export commodity as a main livelihood activity or as part of a portfolio of livelihood activities. They suffer from low financial achievements. They are usually considered to be part of the informal economy (Wiego, 2017) [19]. They are devoid of social protection and have limited records. They may be men or women. They may depend on family labor, but may hire workers. They are often vulnerable in supply chains.

The phenomenon of vulnerability for small-holder farms in developing areas of the world is a significant factor affecting weakness in the face of climate change impacts. It is defined as a natural resource or social system that is susceptible to sustaining damage from climate change impacts. It depends on exposure, sensitivity, and adaptive capacity (IPCC, 2001) [8]. The exposure to risks is explained by localized weather events and emerging pests and diseases. In regards to economics, those risks can affect the crop productivity and consequently the revenues of the small-holder farms. Likewise, above-average temperatures reduce productivity significantly. Losses should be considered together with on-farm levels and performance losses of natural resources. Water scarcity is one of the main effects that will be given as an example for off-farm levels. It affects the performance of watersheds to meet the small-holder farms' needs. Rationalizing water use in agriculture will greatly facilitate adaptation to climate change in small-holder production systems (Bates et al., 2008) [3].The following figure is remarkable for understanding the significance of water storage investments. Before examining the figure, it is necessary to understand water-related definitions seen in the table below. Seasonal storage index (SSI) indicates the volume of storage needed to satisfy annual water demand based on the average seasonal rainfall cycle. It is calculated as the volume needed to transfer the excess water from wet months to the dry months (Brown and Lall, 2006) [4]. According to the figures, some countries cannot store fresh water in their watersheds because either they do not have enough infrastructure or they experience more dry seasons. Nepal, Sierra Leone, Gambia, and Rwanda are such countries. Another topic is related to the water pricing issues in some regions of the world. Indeed, inappropriate water pricing and subsidized electricity tariffs that encourage the excessive use of groundwater pumping also increases vulnerability to changing climatic conditions (Stern,2006) [17]. In Mexico, for example, 104 aquifers, which are responsible for 60% of the irrigation withdrawals, drain faster than they can replenish themselves.The consequences show the significance of inadequate investment in water-related infrastructure and poor management in resolving the problems with climate change.

Table 1. Seasonal Water Storage Index and Requirements of Selected Countries

Countries	SSI as % of Annual Volume	Current Storage (% of SSI)
India	21	76
Bangladesh	41	33
Ethiopia	10	8
Nepal	47	0
Senegal	40	7
Malawi	34	0
Albania	23	21
Sierra Leone	3	0
Gambia	56	0
Rwanda	9	0

Climate change will affect various regions of the world in diverse fashions. Yet, agriculture will suffer more from those effects. At first glance, Sub-Saharan African Regions may seem to suffer more from climate change because agriculture is inevitably the largest sector on the continent. However, South American and Southern Asian agriculture will also suffer from those effects although the degree of impact is different. It is stated that, by 2100, regions of arid and semi-arid land are expected to expand by 5-8 percent or 60-90 million hectares, resulting in agricultural losses of between 0.4-7 percent of GDP in the Africa (PACJA, 2009) [14]. Of all African countries, 40 percent are expected to lose their self-sufficiency characteristic. In addition, rising sea levels will result in saltwater intrusion into inland freshwater supplies. It may cause crop failure in coastal countries. These crops are exportable production such as mangos, cashew nuts, palm oil, and coconuts in Benin, Ivory Coast, and Guinea (IPCC, 2007) [9]. On the livestock side, it is stated that a temperature rise of up to 5°C from 2006 average global temperatures could benefit some small-holder farms who raise sheep as they are more heat tolerant than other species. The same temperature rise could reduce revenues of large-scale farms because they prefer non-heat tolerant cattle. Decreases of their revenues may account for 35 percent or 20 billion US dollars annually (Seo and Mendelsohn, 2007) [16]. Yet, increased rainfall has the potential to reduce livestock revenue for both large-scale and small-holder farms. In another part of the world, South Asia will suffer from drought and crop quality. Asian countries' agricultural sectors have a share of 20-50% in GDP, and their labor forces depend on agriculture with the same share of 20-50%.India and Bangladesh are important cases in this region. Flooding is one of the major causes of crop devastation in Bangladesh almost every year, and it affectsabout 80% of the land.Reductions in production could potentially be as high as 17%–28% for rice and 31%–68% for wheat (Karim et al. 1999) [10]. A study indicates that irrigated rice in the Western region is likely to change by –11% to +5% dependingon location. Irrigated rice yield in the majority of the region is projected to decline by about 4%. Rainfed rice yields are projected to change in the range of–35% to +35%, with a large portion of the region likely to lose up to 10% of its rice yields.In addition, climate change is likely to reduce yields of maize and sorghum by up to 50%depending upon the region.

Trade-offs of adaptation to climate changes

Adaptation is a key response to reducing vulnerability to the impacts of climate change. Adaptation strategies cannot combat climate change, but it can alleviate its negative effects. It is explained as an adjustment in natural or human systems in response to actual or expected climatic stimuli or effects, which moderates harm or exploits beneficial opportunities (IPCC, 2007) [9]. We can infer from the definition that two aims gain importance for small-holder farms: to reduce exposure to the risk of damage and to provide stability to cope with unavoidable damage. There are many adaptation strategies in agriculture, which are classified as crop, livestock and other strategies (Table 1).

Planting drought-resistant crops can reduce irrigation water needs. Yet, irrigated-farming means more earnings in many places in the world. Thus, crop diversification can be preferred in suitable lands. High-value crops can be feasible in both irrigated and non-irrigated areas. It is stated that land use conversion, such as the shift from livestock farming to game farming, may provide new opportunities for small-holder farms (Ziervogel et al., 2008) [20]. Changing cropping patterns and using new planting calendars are technical adaptations. This requires better weather forecasts. Yet, changing harvest seasons may cause price fluctuations. Mixed cropping may become another alternative to reducing impacts of climate change. Maize, sorghum, legumes, and nuts may be grown in the same proximity in the field. It can increase the labour costs and harvest losses, while it is beneficial for soil productivity. Mendelsohn et al., (2000) [12] found that planting different varieties of the same crop is one of the most important

adaptations. Another way is to reach efficiency in water use. As water becomes a limiting factor, improved irrigation efficiency will always become an important adaptation tool. Conserving soil moisture supports irrigation water efficiency. Contour farming can provide a way to keep moisture in the base level. It refers to field activities such as ploughing and furrowing that are carried out along contours rather than up and down the slope. The contours conserve water by reducing surface run off and encouraging the infiltration of water into the crop area. It requires advanced mechanization and additional labour costs. And finally, agroforestry should be considered together with previously mentioned adaptation techniques. It is a rational land-use planning system that tries to find balance in the raising of food crops and forests (Adesine et al., 1999) [1].

Livestock adaptation strategies are more expensive compared to crop adaptation, and needs additional expertise. A compulsory integration is necessary, linking pasture, livestock-crop management, and pasture management with efficient grazing. Small-holder farms usually lack technology in livestock breeding and agricultural programs (Hoffmann, 2008) [7]. A considerable amount of technology is necessary for and is related to the improvement of local genetics through cross-breeding with heat and disease tolerant breeds. Livestock management systems require some regulations providing lower cost husbandry systems. Yet, small-holder farms have some advantages if they venture to earn their livelihoods from livestock section. This comes from managing the heat stress of animals, because intensive farms' livestock management costs will be higher than that of general farms. A reduction in livestock numbers means more productive animals that will lead to more efficient production. Selection of large animals rather than small can provide advantages in the reduction of heat stress. Agricultural extension education for livestock keepers may increase awareness of climate change adaptations, and the adaptation capacity of a country. Other adaptation strategies are different from live systems, such as crop and livestock adaptation strategies. Labour migration is unique to nomadic societies, and includes migration towards ample water resources. Income diversification concerns non-farm income sources. Off-farm income sources generate opportunities for small-holder farms and accelerate the adaptation to climate change policies implemented by policy-makers in the region.

Table 2. Selected Adaptation Strategies for Small-Holder Farms and Agriculture Sector

Crop Adaptation Strategies	***Livestock adaptation strategies***	***Other adaptation strategies***
*Planting of drought resistant varieties of crops	*Production adjustments	*Labour migration
*Crop diversification	*Breeding strategies	*Income diversification
*Change in cropping pattern and calendar of planting	*Livestock management building	
*Mixed cropping	*Capacity building for livestock keepers	
*Improved irrigation efficiency		
*Adopting soil conservation measures that conserve soil moisture		
*Afforestation and and agro-forestry		

Adaptation is a key response to reduce vulnerability to climate change impacts. In spite of its costs, adaptation offers the opportunity to adjust economic activity in vulnerable sectors and support sustainable development. However, the adaptation costs vary according to region, scenarios, sectors, and also farm size. It is stated that the developing world and consequently small-holder farms endure costs compared to those of large-size farms. The following graphic illustration indicates the differences between small-holder and large-size farms' adaptation

costs to climate change. The figure was re-arranged from Stern (2006) [17]. It is stated that small-holder farms' adaptation costs and costs without adaptation will be higher than large-scaled farms. Consequently, costs to government expenditures will be higher in the developing world at the macroeconomic level.

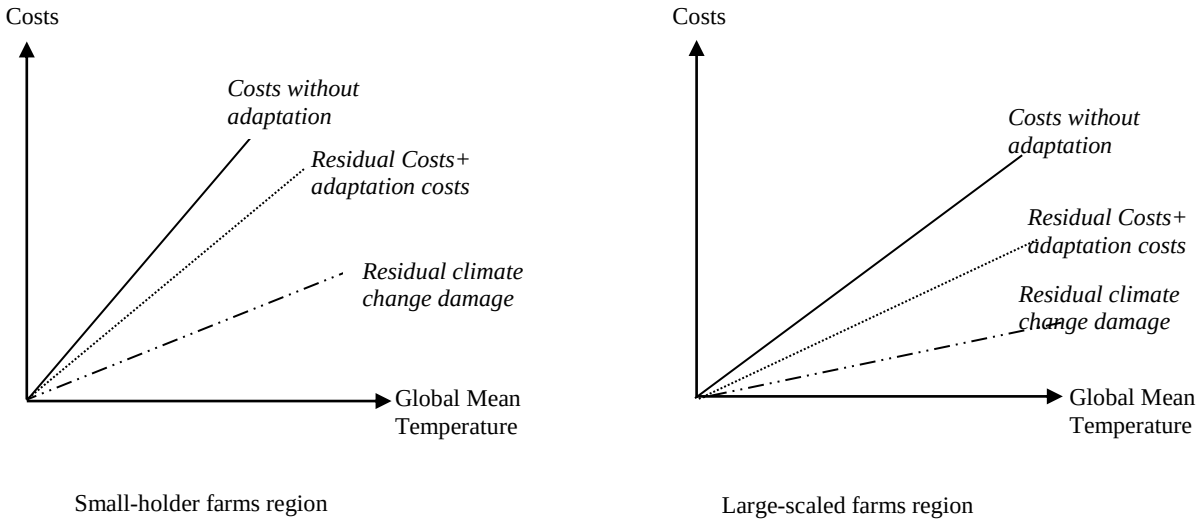

Fig. 1. Changing adaptation costs for small-holder farms and large-scaled farms

Several research projects were carried out in order to calculate adaptation costs at the micro level. Adaptation strategies often require substantial initial investments, but the range of costs can be changeable according to type of strategies followed. McCarthy et al. (2011) [11] estimated costs in some strategies for various countries (Table 3). According to following table, costs change according to the countries examined. Opportunity costs are higher for medium or large-sized farms. One another study carried out by Rosenzweig and Parry (1994) [15] in order to find cereal loss with climate change. It is stated that cereal losses' cost will decrease from 9% to 17% with adaptation costs. Improved seed adoption was found to be highly beneficial to countries. In fact, the net present value of such investments was estimated to range from an average of 203 USD per hectare to 766 USD per hectare in selected countries such as Malawi, Tanzania, Bangladesh, and India (Cacho et al., 2016) [5]. In addition, irrigation and water saving technologies can supply some benefits to small-holder farms. For instance, the benefit of new technology-irrigation is about 226 USD/ha in Bangladesh while it accounts for 7.8 in benefit/cost ratio. Same technology indicates the values of 494 USD/hectares and benefit/cost ratio is 17 in India. Improved grazing management can provide 118 USD/ha net present value over 20 years to small-holder farms.

Table 3. Adaptation costs in selected strategies in changing countries

Strategies	Origin	Investment costs USD/ha	Maintenance costs USD/ ha/ year
Agro-forestry *(Shelter belts, high input system, grass barriers, countour ridging)*	Kenya	160	90
	Togo	376	162
	Indonesia	1,159	80
	Colombia	1,285	145
Soil and Water conservation			
Small-scale conservation tillage	Kenya	0	93
Bench terrace	Ethiopia	2,060	540
Compostproduction, application	B. Faso	12	30
Run off and flood water farming	Ethiopia	383	814
Grazing management			
Grassland restoration	China	65	12
Rotational grazing	S. Africa	105	27

Numbers seem hopeful for relieving the climate change effects. Yet, small-holder farms' financial constraints, existence of

public goods, and imperfect information can affect the transition to adaptation policies in the regions where small-holder farms are located [2]. Let's assume adaptation costs are equal for all types of farms. Even if it is equal, the share of adaptation costs in the revenues will be higher for small-holder farms. Financial support is imperative; otherwise industrial agriculture will eradicate the small-holder farms. If we want to make world agriculture sustainable, we need small-holder family farms in a considerable proportion. A qualified dialogue is necessary among all stakeholders to decide what changes in policies and incentive structures are needed. Agricultural extension workshops can provide qualified knowledge to the related regions (Touch et al., 2016) [18].

CONCLUSIONS

All regions will eventually feel the effects of climate change, yet some regions experience those effects more severely. Less-developed regions of the world will have a disproportionally harmful effect in their poor communities, in particular, those who are living at or close to the margins of survival. Also, some sectors will suffer more from those effects. Small-holder farms meet important needs of the world in terms of sustainable farming. The sustainability of small-holder agricultural systems will depend on the ability of small-holders to adopt climate-smart practices and technologies. Global poverty cannot be reduced unless resilience of smallholder farms to climate change impacts are provided. Small-holder farms can adapt to climate change if they, indeed, adopt a diversifying on-farm agricultural production. They mutually depend on natural resources, and consequently, if they have enough support, natural resources can be conserved as well. Finally, it must be recognized that the costs of inaction are much greater than the adaptation costs. Lack of knowledge in the rural areas is a reality for climate change's possible impacts. At least the magnitude of the possible impacts is not known in many rural families. Thus, it is urgently recommended that agricultural extension services in the region are implemented in order to build small-holder farm abilities to better cope with and adapt to climate change.

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ANALYSIS OF OBSTACLES ON WINE TOURISM DEVELOPMENT IN THE REPUBLIC OF MOLDOVA

Tatiana IAŢIŞIN, Tatiana COLESNICOVA

National Institute for Economic Research, Academy of Sciences of Moldova, 45, Ion Creanga Street, Chisinau, Republic of Moldova, MD-2064, Email: tatianaiatisin@yahoo.com

Corresponding author: tatianaiatisin@yahoo.com

Abstract

In this paper are analyzed Moldova's obstacles on wine tourism development. The actuality of this research topic results from the limited financial resources for the development of this sector, especially in insufficient of actions for the tourism visibility inside and outside the country. The purpose of the paper consists in the analysis of wine tourism in Moldova and in identifying its main problems for the future of elaboration of proposals. In elaboration of this paper were used the following research methods: analysis, comparison, grouping, SWOT analysis. The following results are obtained: identification and analysis of wine tourism in Moldova and elaboration of proposals in order to avoid the risks and uncertainties for the development of wine tourism.

Key words**:** *wine tourism, tourism destinations, wine regions, SWOT analysis.*

INTRODUCTION

Tourism industry is a part of the economy, consisting of a series of activities or more branches whose common function is meeting the needs of tourists. Worldwide, the travel and tourism industry is the most dynamic sector of activity and also the most important generator of job places. From an economic perspective, tourism is a major source of recovery of national economies of those countries with important tourism resources and exploit them accordingly. Both the tourism branch and wine industry contribute to attracting consumers of production of wine tourism, to the improvement and land planning, creation of new jobs, promoting tourism facilities in the Republic of Moldova.

According to the legislation, wine tourism is a form of tourism oriented towards visiting economic agents that work in the field of wine and wine regions with the aim of combining the pleasure of tasting wine products with knowledge of the rural environment, lifestyle and local cultural activities [7].

Wine production has had an impact on the history, culture, and the territory that has numerous winemaking places that are part of the national heritage. Among these can be mentioned the only renowned underground cities, such as Cricova, Milestii Mici, Branesti Cellars, Lion Gri. However, Milestii Mici wines have been declared the biggest wine collection in the world with 1.6 mln bottles, registered in the Guinness Book [14].

The role and economic, social, cultural, educational and political importance of wine tourism is manifested by increase of gross domestic product and national income due to the volume in tourism receipts. It rebalances the trade balance of payments due to the increase in foreign exchange earnings, with an impact on domestic export, and socially creates new jobs and emergence of new professions, in this way reducing unemployment. Cultural and educational role is manifested through visiting an area (country), which gives tourists the opportunity to acquire new knowledge of geography, history, art, literature etc. The political role is manifested by the fact that tourism is considered the *"messenger of peace"* that helps to promote a better understanding between peoples belonging to different cultures. The contribution of tourism to economic and social progress and its intensity varies significantly from country to country, depending on its level of development and the policy promoted towards it [13].

The purpose of the paper consists in the

analysis of wine tourism in Moldova and in identifying its main problems for the future of elaboration of proposals.

MATERIALS AND METHODS

The main indicators used in this paper have been: the surface covered with vineyards and grape production in the Republic of Moldova. The empirical data were provided by the National Bureau of Statistics [1].

In elaboration of this paper were used the following research methods: analysis, comparison, grouping, SWOT analysis.

RESULTS AND DISCUSSIONS

According to the National Bureau of Statistics data [1], Republic of Moldova has 135.4 thousand ha of vineyards, of which 129.0 thousand ha bearing vineyards (2015). In 2010 the area of vineyards made up 144.9 thousand ha, of which bearing 132.8 thousand hectares. Gross grape yield in 2015 reached 598.7 thousand tons, and in 2010, the grape harvest has made up 482.0 thousand tons. The average yield amounted for 45.6 q / ha in 2015, and in 2010 was about 35q / ha. The wine industry is considered a basic and strategic branch of Moldovan economy, while about 80-90% of all wine produced is exported. According to the Ministry of Agriculture and Food Industry of Moldova, export of alcoholic products for 10 months of 2015 amounted to 121.8 mln. USD, down with 18.1% (27 mln. USD) compared to the same period of the previous year. Exports of alcoholic products to EU countries amounted to 29.6 mln. USD and to CIS countries amounted to 57.8 mln. USD, decreasing from the same period of the previous year by 17.6% and respectively 28.2%. Also, Moldova has lost Ukraine among the largest consumers of Moldovan wine due to the geopolitical crisis from the neighboring country [10].

Republic of Moldova, with advantageous geographical location, natural-climate components and cultural-historical attractive, has all the prerequisites for the organization and development of wine tourism. Wine tourism sphere development for each country and for the Republic of Moldova tends to attract more foreign tourists, which help promote tourism image of Moldova abroad, the development of national economy in general and of tourism in general. The wine tourism is a form of tourism that was quickly adapted and integrated in the global travel market requirements in the current context.

Law no. 352-XVI of 24 November 2006 [7] on the organization and conduct of tourism activity in the Republic of Moldova defines tourism as one of the priority areas of the national economy. Wine tourism is a sector to provide services that contribute to the economic development through the accumulation of capital within the approximately 12 types of specific activities for the sector, attracting in its work about 20 related branches with about 140 services related to the tourism sector: public alimentation, transport, production and marketing of goods, equipment, souvenirs, cultural activities, sports, leisure, medical services etc.

Development of wine tourism with all the infrastructure of wineries participating in the formation of tourism zones and routes is focused on the possibility of visiting wine cellars, wine tasting, accumulation of knowledge about wine, knowledge creation process of wine (knowledge winemaker, visit the cellars, manufactures, vineyards). Wineries, exhibition centers, tasting rooms, underground cellars, and wine production diversity represents a great potential for promoting wine tourism. Generalizing the above mentioned, we can mention that wine tourism is a form of tourism oriented towards visiting traders of wine and wine regions with the aim of combining the pleasure of tasting the products, enjoy wine culture, get knowledge about the eco aspects of the wine and also get acquainted with the local lifestyle, rural development and cultural activities [12].

Also, tourists can be attracted not only by the beauty of the wine, but also the relationship between price / quality of products and services and stimulation of interest in less known places, more unusual by crossing the roads of wine and knowledge of new and

interesting objectives, less known in tourism and closer to pure nature.

To determine the main directions of wine tourism development and winemaking in the Republic of Moldova, there is a need for a SWOT analysis. (Table 1).

Like other fields, the wine tourism faces a number of issues such as:

a)lack of quality promotional materials in foreign languages;

b)non-application of norms for wineries destinations, tasting spaces and tourism routes throughout the tourism circuits;

c)marketing potential problems in shifting towards tourism markets;

d)lack of an attractive service for tourists (organized and individual) at wineries, balanced distributed in the country;

e) lack of business expansion projects in wine tourism;

f) the staff is not highly qualified for specific guidance;

g) little tourism marketing activities.

Table 1. SWOT analysis of the wine tourism in the Republic of Moldova

STRENGHTS	WEAKNESSES
The advantageous geographical location. The climatic conditions, the landscape and soil composition allow to cultivate the different varieties of grapes and produce table wines in the richest assortment.	A destination appreciated by a limited number of foreign tourists [3-4]. Few visitors get to know Moldova through excursions.
The country has attractive cultural and historical components, and all the prerequisites for the organization and development of the wine tourism.	Reduced flexibility in the work agenda in the development of tourism packages for different categories of visitors. Republic of Moldova remains a country still unknown to Europeans.
The rich history of wine making and the wide range of wines.	Trip cost is quite high, and often on weekends, holidays, the price increases for purpose (for example the minimum price at a 3* hotel is 40 euro for a seat).
Wine heritage viticulture is made up of vineyards, wineries, exhibition centers, tasting rooms with exceptional architecture and national colors, underground cities, the diversity of production, specialized shops, all of which are representing a considerable potential for wine tourism promotion in the country.	Limited knowledge about the value of tourism heritage owned by the rural community [5-6]. Insufficient capacities for the management of the wine tourism sector. Lack of attractive service system for tourists (organized and individual) at different wineries balanced spread in the country. The staff is not highly qualified for specific guide and does not possess international languages. Lack in the infrastructure development for the wine tourism services. Poor potential use of the households that are producing grapes.
There is a legal and regulatory framework of tourism [3-6]. There are relevant policy documents: Strategy for the Sustainable Tourism Development, National Program Wine Road [11-12].	Inadequately applied and harmonized legal framework. Insufficient capacity to manage the tourism sector. Low-level cooperation with specialists in charge of tourism in the territory. The need to reform the wine tourism sector management. Lack of vision and clear strategies for attracting national and international tourist flows.
Viticulture and winemaking are basic sub-branches of the Moldovan economy, generating about 15% of the annual budget.	The legislation on the wine sector is outdated, contradictory, misfit to a market economy [2-6]. Limited financial resources for the development of the sector. Low share of non-budgetary funding and projects. Lack of projects in business expansion in wine tourism. Lack of actions for the tourism visibility inside and outside the country.
Republic of Moldova was included in the Guinness Book as the holder of the largest wine collection in the world, which is a strong point for attracting foreign tourists [14].	Financial support for projects in the field. Few tourism marketing activities, lack of promotional materials in foreign languages.
Participation of Moldovan wine companies in the most important international wine competitions and exhibitions in order to promote a positive image of Moldovan wines on world markets.	Insufficient financial resources to promote the field: exhibitions, promotional materials. A reduced cooperation with strategic partners, including in the territory. Poor development of special services for the creation of a service attractive to tourists in the company.
Conducting of the traditional holiday *"National Day of Wine"* which is one of the most significant events in the Moldovan wine industry agenda [8].	Abandoning the *"City of Wine"* project. Poorly trained staff for the qualitative Moldovan hospitality. Lack of actions for the tourism visibility inside and outside the country. Low degree of specialization of the wine tourism offer.
OPPORTUNITIES	**THREATS**
The country is a member of representative international organizations (World Tourism Organization, the Danube Commission for Tourism, GUAM, etc.)	Existence of risks related to insufficient administrative capacity. Shortage of well-trained staff. Risks of political conjuncture. Territorial divide and differences in access to tourism services.
Increasing attention of central and local government bodies of the country to develop tourism in the wine country.	Instability of the economic development of the country does not allow targeting of financial resources required for the wine tourism sector. Slow deployment of the National Programme "Wine Route" [12]. Modest progress in the wine tourism.
Creating an attractive service system for tourists in the enterprise.	The staff does not have a high qualification for specific guidance.
Creating new job places.	Long migration of population and demographic risks.
Using the potential of households that produce grapes.	Insufficient financial resources to promote grape-producing households.
Improving the regulatory framework in the sphere of viticulture and wine tourism in order to develop this field in the country.	Inconsistency of the regulatory toolkit to enforce the law. Fragmentary application or abandonment of the regulatory framework.
Develop a strategy for effective and targeted development aimed at transforming the sector into a viable and profitable branch.	Incoherence of priorities and strategic actions in the absence of a vision of branch development. Lack of large-scale projects in the implementation of sector strategies.
Forming a clear vision and strategy to attract national and international tourist flows.	Lack of applying norms for wine destinations, tasting spaces and routes from the tourism circuit.
Attracting a large number of wine touristic products consumers.	Lack of an attractive service system for tourists (organized and individual) at wineries.
Renewal of vineyards with the planting of vines of modern type, using seedlings drained for main virus diseases, productive and high quality clones of grapes, which will raise the quality of the produced wines.	
Big opportunities insufficiently valorized through sporadic tours.	

Source: developed by the authors

CONCLUSIONS

Thus, for increasing the quality of tourism product of the Republic of Moldova in order to offer our visitors unique experiences, there

is necessary for support and assistance to wineries that provide or intend to develop wine routes and tourism services. The tourism industry was aligned around common values and objectives, supported by national tourism brand image "Tree of Life", a deep and powerful symbol that can help us to communicate more effectively about the Republic of Moldova as a tourism destination.
Following the carried out analysis we can mention that Moldovan wine tourism has strengths and opportunities, as well as professional training and behavior of staff from this field, for promoting a positive image of the country internationally. But we also found that there are weaknesses, threats and risks faced by the wine tourism.
In order to avoid these risks and uncertainties for the development of wine tourism is needed:

- to improve the legal framework in the field of tourism in accordance with the requirements of the tourism market, while bringing it up to the European standards.
- promoting our country as a tourism destination, using for this purpose the national tourism brand as a platform for promotion;
- cooperation with the specialized media in tourism, including international media, but also online resources and social environments;
- organization of visits of foreign journalists to acquaint with the tourism potential of the Republic of Moldova;
- make the most of Moldova's image as an unknown and undiscovered land.

At the same time, promotion and development of the Moldovan wine tourism can serve as growth drivers for both the tourism industry and the wine industry, being also a powerful factor for regional development.

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REVEALED COMPARATIVE ADVANTAGE OF MOLDOVA'S LIVESTOCK PRODUCTS

Anatolie IGNAT, Alexandru STRATAN, Eugenia LUCASENCO

The National Institute for Economic Research, 45 Ion Creanga str., Chisinau, Republic of Moldova, Emails: anatolie.ignat@gmail.com, alex_stratan@yahoo.com, eugenia_lucasenco@yahoo.com

Corresponding author: eugenia_lucasenco@yahoo.com

Abstract

The paper aimed to present the analysis of the Revealed Comparative Advantage (RCA) of Moldova's livestock products. The research was carried out based on the statistical data provided by the National Bureau of Statistics, as well as data collected from the WITS database. The outcomes of the analysis of trade value, RCA, and CAGR of the Moldova's livestock exports at 2-digit and 4-digit levels of HS comparing to the world and EU-27 have been presented in the paper. As a conclusion, export of most livestock products is not stable from year to year. Often disruptions in exports supplies are caused by multiple factors such as weather conditions, more competitive regional imports, import bans imposed by partner countries, etc.

Key words**:** *Revealed Comparative Advantage (RCA), Republic of Moldova, livestock products*

INTRODUCTION

The climatic conditions of the country and fertile soils are favorable for the livestock production that is one of the oldest occupations of the rural population. Livestock products represent an important part of the diet of the Moldovan population. The cattle growing is the main branch of livestock production in Moldova, providing the highest amounts of animal production as milk and meat.

It plays also a strategic role in ensuring food security of the country, because milk and dairy products are socially important as an essential element of food rations of the population, including children, elderly people and socially vulnerable groups [8].

An important part of livestock products is traditionally exported since the geographical location of the Republic of Moldova is advantageous for trade with countries from CIS, Eastern Europe, Central Asia and Middle East. However, the agricultural production in Moldova, including the livestock sector is still characterized by large risk exposures, which often, but not exclusively, comes from climate phenomena.

MATERIALS AND METHODS

The revealed comparative advantage is used for calculating the relative advantage or disadvantage of Moldova's livestock products as evidenced by trade flows. That is, the RCA is equal to the proportion of the country's exports that are of the class under consideration divided by the proportion of world exports that are of that class. A comparative advantage is "revealed" if RCA>1. If RCA is less than unity, the country is said to have a comparative disadvantage in the commodity or industry [2,3].

For a more comprehensive calculation and analysis of the Revealed Comparative Advantage of various groups of livestock products for Moldova compared to the world, to other individual countries and to some specific groups of countries the World Bank "World Integrated Trade Solutions (WITS)" database was used (World Bank, 2015) [9].

RESULTS AND DISCUSSIONS

Livestock products at 2-digit level

For the analysis of the competitiveness of livestock exports from Moldova we used such indicators as Revealed Comparative

Advantage (RCA) in 2005 and 2014, Compound Annual Growth Rate (CAGR) for the period of 2005-2014 and Trade value in 2014 at the 2-digit (chapter) level [4].

The most important categories of livestock exports are: "02_Meat and edible meat offal", "04_Dairy produce; birds' eggs; natural honey" and "01_Live animals; animal products".

The other three categories of livestock products at the 2-digit (chapter) level namely "16_Preparations of meat, of fish or of crustaceans", "05_Products of animal origin, not elsewhere specified" and "03_Fish and crustaceans, molluscs and other aquatic invertebrates" have a much less importance in the agro-food exports from Moldova since volumes of trade for these groups of livestock products was less than 1 mil USD in 2014 and the RCA in 2014 less than 1 (Table 1) [6].

Table 1. Trade Value, RCA, and CAGR of the Moldova's livestock exports at 2-digit level of HS comparing to the world, 2005-2014, mil USD

2-digit chapter of HS	Trade Value (2014), mil USD	RCA (2005)	RCA (2014)	CAGR (2005-2014)
02_Meat and edible meat offal	35.30	0.27	2.08	38.33
04_Dairy produce; birds' eggs; natural honey	17.89	0.04	1.44	3.49
01_Live animals; animal products	6.42	1.39	2.18	14.10
16_Preparations of meat, of fish or of crustaceans	0.29	2.72	0.05	-15.62
05_Products of animal origin, not elsewhere specified	0.12	0.49	0.09	19.11
03_Fish and crustaceans, molluscs and other aquatic invertebrates	0.01	0.03	0.00	-29.15

Source: elaborated by author based on *WITS database*

Exports of „02_Meat and edible meat offal" have a leading role among livestock exports amounting to 35.3 million USD in 2014. It has also one of the highest value of RCA among livestock products groups at 2-digit level of HS with a value of 2.08 in 2014 and this indicator is growing comparing with 2005 when its value was of 0,27.

The second important group of livestock products according to the trade value in 2014 (17.9 millions USD) is "04_Dairy produce; birds' eggs; natural honey". However it has a lower and rather moderate Revealed Comparative Advantage and Compound Annual Growth Rate comparing with "01_Live animals; animal products" that had the highest RCA level in 2014 (2,18) comparing with other groups of livestock export products. However, the trade volume is less than those of the "04_Dairy produce; birds' eggs; natural honey".

Per general all three groups of livestock products (at 2–digit level) that are competitive on the external markets has a rather moderate RCA with a value ranging from 1,44 to 2,18 in 2014.

Significant livestock products at 4-digit level

In order to identify in more detail different groups of livestock products the further analysis of the RCA and export value at 4-digit product groups with significant exports in 2014 was carried out.

Live animals and animal products

Export of "0102_Live bovine animals" has a dominant position in the group "01_Live animals; animal products" with a high and increasing RCA in 2014 comparing to 2005. The second important position according to the trade value in 2014 belongs to "0104_Live sheep and goats". The RCA is also high and increasing (Table 2).

Table 2. Trade Value, RCA, and CAGR of the Moldova's live animals exports at 4-digit level of HS comparing to the world, 2005-2014, thousand USD

4-digit chapter of HS	Trade Value (2014), thous USD	RCA (2005)	RCA (2014)	CAGR (2005-2014)
0102_Live bovine animals	1,284.03	2.31	3.86	15.57
0104_Live sheep and goats	667.86	5.67	11.31	10.88
0106_Other live animals	4.88	0.08	0.02	-4.43

Source: elaborated based on *WITS database*

The other groups of livestock products will be not analyzed due to the insignificant and unstable trade volume.

Meat and edible meat offal

The most important group of "02_Meat and edible meat offal" at 4-digit level is the "0203_Meat of swine, fresh, chilled or frozen" with a trade value of about 22.3 million USD in 2014. The RCA level is high and increasing especially taking into account that in 2005 the RCA was less than 1.

Table 3. Trade Value, RCA, and CAGR of the Moldova's live animals exports at 4-digit level of HS comparing to the world, 2005-2014, thousand USD

4-digit chapter of HS	Trade Value (2014), thous USD	RCA (2005)	RCA (2014)	CAGR (2005-2014)
0203_Meat of swine, fresh, chilled or frozen	22,266.56	0.04	5.42	89.07
0204_Meat of sheep or goats, fresh, chilled or frozen	3,298.04	1.04	3.51	24.08
0202_Meat of bovine animals, frozen	2,335.21	1.25	0.72	8.22
0209_Pig fat, free of lean meat, and poultry fat, not rendered or otherwise extracted, fresh, chilled, frozen, salted, in brine, dried or smoked	1,802.87	0.00	19.58	192.51
0205_Meat of horses, asses, mules or hinnies, fresh, chilled or frozen	313.75	0.75	5.13	26.76
0206_Edible offal of bovine animals, swine, sheep, goats, horses, asses, mules or hinnies, fresh, chilled or frozen	103.63	0.08	0.10	17.25
0207_Meat and edible offal, of the poultry of heading 01.05, fresh, chilled or frozen	0.61	0.10	0.00	-45.72

Source: elaborated based on *WITS database*

It is followed by "0204_Meat of sheep or goats, fresh, chilled or frozen" with a rather high and increasing RCA and a trade value of 3,3 million USD in 2014. The next after importance livestock products exported from Moldova are:

-"0202_Meat of bovine animals, frozen" that is the third after importance product in the group "02_Meat and edible meat offal" according to the trade value that was about 2.3 mill USD in 2014. However this product was rather uncompetitive in 2014 with an RCA of 0.72 that is decreasing comparing with a moderate competitiveness of this product in 2005 with an RCA value of 1.25.

-"0209_Pig fat, free of lean meat, and poultry fat, not rendered or otherwise extracted, fresh, chilled, frozen, salted, in brine, dried or smoked" have the highest and dynamically increasing level of RCA (19.58 in 2014) and the forth position according to the trade value in 2014 (1.8 mil USD).

-"0205_Meat of horses, asses, mules or hinnies, fresh, chilled or frozen" has a rather high and increasing RCA (5.13 in 2014 comparing with 0.75 in 2005). However its contribution to the total trade value is rather low (311.7 thousands USD in 2014)

-"0206_Edible offal of bovine animals, swine, sheep, goats, horses, asses, mules or hinnies, fresh, chilled or frozen" despite an increase still has a low competitiveness with an RCA of 0.10 in 2014.

-"0207_Meat and edible offal, of the poultry of heading 01.05, fresh, chilled or frozen" very uncompetitive with a rapidly decreasing RCA that was close to the zero value in 2014 (Table 3).

Dairy produce; birds' eggs; natural honey

Exports of this group are limited to five livestock products, namely:

-The natural honey has a highest RCA among other products of the group "04_Dairy produce; birds' eggs; natural honey". Its value was of 32.9 in 2014 with a dynamic increase from 4.6 in 2005. The trade value of natural honey exports reached 9.7 millions USD in 2014 [7].

-"0406_Cheese and curd" has second position in this group with a trade value of 5.4 millions USD in 2014 and an moderate RCA of 1.25 in 2014 with an slight increase from the 0.57 in 2005.

-"0405_Butter and other fats and oils derived from milk; dairy spreads" has a moderate RCA of 1.47 in 2014 that is decreasing comparing with its value of 3.82 in 2005.

-"0402_Milk and cream, concentrated or containing added sugar or other sweetening matter" became very uncompetitive in 2014 with an RCA value of 0.24 comparing with a rather high RCA of 5.84 in 2005.

-"0407_Birds' eggs, in shell, fresh, preserved or cooked" shows the same trend. Thus its RCA decreased from a very high level of 19.6 in 2005 to a very low RCA level of 0.52 in 2014 (Table 4).

Table 4. Trade Value, RCA, and CAGR of the Moldova's exports of products from the group "04 Dairy produce; birds' eggs; natural honey" 4-digit level of HS comparing to the world, 2005-2014, thousand USD

4-digit chapter of HS	Trade Value (2014), thous USD	RCA (2005)	RCA (2014)	CAGR (2005-2014)
0409_Natural honey	9,698.68	4.60	32.90	44.50
0406_Cheese and curd	5,367.07	0.57	1.25	19.80
0405_Butter and other fats and oils derived from milk; dairy spreads	1,641.06	3.82	1.47	-0.80
0402_Milk and cream, concentrated or containing added sugar or other sweetening matter	823.70	5.84	0.24	-20.63
0407_Birds' eggs, in shell, fresh, preserved or cooked	298.51	19.60	0.52	-23.62

Source: elaborated based on *WITS database*

The decrease of competitiveness of both last two livestock products are related to restrictions imposed by EU regulations for new member countries. Thus, one of the most important livestock exports on the Romanian market represented by "0407_Birds' eggs, in shell, fresh, preserved or cooked" was stopped completely in 2007, the year when Romania joined EU. One year latter, in 2008, Romania stopped imports of honey "0409_Natural honey". However four years ago, in 2013 imports of honey to Romania restarted due to the compliance of the Moldovan standards for natural honey with EU requirements. Only exports of '0307_Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebra" have continued to Romania after 2007 but with a continuously declining trend.

Trade with the EU (RCA of Moldova's livestock products vs. EU 27)

Livestock exports to EU 27 countries is rather limited and decreasing, especially after accession to the EU of such countries as Romania and Bulgaria that traditionally imported from Moldova considerably quantities of livestock products.

Table 5. Trade Value, RCA, and CAGR of the Moldova's livestock products at 2-digit level of HS comparing to the EU-27, 2005-2014, thousand USD

2-digit level of HS	Trade Value (2014), thous USD	RCA (2005)	RCA (2014)	CAGR (2005-2014)
02_Meat and edible meat offal	0.97	0.02	0.00	-39.52
03_Fish and crustaceans, molluscs and other aquatic invertebrates	8.14	0.05	0.00	-26.80
04_Dairy produce; birds' eggs; natural honey	9202.94	1.89	0.91	5.69
05_Products of animal origin, not elsewhere specified	72.41	0.06	0.09	18.86
16_Preparations of meat, of fish or of crustaceans	80.59	0.01	0.02	19.27

Source: elaborated based on *WITS database*

The main reason for the shrinking livestock exports to EU is the noncompliance of the Moldovan standards for livestock products with EU norms and regulations. At present the most competitive group of Moldovan livestock products is the "04_Dairy produce; birds' eggs; natural honey" with a RCA decreasing from a very moderate competitiveness level of 1,89 in 2005 to an almost uncompetitive level of 0,91 in 2014. The other groups of livestock products exported by different modalities to EU 27 are very uncompetitive, with a decreasing trend, or, as in the case of the group "05_Products of animal origin, not elsewhere specified" with an increasing trend (Table 5).

RCA analysis at the 4-digit level of HS shows that the only competitive livestock product on the EU-27 market is the "0409_Natural honey" that has the RCA of 37.56 in 2014 with a dynamic increase of 5.38 in 2005 (Table 6).

The other livestock products exported from Moldova to EU 27 are very uncompetitive with decreasing or slightly increasing trends.

Export of livestock products in the context of DCFTA regulation

The Deep and Comprehensive Free Trade Area (DCFTA) sets up a free-trade area between the EU and Moldova, in line with the principles of the World Trade Organization [1].

Table 6. Trade Value, RCA, and CAGR of the Moldova's livestock products at 4-digit level of HS comparing to the EU-27, 2005-2014, thousand USD

4-digit HS code	Trade Value (2014), thous USD	RCA (2005)	RCA (2014)	CAGR (2005-2014)
0303_Fish, frozen, excluding fish fillets and other fish meat of heading 03.04.	0.03	0.05	0.00	-49.57
0307_Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine;	8.11	0.39	0.01	-25.60
0405_Butter and other fats and oils derived from milk; dairy spreads	0.07	0.25	0.00	-53.22
0406_Cheese and curd	0.08	0.31	0.00	-61.58
0407_Birds' eggs, in shell, fresh, preserved or cooked	0.07	32.59	0.00	-69.67
0409_Natural honey	9,202.61	5.38	37.56	49.47
0505_Skins and other parts of birds, with their feathers or down, feathers and parts of feathers (whether or not with trimmed edges) and down, not further worked than cleaned, disinfected or treated for preservation	28.26	0.29	0.24	17.93
1604_Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs	80.32	0.04	0.06	19.22

Source: elaborated based on *WITS database*

It removes import duties for most goods traded between the EU and Moldova and provides for broad mutual access to trade in services. It also includes provisions on establishment, which allow EU and Moldovan companies to set up a subsidiary or a branch office on a non-discriminatory basis, benefitting from the same treatment as domestic companies in the partner's market.

An important part of the DCFTA is aligning Moldovan trade-related laws to selected EU legislative acts. Adoption by Moldova of EU approaches to policy-making will improve governance, strengthen the rule of law and provide more economic opportunities by opening further the EU market to the Moldovan goods and services. It will also attract foreign investment to Moldova.

The Deep and Comprehensive Free Trade Area presumes a stronger collaboration between Moldova and the EU in terms of development of agricultural policies, based on EU principles, but also enlarges the opportunities for Moldovan producers and exporters and their presence at the EU market. Thus the DCFTA will results in significant harmonization of Moldova's regulatory practices to European rules and norms in trade related spheres and envisage the significant quotas on duty-free exports of selected agricultural products, including dairy products, grain and cereals, and sugar, to the EU, but also the duty free imports of majority of EU agricultural products to Moldova.

The start of the implementation of this agreement in September 2014 has already brought some changes to the sector's opportunities. Exports to the EU of the main categories of agricultural products increased in 2014 in comparison with 2013. The same tendency is available for livestock products. Thus the export of livestock products to EU 27 increased 3.3 times in 2014 comparing with previous year. It is worth to mention that 98.3% of total livestock exports were covered just by one product, namely – "0409_Natural honey"[9].

In 2015 the EU and Moldova have signed a new program for rural development and agriculture, under ENPARD (the European Neighborhood Program for Agriculture and Rural Development), worth an amount of €64 million [5]. This program aims to improve the competitiveness and modernization of the agro-food sector, develop rural areas and increase the living standard of Moldovan citizens. With the launch of the ENPARD Moldova program, the EU will support the establishment of a long-term relationship and dialogue between the government and civil society organizations, farmers, producers' organizations and federations, food business operators and rural communities.

Among the most important measures of this program that may lead to improved livestock exports one can mention the following:

-Improving design and implementation of agricultural and rural development policies and improved service delivery,

-Increasing investment in the modernization of the agriculture, agro-food and feed chains meeting EU food safety and quality requirements,

-Improving education, research and extension services in the agriculture, agro-food sector, including facilitating information systems,

-Improving access to capital, input and output markets for farmers

On the other hand as a side effect of the DCFTA signing exports of agricultural products to Russian Federation decreased due to more restrictive tariff and non-tariff measures imposed for Moldovan agricultural, including livestock products. Thus the total trade value of livestock exports to Russian Federation decreased in 2014 with more than 33% comparing with previous year. Taking into account products with a most important share in total livestock exports one can see that exports of nine livestock products that assured on average about 99% of livestock exports during the period 2005-2014 decreased in 2014 with 38% comparing with 2013. However after a more detailed analysis one can see that this picture is not uniform. Thus for certain livestock products such as "Meat of bovine animals, fresh or chilled", "Butter and other fats and oils derived from milk; dairy spread", "Cheese and curd", "Meat of horses, asses, mules or hinnies, fresh, chilled or frozen" and "Natural honey" the volume of exports decreased from 18% to

100%. In the same time exports of such products as: "Meat of sheep or goats, fresh, chilled or frozen", "Meat of bovine animals, frozen", "Other prepared or preserved meat, meat offal or blood" and "Milk and cream, concentrated or containing added sugar or other sweetening matter" increased from 25% to almost 8 times.

CONCLUSIONS

Export of most livestock products is not stable from year to year. Often disruptions in exports supplies are caused by multiple factors such as weather conditions, more competitive regional imports, import bans imposed by partner countries etc. The natural honey is the only livestock product exported without restriction all around the world.

Livestock exports are characterized by a limited number of exported goods and markets. Often one type of livestock products is exported predominantly to one country. Live animals are exported predominantly to Middle East countries, namely to Syria, and during the recent years significant exports were developed to Iraq and Libya. The most important export destination countries for meat are Russian Federation and Belarus. Kazakhstan is the major destination for dairy exports.

Despite a general increase of the livestock exports the more detailed analysis shows that in many cases the increase of meat exports was not a clearly assumed target but rather an escape valve helping to distribute large quantities of slaughtered animals because of the lack of forages in unfavorable agricultural years.

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CHARACTERISTICS OF THE ROMANIAN AGRICULTURE WORKFORCE

Adina Magdalena IORGA

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Mobile:+40721649215, Email: iorga_adinam@yahoo.com

Corresponding author: iorga_adinam@yahoo.com

Abstract

The article seeks to analyze the principal characteristics of the Romanian agriculture workforce by focusing on the dynamic and structure of rural environment agricultural labor between 2007 and 2013. We have analyzed the principal indicators of the labour market resources as provided by the statistical inquiry data, indicators such as: active population, the occupation rate within the work age appropriate population, unemployment rate and so on, all taking into account education levels, age, the span of the agricultural area available for use. The study on the evolution of worker categories involved in agricultural holding and the level of know-how in the subsequent management of the agricultural holding showcases the actual dimensions of the workforce resources in the field in rural areas, and furthermore, highlights the main problems within them.

Key words**:** *workforce, labour market resources, agricultural holding*

INTRODUCTION

The Romanian rural area of today is the result, in part, of the economic, political and social activities of the XXth century and on the other hand, of the agricultural policies implemented after 1989 [5].

The labor force in agriculture is the premise on which we can base any further development and performance in the Romanian rural area as a whole [6].

The National Strategy for Workforce Occupation 2014-2020 identifies the main challenges for the implementation of workforce occupation policies: the high rate of workforce occupation already in place in agriculture, the diminishing numbers of active population, the aging of the workforce, the high rate of unemployment among youth, the high rate of long term unemployment within the overall number of unemployed people, the low rate participation in continuous training programs[7].

In this context, the agriculture field remains a viable option, as the offers available in other economic sectors are reduced [3].

For an in-depth analysis of the workforce resources in agriculture, specifications regarding volume, structure and quality of said resources are needed [4].

MATERIALS AND METHODS

We have studied the agriculture workforce resources based on the statistical data provided by the Survey on the Household Workforce for 2013, tracking the progress of the following statistical indicators: occupation rate of work age appropriate population (15-64 years old), unemployment rate, long term unemployment rate, based on residence backgrounds. Starting from data of surveys processed by the ASA in 2007 and 2013, we analyzed the evolution of worker categories involved in agricultural holding in that timeframe. Also, we presented the level of training and skills of agricultural holding management and higher echelons, for 2013.

RESULTS AND DISCUSSIONS

In the year 2007, the number of people who lived within the agricultural holdings was 6,398,325, presenting the following structure: people aged between and above 55-65 years old represented 55% of the total number,

people aged between 35-54 were at 33%, while youth aged between 15-24 years old were a mere 12% (Fig. 1).

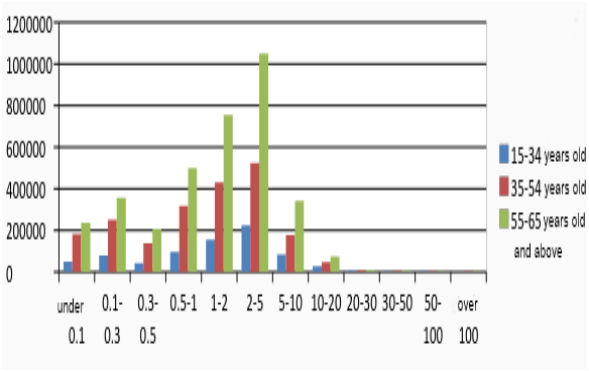

Fig. 1. People in individual agricultural holdings based on age and agricultural area size being used, in 2007. Source: ASA, 2007[1]

(1)The occupation rate of people age appropriate for work (15-64 years old) has similar values on both residential environments, higher in the rural one, of 60.7% compared to 58.9% in the urban areas. The occupation rate for people aged between 20 and 64 years old was of 65.7% in the rural environment, compared to the urban areas 62.5% occupation rate (Survey on the Household Workforce, 2013).

The occupation rate for the workforce residing in rural areas also indicates a large percentage of people with a medium level education (67.5%), similarly high as well as for people with a lower level education (51.3%) (Table 1).

Table 1. Occupation rate of work age appropriate population based on levels of education and location, in 2013

Level of education	Urban	Rural
Superior (short and long term university studies, including: Master's, PhD, post-graduate studies, post-doctoral studies)	82.0 %	79.2 %
Medium (high school, professional and complementary schools, apprentice levels, including stage 1, post-high school)	60.0 %	67.5 %
Lower (general, primary and uneducated)	23.4 %	51.3 %
Total	**58.9 %**	**60.7 %**

Source: AMIGO, 2013

(2)The unemployment rate is 3.6 percents higher in urban areas than in rural ones (8.9% in urban versus a 5.3% margin in rural areas). On age groups, the unemployment rate reached its highest point among the youth (15-24 years old), with a significant percent difference on location, of 33.3% in urban areas compared to the 17.1% in the rural ones.

Long term unemployment (the rate of people without a job for 12 months or more, out of the active population) was more strongly emphasized in the urban areas, at 49.1% than in the rural zones (Table 2).

Table 2. Long term unemployment rate based on age and location, in 2013

Incidence of long term unemployment	Urban	Rural
TOTAL	**49.1%**	40.8%
of which: 15-24 years old	61.4%	58.0%
25 years old and above	51.6%	41.7%

Source: AMIGO 2013

Also, the unemployment rate based on levels of education is smaller in the rural areas, especially on the lower education indicator (Table 3).

Table 3. Unemployment rate on levels of education and location, in 2013

Level of education	Urban	Rural
Superior (short and long term university studies, including: Master's, PhD, post-graduate studies, post-doctoral studies)	**8.9%**	**5.3%**
Medium (high school, professional and complementary schools, apprentice levels, including stage 1, post-high school)	9.2%	6.0%
Lower (general, primary and uneducated)	19.1%	4.2%
Total	**8.9 %**	**5.3%**

Source: AMIGO, 2013

(3)**Workforce categories involved in agricultural holdings**

While the number of permanent employees decreased significantly on holdings of 1-2 hectares (-565 permanent employees), the number of permanent workers in holdings over 50 hectares is increasing (over 8,525 permanent employees). The number of temporary employees has been steadily decreasing, especially in holdings with a surface raging 2-5 hectares (-956,613 temporary employees). The decrease in temporary workers between 2007 and 2013 is quite dramatic, with no more than 1,927,794 people (Table 4).

The number of bosses and management level staff has increased in all used agricultural area size classes. But the biggest increase is registered among management on areas over 100 hectares (+2,257) as well as at those with a surface of under 2 hectares (+4,256). We are actually noting the existence of a polarizing tendency in agricultural holding based on used area size towards the extreme (over 100 hectares and under 2 hectares respectively).

Table 4. Employees that worked in agricultural holdings, on categories and size classes of the used agricultural area, between 2007-2013

Size classes of used agricultural areas (hectares)	2007			2013		
	Employee categories (people)			Employee categories (people)		
	Management	Permanent employees	Temporary employees	Management	Permanent employees	Temporary employees
under 0.1	348	4,764	33,031	993	4,628	53,783
0.1-0.3	731	124	173,617	1,616	226	202,327
0.3-0.5	349	422	155,720	1,006	210	160,431
0.5-1	629	239	465,032	1,687	512	351,304
1-2	993	1,071	953,880	2,004	506	570,122
2-5	2,564	1,221	1,758,732	3,233	1,129	802,119
5-10	2,529	1,467	662,993	2,815	1,063	284,367
10-20	1,269	1,434	200,478	2,141	1,787	90,708
20-30	409	837	40,910	923	914	25,638
30-50	573	1,445	32,953	1,140	1,443	26,629
50-100	1,219	3,353	33,254	1,916	3,800	28,866
over 100	7,179	36,598	134,602	9,436	44,672	121,114
Total	18,792	52,975	4,645,202	28,910	60,890	2,717,408

Source: ASA 2007, ASA 2013 [1, 2]

The number of management staff employees and bosses increased in 2013 both for men and women, even more so for men, with a total of 1,250 women and 8,868 men (Table 5) (Table 6).

Table 5 Categories of employees (male) that worked in agriculture between 2007 and 2013.

Size classes of used agricultural areas (hectares)	2007			2013		
	Employee categories (male)			Employee categories (male)		
	Management	Permanent employees	Temporary employees	Mana Gement	Permanent employees	Temporary employees
under 0.1	295	2,829	19,926	815	2,789	31,406
0.1-0.3	548	80	88,903	1,354	157	123,216
0.3-0.5	306	297	79,395	823	137	97,297
0.5-1	539	155	241,161	1,490	293	210,302
1-2	883	585	500,264	1,795	325	329,310
2-5	2,339	810	870,537	2,963	759	460,520
5-10	2,376	956	365,009	2,611	704	166,530
10-20	1,147	907	114,149	1,941	1,212	55,843
20-30	360	555	23,568	814	656	16,832
30-50	503	1,018	18,804	1,004	1,076	17,289
50-100	1,090	2,425	20,950	1,690	2,760	19,915
over 100	6,430	29,392	86,964	8,384	36,920	85,400
Total	16,816	40,009	2,429,630	25,684	47,788	1,613,860

Source: ASA 2007, ASA 2013 [1, 2].

Table 6. Categories of employees (female) that worked in agriculture between 2007 and 2013.

Size classes of used agricultural areas (hectares)	2007			2013		
	Employee categories (female)			Employee categories (female)		
	Management	Permanent employees	Temporary employees	Management	Permanent employees	Temporary employees
under 0.1	53	1,935	13,105	178	1,839	22,377
0.1-0.3	183	44	84,714	262	69	79,111
0.3-0.5	43	125	76,325	183	73	63,134
0.5-1	90	84	223,871	197	219	141,002
1-2	110	486	453,616	209	181	240,812
2-5	225	411	888,195	270	370	341,599
5-10	153	511	297,984	204	359	117,837
10-20	122	527	86,329	200	575	34,865
20-30	49	282	17,342	109	258	8,806
30-50	70	427	14,149	136	367	9,340
50-100	129	928	12,304	226	1,040	8,951
over 100	749	7,206	47,638	1,052	7,752	35,714
Total	1,976	12,966	2,215,572	3,226	13,102	1,103,548

Source: ASA 2007, ASA 2013 [1, 2]

The number of permanent male employees in holdings over 10 hectares has risen by 8,237 people, while the number of permanent female employees has grown with only 658 people in holdings over 50 hectares.

The number of temporary employees is again dropping significantly, especially more for women (-1,112,024 people) than for men (-815,770 people) (Table 5 and 6).

(4)The training and skills level of agricultural holding management

The level of training and education of upper management of agricultural holdings indicates a very low percentage of 0.01% people with a full agricultural training, 0.03% of people with a basic agricultural training and 0.96% with just a practical, direct training, on-sight and in the field. (Table 7).

Table 7. Agricultural holdings management on age and training levels

Training level of management	Age groups						
Training level of the agricultural holding management	15-24	25-34	35-44	45-54	55-64	65 and over	Total
Only practical experience	12,989	143,854	478,955	582,827	821,116	1,459,127	3,498,868
Basic agricultural training	583	5,946	25,459	30,411	26,496	24,850	113,745
Full agricultural training	132	1,267	2,391	3,835	5,690	3,728	17,043
Total	13,704	151,067	506,805	617,073	853,302	1,487,705	3,629,656

Source: ASA 2013 [1, 2].

The number of men involved in agriculture as a field is higher than that of women on all three levels of training (+1,248,080 people). We are identifying the typical gender segregation thus keeping agriculture as a predominantly male work field.

Considering the challenges raised by the workforce resources in the rural areas, the need to ensure the necessary assets (financial, logistic and legislative) to implement and monitor active measures of occupying the workforce in the rural areas.

In this context, it's mandatory to improve the quality of professional training of management in agriculture holdings, through the involvement of educational institutions in the field, encompassing especially medium and higher learning.

CONCLUSIONS

The structure of the population that in 2007 lived in agriculture holdings shows an accentuated aging process, thus: people aged between 55-65 years old and over represent 55% of the total number, while people aged between 35-54 were at 33%, with youth aged between 15-24 years old were just 12%.

The occupation rate for age appropriate workforce (15-64 years old) in the rural areas is superior to that in the urban ones, but the medium and low levels of education are predominant. The unemployment rate is also reduced, especially on the bottom specter of the education levels, in comparison to the urban environment.

Between 2007-2013, the main categories of workers in the agricultural field have shown the following tendencies:

-the number of management staff has increased on all levels of used agricultural area size. We note the existence of a polarizing increase to the extremes in accordance to size (over 100 hectares and under 2 hectares respectively);

-the number of permanent employees dropped substantially for 1-2 hectares holdings, while the number of permanent employees for holdings spanning 50 hectares is on a steady increase;

-the number of temporary employees is reduced even further for holdings with a surface of 1-2 hectares, amounting to a staggering 1,927,794 people, in the designated timeframe.

The level of training and know-how dissemination of upper management of agricultural holdings indicates a very low percentage of 0.01% people with a full agricultural training, 0.03% of people with a basic agricultural training and 0.96% with just a practical, direct training, on-sight and within the agricultural holding.

We thus insist that the necessity to improve the quality of professional training of management in agriculture holdings, through the involvement of educational institutions in the field, encompassing especially medium and higher learning, is paramount at this time.

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THE IMPACT OF THE EUROPEAN FUNDS ON THE DEVELOPMENT OF THE RURAL AREA. CASE STUDY

Andrei Radu IOVA, Daniela CREȚU

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Emails: andrei_anglia@yahoo.com; danielacretu5@yahoo.com

Corresponding author: andrei_anglia@yahoo.com

Abstract

The paper presents a study of accessing the European funds by the companies in the private sector, aiming to the impact of their implementation on their own economic activity and on the studied locality. The content of this study was elaborated starting from and considering exclusively the information provided on the basis of a questionnaire which included 12 questions, on a sample formed of 18 private beneficiaries of the SAPARD funds and/or EARDF. The research objectives were: to identify the main sources of information on the European funds; the main sources of co-financing of the private beneficiaries; the appreciation by the beneficiaries of the manner of submitting projects and identifying the satisfaction degree regarding their mechanism of implementation; analyzing the impact that these projects had on the direct and indirect beneficiaries. The impact of using grants on the labor market is particularly favorable. This is demonstrated by the results of the survey: more than half (53.6%) of those questioned said that following the investment, more than 3 jobs were created.

Key words**:** *companies, information, implementation European funds, rural area*

INTRODUCTION

At the national, regional and county level, the process of rural development process is governed by a number of specific documents such as: the European Commission position paper on the development of a Partnership Agreement and of some programmes in Romania in the period 2014 -2020, the National Strategic Framework, The national strategic framework for sustainable development of the agri-food sector and Romanian rural area in the period 2014 -2020 -2030, the strategic concept of territorial development of Romania 2030, the Regional Development Plans 2014-2020, the socio-economic development strategies of the counties for the period 2014-2020 etc. (The European Commission, 2014); (NRDF 2007-2013) [1, 7].

The existence and application of all above mentioned documents demonstrate the high degree of awareness at the community and national level regarding the importance of the rural area and its development for ensuring an economic, political and social cohesion at the level of the European Union. (FAO, 2014) [3]

That need was recognized at the European level by laying the basis of a joint European policy in the agricultural area and the rural development. The farmers and entrepreneurs in the rural area should be supported to take full advantage of the funding opportunities under EARDF, the most suitable instrument to the development needs of the rural communities which ensures an unitary and coherent context of the local strategies of rural development (Iova R, A.**,** Cretu, D. 2013) [5].

The present research represents a segment of a wider research of the rural area in Călăraşi county and implicitely of Mânăstirea commune, by SWOT analysis of the commune, on categories of activities and a case study regarding accessing and implementation of the European funds in this commune by the companies and local public institutions. A special place presents the study of accessing the European funds by the companies in the private sector, aiming the impact of their implementation on their own economic activity and on the community. The basis of this study is the analysis of a general regulation framework of the allocation of the European funds destined to the rural

development in Romania (The European Commission, 2014) [7].

MATERIALS AND METHODS

The content of this study was drawn up starting from and considering exclusively the information provided based on a questionnaire, which comprised 12 questions, among which two questions of identification by the beneficiaries of SAPARD and EARDF funds.

The objectives of the research aimed**:** the identification of the main sources of information regarding the European funds; the main sources of co-financing of the private beneficiaries; the appreciation of the manner in which the beneficiary submit projects and the identification of the satisfaction degree regarding the mechanism of their implementation; the analysis of the impact these projects had on the direct and indirect beneficiaries.

Survey was selected as a method of collecting and processing data and the questionnaire was used as a research instrument.

The sample was formed of 18 private beneficiaries of SAPARD and/or EARDF funds. For collecting the information and reaching the proposed objectives, the method of direct survey was selected, face to face, in the headquarters of the respondents.

RESULTS AND DISCUSSIONS

Mânăstirea commune is located on the border of South-East part of Romania in South Muntenia Development Region. The commune is situated on the left bank of the Danube, on the border with Bulgaria, on a surface of 12,354 hectares (Monograph of Mânăstirea commune, 2016) [6]. From the total surface of Mânăstirea commune, a significant percent is represented by the agricultural land (90.66%), of which: 97.23% arable land; 2.02% vineyards; 0.57% pastures and 0.18% orchards (Fiche of Mânăstirea locality, 2016) [4].

(Figure 1).

In Mânăstirea commune, a total of 52 companies and 25 family enterprises and natual persons operate and develop activity in different areas of the market, as follows: 5211-Retail sale; 5621- food activities (catering) for events; 5630-Bars and other beverage serving activities; 0161- support activities for crop production; 6021-Other road transports of passenger; 4711-Retail sale in non-specialized stores; 4773-Retail sale of pharmaceutical products in specialized stores; 0111-Cereals; 1571- Products manufacturing for animal feed; 4941-Road transport of goods; 0141-mechanization, chemisation etc.

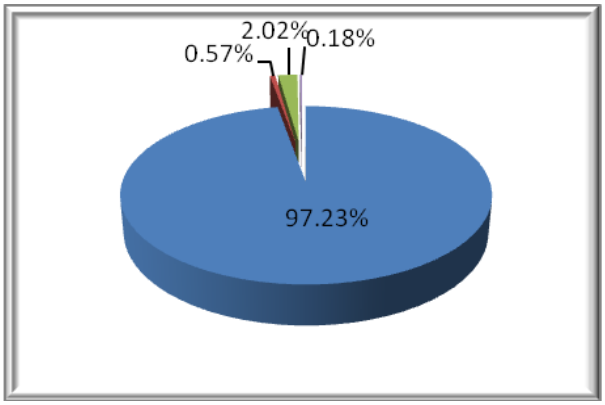

Fig. 1. The agricultural surface of Mânăstirea commune, on use categories

The higher percent is represented by the companies (64%), followed by the family associations (20%) and authorized natural persons (13.33%), the lowest rate having the cooperatives (2.66%).

The education level of the respondents, respectively company managers has a percent of 72.2% with higher education.

One of the questions in the questionnaire aimed **the identification of the main sources of information regarding the European funds.** The main sources of information regarding the European funds, identified following some surveys, are: other beneficiaries 38.8%; newspapers, radio, TV 11.1%; commune local council 11.1%; friends, neighbours, relatives 16.76%; Agricultural department 5.5%; consultants 11.11% (Table 1).

Thus, there is a discrepancy between the unofficial sources of information 55.6% (other beneficiaries, relatives, friends, neighbours) and the official sources 44.44%

(mass media, local council, Agricultural Department, consultants etc.).

Table 1. The sources the companies found about the European funds

No.	Sources of information	Number of respondents	Frequency
1	From other beneficiaries	7	38.8
2	From mass media	2	11.11
3	From the local council	2	11.11
4	From the agricultural department	1	5.55
5	From the consultants	2	11.11
6	Other sources	3	16.76
7	No response	1	5.55
	TOTAL	18	100.00

It is noted that the previous experience of the European Funds beneficiaries is the most beneficial, but the official sources of information have relatively reduced efficiency.

Another question aimed the **modality of ensuring the co-financing**. One of the major problems mentioned by the grants beneficiaries is ensuring the co-financing, mandatory for the private beneficiaries. As it is noted in the information presented in the following table, about two thirds of the respondents contracted bank loans or investment funds for ensuring the projects co-financing (Table 2).

Table 2. The main source of project co-financing

Surce of co-financing	Number of respondents	Frequency (%)	Cumulated Percent (%)
Bank loan	10	56.1	56.1
Investment funds	2	9.8	65.9
Own sources	6	34.1	100.0
TOTAL	1 8	100	

This aspect would be normal in the case of a functioning market economy and in the case of existence of a competitive banking system. Under the current conditions, the interest rates and the fees charged by the banks, the foreign exchange, do not stimulate the entrepreneurs to develop businesses based on credit and can constitute obstacles to the absorption of the European funds. Higher interest rates, the exchange rate made that the beneficiaries/ potential credit beneficiaries to be unable to cover the cost of credits. Many investors expect the market regulation, respectively banking system easing.

Despite these difficulties, most of the beneficiaries (72.22%) said they would not have made the investment without support (Table 3).

Table 3. Answers to the question: 3„Would you have made the investment without SAPARD/ERDF support?"

No.crt	Answers	Number of respondents	Frequency (%)
1	Yes	4	22.23
2	No	13	72.22
3	I do not know/No answer	1	5.55
	TOTAL	18	100

Another question of the questionnaire aimed **the impact of the European funds on the labor market in Mânăstirea commune.**

According to the survey, about 70% of the respondents said that the investment achieved contributed to job creation (Table 3.7.). In order to show which are the most important direct benefits on the beneficiaries of SAPARD/EARDF, the respondents expressed the satisfaction degree o several possible effects of the investment achieved (Table 4).

Table 4. Beneficiaries' perception on the effects of the investment achieved

Effects following the investment achieved	To a great extent (%)	Not too much (%)	Not at all (%)	I do not know/No answer (%)
Profit increase	43.9	31.7	9.8	14.6
Job creation	29.3	39	29.3	2.4
Professional reconversion	39	31.7	22	7.3
Job reduction	14.7	0	78	7.3
Products, services quality increase	41.5	5.8	41.1	5 .6
Work productivity increase	60.9	9.1	60.8	9.2
Production capacity increase	75.6	6.2	75.3	6.9
Environment conditions improvement	41.5	5 .7	41.5	5 .3
Working conditions improvement	46.3	3 .7	46.2	3.8
Living conditions improvement	43.9	43.9	12.2	0

In the respondents' opinion, the investments, achieved have marked most strongly, positively, the production capacities, the labor productivity and the working conditions.

These cumulated effects have not resulted in the increased profits and hence the increase of the living standards only about 40% of those questioned. It is expected that on long-term positive effects will amplify the amortization of the investments achieved. One of the targets of the study was that related to the presentation of the grants beneficiaries evolution compared to their initial status before contracting funds.

The results allow revealing some interesting findings with useful practical consequences in the implementation of such programmes.

More than 70% of those questioned said that **the situation of the company before contracting SAPARD/EARDF funds** was prosperous, in a very good situation or stagnating, and only a quarter consider that their company was in difficulty and did not carry out activity. Moreover, according to the applicants guidelines for all types of measures, only the companies which had profit in the last fiscal year or which had not activity may benefit from the European funds. This limits the possibility of the companies in difficulty to recover and develop profitable businesses in the rural area.

The utility of European grants from the beneficiaries perspective results from the important percentages obtained by the response had improved to question 6.

"Immediately after the project implementation under SAPARD/EARDF, which was the situation of your company?".

It is very important to note that the representatives of 61.1% of the funds beneficiaries say that their situation has improved, suggesting the impact that the European funds have on the local economic development by supporting the private initiative in the rural areas, considered to be the engine of the economy, creating revenues to the local budgets and creating new jobs.

At the question 7.**"Which difficulties did you face when accessing the European funds?**", the main difficulties identified in accessing grants were, in this order: procedures for issuing permits, authorizations, certificates needed for the investments achievement, fulfilling the requirements of the payment files, finding the funds needed to co-financing, the requirements related to the documents to be drawn up, the duration of the selection procedures.

At the question 8. "**In future do you think you will access grants?"** The favorable experience determined 56.1% of the respondents to declare that they intend or it is possible to apply for grant programmes in various sectors: livestock, tree growing, greenhouse creating, wood processing, tourism etc. It is stressed, however, that a significant proportion (43.9%) do not intend or do not know whether they will apply for such projects, probably because of difficulties occurred.

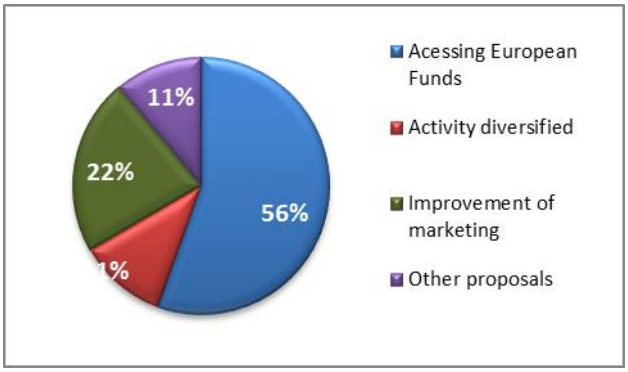

Fig. 2. Proposals for company development

At the question „9**. Was the project implemented by a consultancy firm or by an internal team?**", the results were about 90% , YES and 10% NO.

In the category **"other proposals"** for the company development, are: extension of the company by grown land surface; purchase of new equipment and extension of car number; implementation of a project for a cattle farm for meat; implementation of a project for purchasing agricultural equipment.

Further on several of these comments and proposals "collected" on site were grouped (Table 5).

From the 77 companies, which develop activity in Mânăstirea commune, only 18 accessed European funds, respectively, 23.4%. In their structure, we find 3 agricultural companies (16.7%), 9 commercial companies (50%), 3 authorized natural persons (16.7%), 2 individual enterprises (11. 1%) and a family enterprise

(5.5). (Table 6).

Table 5. Comments, proposals and recommendations of SAPARD/EARDF funds beneficiaries

Related aspect	Beneficiaries' comments
Cofinancing	-I received from the bank a comfort letter, and after the file approval I did not receive the credit with the guarantee fund; -The most difficult is to obtain co-financing -the interests are very high, the state does not pay the subsidy in time
Bureaucracy	It would be well to support those who are working the land, without so many files, without much money for bureaucracy; The bureaucracy is the main cause for which the farmers give up on accessing grants Too many documents, approvals are required
Analysis duration of the files	It lasted one year since we submitted the file until we started the project Much time and money is lost with the files
Lack of information in the rural are	If the rural population would be informed, more funds were accessed.
High costs	Many costs to submit the file and no guarantee to succeed
Difficult collaboration with entrepreneurs, designers	More responsibility from the designers, performers We had numerous problems because of the designers

Regarding the category of projects accessed after 2007, all were funded by the European Agricultural Rural Development Fund.

Among the 9 companies in the agriculture sector, 5 accessed European funds also under SAPARD programme.

It is worth mentioning that all companies that have accessed European funds are operating in the agriculture sector.

The researches undertaken reveals that there is a need of the rural population for sustainable financial services and products, completed by information services, vocational training and counselling, taking into account that the poor population has the capacity to develop dynamic economic activities, but the lack of funds is a barrier difficult to overcome for the achievement of their project, their technical and financial knowledge is insufficient financial, the banks and other institutions are often far from the rural population both geographically and technically, they do not have the culture and interest in working with the poor rural population.

Table 6.Projects developed by the private companies

No. crt.	Project title	Applicant	Programme	Measure	**Value (Euro)**
1	Modernization of farm **Investments in farms**	SA CORNATEL Mânăstirea	EARDF **SAPARD**	1.2.1 3.1.	700,000
2	Services providing	SA MOSTIȘTEA Mânăstirea	EARDF	3.1.2	258,000
3	Irrirgations	SA VITISEM Coconi	E EARDF	1.2.3	994,000
4	Modernization of farm **Investments in farms**	SC BIOTERA SRL	EARDF **SAPARD**	1.2.1 3.1.	1,200,000
5	Modernization of farm **Investments in farms**	SC STEFAN&CO PROD COM SRL Bucharest	EARDF **SAPARD**	1.2.1 3.1.	1,150,000
6	Modernization of animals farm (pigs)	SC NUTRICOM SA Oltenita	EARDF	1.2.1	950,000
7	Construction of bread factory	SC VLAD PROMTEH SRL Bucharest	EARDF	3.1.2	1,200,000
8	Construction of bread factory	SC Agroluc Mânăstirea	EARDF	3.1.2	870,000
9	Services i	SC DAMIRIN SRL Mânăstirea	EARDF	3.1.2.	300,000
10	Modernization of farm **Investments in farms**	SC SAMA SRL Mânăstirea	EARDF **SAPARD**	1.2.1 3.1.	768,000
11	Modernization of farm **Investments in farms**	SC MARIA TRADING SRL	EARDF **SAPARD**	1.2.1 3.1.	1,150,000
12	Modernization of farm	SC AGRO LUK IMPEX SRL Mânăstirea	NRDP	1.2.1	897,000
13	Modernization of farm	II VELICU IONUT DAN	NRDP	1.2.1	120,000
14	Modernization of farm	PF VELICU CORNEL	NRDP	1.2.1	200,000
15	Modernization of farm	PFA NICOLAE MARIN	NRDP	1.2.1	200 000
16	Modernization of farm	PFA CAPRARU NICULAE	NRDP	1.2.1	200 000
17	Services providing	IF PASTAERU PETRE	NRDP	3.1.2	189,000
18	Modernization of farm	II ZLATE IONUT SORIN	NRDP	1.2.1	200,000

CONCLUSIONS

In terms of accessing funds with European funding, following the survey applied, it appears a image of a commune with a low degree of accessing European funds, with poor communication of the companies with the specialists in accessing these funds, but with hopes for development given by the organization managers' wish to attend training courses for acquiring skills in the European projects sector and the desire to access in the future also other European projects.

"List of wishes" given by the companies following which the commune development might achieve leads, to the mental level, to the image of a locality, where the improvement of the basic infrastructure (roads, water supply sewerage, gas, etc.) would lead to an increase in the number of jobs, would decrease the rate of migration of young people, in a word, it would provide the chances of an increase in the quality of life for its inhabitants.

The local authorities should be involved in the modernization of the agriculture, the establishment of consultancy office at the commune level because it is an activity prevailing in the area that can help people to increase their incomes and thus to decrease the number of unemployed and people without a job.

The presence of the agricultural consultancy office in the commune would help small producers to edit some projects for funding, would provide solutions to the problems they face and would be at their disposal with suggestions in situations of uncertainty.

The local authorities consider that the agriculture development depends on the private sector and existing legislation.

The researches made have allowed the detachment of some trends and some conclusions in order to access and efficiently use the European funds for the rural development and for the successful development of other types of interventions in the rural area: credits, organizing some training courses for the farmers, internships and experience exchanges etc.

Given the complexity for obtaining the European funds on the one hand and the situation of the Romanian rural area (poor economic and social infrastructure; fragmented property; the predominance of semi-subsistence households; the structural fragility of crops; poor quality of entrepreneurship and lack of investment sources; poor quality of services and low level of education and training of the labor force; resistance to change) it results that the role of ,,engine"' in the rural development and the use of the opportunities offered by the European context must belong to the local and regional decision makers. (Crețu D.**,** Iova A.R., 2013) [2].

It is recommended to achieve some campaigns to popularize the successful investments, by the fact that 39.0% of the respondents said that the project they made constituted a benchmark for other grant applicants in the locality or in the neighboring localities.

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IDENTIFICATION OF POTATO PURCHASING BEHAVIORS AND PREFERENCES OF CONSUMERS BY MEANS OF ROBUST FACTOR ANALYSIS

Koksal KARADAS, Ahmet Metin KUMLAY, Ecevit EYDURAN, Ayse KARADAG GURSOY

Igdir University, Agricultural Faculty, Department of Agricultural Economics, Department of Field Crops, Department of Animal Science, Biometry Genetics Unit, Igdir, Turkey, Email: kkaradas2002@gmail.com

***Corresponding author*:** kkaradas2002@gmail.com

Abstract

The present questionnaire study was conducted to establish potato purchasing preferences of 385 consumers selected randomly from Igdir, Turkey. All the items ranging from 1 to 11 on the basis of an ordinal 11 point scale data on fresh potato and its products were collected from the consumers. Robust Unweighted Least Squares (RULS) extraction method was used based on promin rotation method for obtaining better solutions in the ordinal data set. Polychoric correlation matrix was used instead of Pearson correlation matrix in the violation of the basic assumption on normal distribution of the ordinal items due to the fact that it is evidence that null hypothesis of multivariate asymmetric kurtosis was rejected (P=0.000). Four new factors were extracted from all the items on both fresh potato and its products through `Factor` software program, which gives more comprehensive and understandable outputs. The rotated factor loadings for potato products were clustered into four factors: content (Factor 1), value of nutrient and calorie (Factor 2), additives and price (Factor 3) and situation of package and health (Factor 4), respectively. The rotated factor loadings for fresh potato preferences of the consumers were also assigned to four factors: source (Factor 1), price and color (Factor 2), tubers structure (Factor 3) and tubers properties (Factor 4), respectively. The current results revealed that an application of EFA factor analysis on the basis of ULS extraction method, promin rotation method and polychoric correlations as a dispersion matrix was more effective when compared with the traditional EFA applications for the ordinal data. Besides, potato producers, sellers and entrepreneurs who desire to develop new marketing strategies might be recommended to take into account four factors that can affect purchasing preferences of the consumers on fresh potato and its products

***Key words*:** *Unweighted Least Squares, Ordinal data, EFA, Bootstrapping, purchasing preferences*

INTRODUCTION

Potato is one of the most important crops human nourishment in the world and rich in carbohydrates and its protein quality is quite high with a biological value of 90-100. It contains more lysine, methionine and cysteine amino acids in comparison with cereal proteins and phenolic compounds neutralizing free radicals due to their antioxidant activities (Donnelly and Kubow, 2011) [2].

However, there are some factors (economical, demographic, cultural, political etc.) influencing consumer purchasing preference on potatoes (Srivastava and Tiwari, 2014) [9]. Before a potato variety produces in an agricultural area, an examination of consumer preferences and attitudes toward the variety is recommendable. Hedonic variables such as color, texture, flavor etc. are important for identifying consumer potato preference in fresh market. This information might help breeders and marketers to make a precision decision on selection of accurate potato varieties (Leksrisompong et al., 2012) [5]. Smith and Peavay (2000) [8]investigated factors affecting potato purchasing preferences of consumers and consumer preferences for three types of potatoes, the russet, round white and red-skinned. Kezis et al. (1988) [4] examined the effect of potato variety on consumer preferences in home use and attitude toward Marine round white potatoes. Srivastava and Tiwari (2014) [9] evaluated the consumer preference on Lay`s potato chips and factors affecting brand preference of the consumers. Ribeiro et al. (2016) [7] made an assessment on factors

(shape, skin colour and texture and seal of quality etc.) affecting consumer preferences the French potato cultivars. Teweldemedhin and Mulonda (2016) [10] have tried to determine significant factors on consumer preference on sweat potato in Namibia. There are many reports on identifying consumer preferences on potato and its products at different regions of the world, but there is lack of the related studies in Turkey. The aim of this survey was therefore to determine potato purchasing preferences of 385 consumers who were selected randomly from Igdir province, located in the Eastern Anatolia Region of Turkey through Robust Unweighted Least Squares (RULS) extraction method, which provides more advantages in comparison with a routine factor analysis application with principle component extraction method (Baglin, 2014) [1].

MATERIALS AND METHODS

The questionnaire study was conducted to determine potato purchasing preferences of 385 consumers chosen randomly from Igdir, Turkey.

Formula of simple random probability sampling used in the determination of the required sample size can be written as follows as defined by Erturk et al. (2014) [3].

$$n\frac{z^2}{e^2}p.q = n\frac{1,96^2}{0,05^2}0,05.0,05=385$$

n= sample size

z= Standard table value for 95%.

p= proportion of those who prefer potato (0.5)

q=proportion of those who don't prefer potato (q=1-p)

e= proportion of error accepted in sampling method (5%)

All the items ranging from 1 to 11 on the basis of an ordinal 11 point scale data regarding fresh potato (12 items) and its products (16 items) were gathered from the consumers.

Robust Unweighted Least Squares (RULS) extraction method was specified based on Promin rotation method for gaining better solutions in the ordinal data set. Polychoric correlation matrix was used instead of Pearson correlation matrix in the violation of the basic assumption on normal distribution of the ordinal items since null hypothesis of multivariate asymmetric kurtosis was rejected (P=0.000). Four new factors were extracted from all the items on both fresh potato and its products through `Factor` software program, which gives more comprehensive and understandable outputs (Lorenzo-Seva and Ferrando, 2006; Baglin, 2014) [1, 6]. Suitability of explanatory factor analysis with the RULS extraction method to the studied data sets was tested with Kelley`s criterion, giving the expected value for Root of Mean Square of Residuals (RMSR). Determinant, Kaiser-Meyer-Olkin (KMO) and Bartlett test values of the polychoric correlation matrix were estimated. Also, Bias-corrected bootstrap 5% confidence interval for the KMO test was found.

RESULTS AND DISCUSSIONS

A limited use of robust factor analysis methods is currently available in literature. In the violation of the assumptions on normal distribution of ordinal items, the routine use of explanatory factor analysis may cause biased estimates. With the intention of this problem, a new free software `FACTOR` was developed by Lorenzo-Seva and Ferrando (2006) [6]. Very high reliabilities of four rotated factors were determined. Table 1 presents results of Robust Unweighted Least Squares Method for potato products. The rotated factor loadings for potato products grouped into four factors: content (Factor 1), value of nutrient and calorie (Factor 2), additives and price (Factor 3) and situation of package and health (Factor 4), respectively. Determinant (0.004), Kaiser-Meyer-Olkin (KMO=0.871) and Bartlett test values (2090, P=0.00001) of the polychoric correlation matrix were calculated for potato products. Bias-corrected bootstrap 5% confidence interval estimated for the KMO test was found between 0.867 and 0.882. Root Mean Square of Residuals (RMSR=0.0265) was found lower than an expected mean of RMSR estimated for Kelley`s criterion (0.0510), implying that the explanatory factor analysis exposed to 16 items regarding potato products

in the present study gave reliable outcomes. Table 2 illustrates results of Robust Unweighted Least Squares Method for fresh potato comsumption. The rotated factor loadings for fresh potato preferences of the consumers were also assigned to four factors: source (Factor 1), price and color (Factor 2), tubers structure (Factor 3) and tubers properties (Factor 4), respectively. Ribeiro et al. (2016) [7] reported that potato shape, skin color and texture etc. were significant variables in purchasing preference of consumers, which was in agreement with the results obtained here. In line with our study, Smith and Peavey (1990) [8] highlighted that potato type and color had a significant effect on consumer potato preference, depending upon cultural factors. To improve promising potato types and marketing tactics, consumer preferences should be taken into consideration (Smith and Peavey, 1990) [8].

To the best of our knowledge, there was lack of information about structures and characteristics of tubers in fresh potato in literature but this information was available in the present study.

Determinant (0.087), Kaiser-Meyer-Olkin (KMO=0.653) and Bartlett test values (924, P=0.00001) of the polychoric correlation matrix were estimated. Bias-corrected bootstrap 95% confidence interval for the KMO test was determined between 0.621 and 0.718. Root found slightly lower than an expected mean of Mean Square of Residuals (RMSR=0.0277) was RMSR found for Kelley`s criterion (0.0510), inferring that the explanatory factor analysis exposed to 12 items on consumer preferences of fresh potato in the present study gave reliable outcomes. In general, cultural, economic, cultural, political and technological factors affecting consumer preferences are present together with personal characteristics (Srivastava and Tiwari, 2014) [9].

When previous studies were examined, our study showed the value of potato nutrient and calorie was a significant factor in the scope of consumers` potato purchasing preferences

Table 1. Results of Robust Unweighted Least Squares Method for potato products

Factor Names	Items	F1	F2	F3	F4
F1 (Content)	Fat content control	**0.37**			
	Salt content	**0.63**			
	Cholesterol level	**0.66**			
	Vitamin content	**0.67**			
	Sugar content	**0.70**			
	Fibre content	**0.68**			
	Odor	**0.47**			
F2 (Value of nutrient and calorie)	Nutritional value		**0.85**		
	Calorie value		**0.74**		
F3 (Additives and price)	Additives and preservatives			**0.71**	
	Price			**0.44**	
F4 (Situation of package and health)	Expiry date				**0.34**
	Unhealthy- healthy food				**0.58**
	Packaged-unpackaged				**0.64**
	Manufactured from hazardous material				**0.44**
	Taste				**0.34**

Table 2. Results of Robust Unweighted Least Squares Method for fresh potato

Factor names	Items	F1	F2	F3	F4
F1 (Source)	Place of production	**0,66**			
	Odor	**0,58**			
	Species	**0,65**			
F2 (Price and color)	Price		**0,48**		
	Color		**0,55**		
F3 (Tubers structure)	Fresh-Early riser-stored			**0,49**	
	stiffness			**0,83**	
	Size of tubers			**0,30**	
F4 (Tubers properties)	Bruises				**0,24**
	Multistemmed or not				**0,74**
	Stem depth				**0,74**
	Cleanness				**0,19**

CONCLUSIONS

The current results revealed that an application of EFA factor analysis on the basis of ULS extraction method, promin rotation method and polychoric correlations as a dispersion matrix was more effective compared with the traditional EFA applications for the ordinal data.

Also, potato producers, sellers and entrepreneurs who desire to develop new marketing strategies might be advised to consider four factors influencing purchasing preferences of the consumers on fresh potato and its products. Thus, potato producers gain more income and consumers provide more benefit by obtaining more qualified potatoes and potato products.

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DETERMINATION OF RED MEAT CONSUMPTION AND MEAT CONSUMPTION HABITS. THE CASE OF ISPARTA PROVINCE

Bahri KARLI, Fatma ERTATIŞ, Filiz YÜKSEL, Ayşe TEKİN, Mevlüt GÜL

Suleyman Demirel University, Faculty of Agriculture, Department of Agricultural Economics, 32260, Isparta, Turkey, Email:prof.aysetekin@gmail.com

Corresponding author: prof.aysetekin@gmail.com

Abstract

In this study, red meat consumption preferences and factors affecting consumption were investigated according to income status of families living in urban areas in Isparta province, Central district. Face - to - face interviews were conducted with 320 households living in the urban area and the data were collected by questionnaire from January to March 2013. Households were divided into 3 different income groups according to their monthly incomes (households with 0-1,600 Turkish Lira (TRL), 1,601 - 3,500 TL and over 3,501 TL). Demographic characteristics, places of purchase, frequency of consumption, and reasons for branded product preferences were explored in the study. In addition, the relationship between socio-economic and demographic characteristics of consumers and red meat consumption was analysed by chi-square test.

Key words**:** *red meat consumption, consumer preferences, Chi-Square test, Isparta*

INTRODUCTION

The livestock sector contributes directly and indirectly to many sectors, mainly wholesalers, retailers, food&beverages services and refrigerated transport, as well as feed producers, equipment manufacturers in the whole supply chain. Through domestic consumption and foreign trade, livestock sector has an important share in gross domestic product (GDP of the countries and therefore, the livestock sector is an indispensable sector for each country. Consumption of animal-derived nutrients is at most importance to human health and nutrition. It is suggested by nutritionists that about half of the daily protein that should be consumed for healthy and balanced nutrition is made up of animal-derived proteins.

Proteins are nutrients that cannot be stored in the body and must be taken from the outside. In terms of the amount of protein contained in basic food stuffs, animal foods are at the forefront. In Turkey, animal foods are a frequently consumed food source. The amount of protein in animal foods: meat 15-20%, in fish 19-24%, in egg 12%, in milk 3-4%, in cheese 15-25%. For this reason, milk, eggs, white meat and red meat should be consumed on a daily basis. Scientific researches emphasize that at least 40-50% of the per capita protein need for adequate, healthy and balanced nutrition should be provided mainly from food materials of animal origin consisting of red meat and white meat (Gökalp, 1984; Göğüş, 1986) [3,4].

Meat is generally referred as the consumption of an animals' tissues as food. Red meat falls under meat category obtained from cattle and sheep and white meat falls under the meat category obtained from animal species such as chicken and fish. Generally, meat and animal protein consumption per capita is regarded as an important criteria when the development level and living standards of the countries are determined (Yaylak et al., 2010) [16].

In developed countries, 70% of the daily protein consumption comes from animal food, whereas in Turkey, 73% of the daily protein requirement is met by herbal products (TAGEM, 2010) [13]. Furthermore daily animal meat consumption is calculated as 60 gr in developed countries, 25 gr in developing countries and 12 gr in less developed countries (Güneş, 2016) [6].

According to 2015 data in Turkey; there are 41,924,100 sheep, goats and 14,127,837 cattle in Turkey. Total red meat production in Turkey was 1,149,262 tons in 2015. The number of sheep was 75.15% (31,507,934),

the number of goats was 24.85% (10,416,166), the number of cattle was 99.05% (13,994,071) and the number of buffalo was % 0.95 (133,766). The 88.31% of total red meat comes from cattle, 8.70% from sheep, 2.95% from goat and 0.04% from buffalo meat (TUİK, 2017).

Meat is considered as an important source of animal protein and besides it is a vital source for healthy physiological growth of especially children and. Red meat is also more expensive than white meat and fish in almost every part of the world, as it is tasty and can be consumed in a wide variety of forms and the digestion rate is high. Higher prices cause people in low income group to reduce their meat consumption and even cannot meet adequate daily protein needs (Atay et al., 2004) [2].

First of all, in addition to increase meat consumption, it is also important to determine the factors that affect meat demand of consumers. In Turkey beef and veal consumption per capita is 7.85 kg, 25 kg in the US, 19 kg in Canada, 22 kg in Australia and 10.5 kg in the European Union (Güneş, 2016) [6]. Therefore, per capita meat consumption in Turkey is still considered low. In Turkey there are some factors that affect meat demand and consumption. The differences? in the number of animals in the country, price instability, production technology, product deterioration, storage conditions, health conditions, lack of food safety, increase in feed prices, cultural structure, education level, national income, income level, consumer habits and consumer preferences. There are reasons that affect supply as well. Today, main factor that affects the meat consumption is price instability. This affects producers-consumers, producers, industrialists and industrial consumers' relations (Güneş, 2016) [6].

The consumption habits of foodstuffs may vary from country to country, from region to region, or even from culture to culture. In Turkey, Many studies are made to determine the behaviours of consumers about meat consumption have been done with varying numbers of participants in different age groups, professions and income groups (For example; Mutlu, 2007 in Adana) [10].

This study was carried out to examine consumption levels and consumption patterns of red meat in urban area consumers in central district of Isparta province. Because, a healthy life can only be achieved with adequate and balanced nutrition. This research was conducted to determine consumers' consumption levels of red meat and the red meat consumption habits and patterns of consumers in Isparta. In this regard; "What are the problems that are encountered when too much red meat is consumed?", "How much red meat should be consumed"? What is the ideal amount for health living? In addition, the relationship between the consumption of red meat and the income level, education and the demographics of the consumers are also considered.

MATERIALS AND METHODS

Main findings of the study were obtained by questionnaire from the households living in central urban area of Isparta province. In addition, research results and statistical information about the subject were also utilized. In marketing research, different sample sizes are used for different main mass sizes and tolerance levels in practice (Kurtuluş, 1998) [6].

For the study, with the assumption that at least 70% of households residing in the urban area consumed meat and products, this average 70% to ± 0.05 could be wrong (ie 0.65 and 0.75) and 95%. The size of the house was taken as 321 households according to Kurtuluş (1998) [6].

The data were gathered by personal interview with the prepared questionnaire. A survey was conducted in 44 districts considering the varying socio-economic development levels in the province centre. The number of surveys conducted in each neighbourhood was proportionally distributed considering the population situation. The survey was conducted on February 2013.

The data obtained by the questionnaire were transferred to the electronic environment and the calculations were made using statistical package programs. Monthly income levels of

the households were taken into consideration while creating cross tabulations on the data. The data were assessed and interpreted taking into account the income groups and the group average. In the statistical analysis, the relationship between the income level and the red meat consumption habits, the education level and the red meat consumption habits, and the number of individuals in the family and consumption habits were examined by the χ^2 (Chi square) test. Variance analysis was performed on continuous data.

RESULTS AND DISCUSSIONS

Characteristics of interviewed individual

Demographical and economic characteristics of consumers and their respective families should be screened separately. The understanding of socio-demographic characteristics generally provides a clearer understanding of changes in preferences and behaviours of consumers (Mucuk, 2001) [9]. For this reason, the demographic and economic characteristics of households interviewed before deepening consumers' attitudes and behaviours for red meat and meat products were surveyed.

Household income groups were formed in this study because consumer behaviours may be different according to income groups. According to this situation, the ones with the income of 1,600 TL per month have low income (Group I), those with the income between 1,600-3,500 TL were the middle (Group II) and those with the income 3,500 TL or more had was grouped as the high income (Group III). The 51.2% of interviewed households were found to have middle income, 25.3% had low income and 23.5% had high income level.

The 50.67% of the interviewed individuals were female, 49.33% were male and 12.5% of the households had a baby. 68.44% of the interviewed family members were married, 25.63% were single, 3.75% lost their husbands and 2.19% were divorced. The average duration of stay in the city was about 22 years. The 50.63% of interviewed individuals reside in their own home, 34.06% live in rent. It was observed that 52.50% of the participants had cars, 83.75% had computers and 75.63% had internet connections. It was found that the household size was composed of 3.53 individuals. Household size in income groups varied between 3.40 and 3.77 persons. Generally 35.32% of the individuals were high school graduates. In the second rank, 28.45% were primary school graduates and in the third rank, 21.26% were interviewed with university graduates. The number of people working in households was 1.48. Of these, 67.30% were male employees. The working rate of women was 32.70% (Table 1).

Table 1. Some characteristics of the interviewed houses

Specification	I	II	III	Total/ Average
Educational level of interviewed individual				
Not literate (%)	1.75	0.99	0.90	1.96
Literate (%)	3.51	0.99	0.81	0.33
Primary education (%)	45.93	28.41	24.67	28.45
High school (%)	31.24	33.34	33.52	35.32
College (%)	3.03	10.00	5.09	7.87
University (%)	11.93	21.46	28.13	21.26
Graduate (%)	2.60	2.80	3.64	2.96
Doctorate (%	0.00	2.00	3.24	1.84
Interviewed Individual (Female,%)*	53.09	50.8	48.03	50.67
Household size (person) *	3.41	3.45	3.84	3.53
Number of women in households (%)	51.09	50.53	48.94	50.27
Number of men in households (%)	48.91	49.47	51.06	49.73
Number of individuals working in dynasties (person) *	1.25	1.37	2.00	1.48
Number of men working in dynasties (%) *	61.39	71.11	65.54	67.30
Number of women working in dynasties (%) *	38.61	28.89	34.46	32.70
Marital status				
The married (%)	64.2	67.88	74.33	68.44
Single (%)	24.69	26.67	24.32	25.62
Divorced (%)	4.94	1.21	1.35	2.19
Widow (%)	6.17	4.24	0.00	3.75
Age group of the household (year)				
00-06 (%)	6.52	3.16	5.99	4.69
07-14 (%)	9.78	9.12	7.04	8.76
15-17 (%)	6.52	8.60	5.63	7.35
18-22 (%)	11.23	10.70	11.97	11.15
23-29 (%)	18.48	17.37	16.90	17.52
30-39 (%)	14.13	14.39	17.96	15.22
40-49 (%)	18.48	21.23	14.79	18.94
50-59 (%)	11.96	12.63	13.03	12.57
60-69 (%)	2.54	2.28	6.34	3.36
70 and more(%)	0.36	0.53	0.35	0.44
Number of infertile infants (0-3 old)(%)	20.99	6.67	16.22	12.50
Life in the city (year)	24.77	20.45	21.68	21.83
Owners of cars (%)	35.8	47.27	82.43	52.5
Host				
Property (%)	37.04	46.06	75.68	50.63
Rent (%)	48.15	35.76	14.86	34.06
Other (%)	14.81	18.18	9.46	15.31
Internet connection (%)	44.44	81.82	95.95	75.63
Computer owner (:%)	64.2	86.06	100.00	83.75

The distribution of monthly total food expenditures according to income levels of interviewed households was examined. The

low income group's food expenditure was found to be at most TRL 100-199, the middle income group at TRL 500-599, and the high income group at TRL 800-899 (Table 2).

Table 2. Monthly total food expenditure of the households

Food expenditure (TRL)	I	II	II	Total
99 TRL and less	11.11	0	0	2.81
100-199 TRL	28.4	1.82	0	8.13
200-299 TRL	25.93	18.79	0	16.25
300-399 TRL	14.81	13.94	4.05	11.88
400-499 TRL	8.64	10.3	5.41	8.75
500-599 TRL	7.41	20	12.16	15.00
600 TRL and more	3.70	35.15	78.38	37.20

Table 3. Monthly total meat and meat products expenditure of the households

Total meat and meat products expenditure (TRL)	I	II	III	Total
Less than 50 TRL	22.22	1.82	-	6.56
50-99 TRL	49.38	30.91	14.86	31.88
100-199 TRL	28.40	54.55	52.70	47.50
200-399 TRL	-	11.52	16.22	9.69
400-599 TRL	-	0.61	5.41	1.56
600 TRL and more	-	0.61	10.81	2.81

It was found that the expenditure of monthly meat and meat products in the income group was concentrated under 199 TRL.

The monthly income of meat and products in the low income group is 99 TRL and below. In the middle and high income groups, it was found that the households spent more than 100-199 TRL on meat and products (Table 3).

Consumption of red meat and meat products and factors affecting the consumption

The types of meat consumed primarily by the families surveyed, the reasons for not consuming red meat, and the proportional distribution of reasons for consuming red meat were examined. In all consumption frequency groups, it was stated that chicken was the first, fish was the second, beef was the third, and sheep-goat was the fourth. On average, chicken was 99.38%, fish was 94.69%, beef was 82.20% and sheep meat was 57.82% (Table 4).

Table 4. Average consumption frequency of meat and meat product

	Every day	**2-3 times a week**	**A week**	**Every 15 days**	**Once a month**	**Every 2-3 months**	**I do not consume**	**I am not buying**
Beef	0.63	5.31	15.94	20.94	30.63	8.75	11.25	6.88
Sheep and goat meat	0.31	1.25	3.44	15.31	25.63	11.88	23.13	18.13
Chicken meat	1.25	22.81	34.06	28.44	12.19	0.63	0.63	0
Fish meat	0.31	5.94	25	31.56	23.75	8.13	2.5	2.81
Sausage	5	12.19	9.06	26.56	18.44	7.5	10.31	10.94
Bacon	0.94	0	0.63	1.56	7.19	6.56	46.25	35.63
Salami	1.88	5.94	4.38	12.81	10.94	4.38	32.81	26.56
Sausage	1.88	6.56	4.38	14.69	10.63	4.69	31.25	25.63
Offal	0	0.94	2.81	13.44	11.25	10.31	35	25

As the reason for not consuming red meat; households have health concerns considered as, mainly related to animal diseases, high fat ratio, high cholesterol, hormone usage in animals and antibiotic usage. Such factors are important in the consumption of red meat and meat products. As a result, it was seen that the purchase and consumption of ready-made food decreased.

News related to health effects of red meat and meat products consumption in the media reduced consumption by 45.75% and changed consumers' preferences. About the reliability (health) of meat products, 66.56% of the households were informed from TV, 58.70% from newspapers and magazines, 38.75% butcher, 38.75% environment, 31.25% product labels, 28.75% internet and 12.81% use resources such as doctors and specialists. Information obtained from these sources significantly affect and change red meat consumption. As a result, the demand for other types of meat was reached as a result of increased demand. It has been found that consumers consider certain criteria when buying red meat. It was determined that 56.25% of the consumers consumed red meat, 36.56% considered quality and price as an important factor and 7.18% considered only price.

Factors that effects the decision of consumers to buy meat products are given in Table 5.

According to this, it was determined that the primary factor in purchasing decision was to be health benefits, freshness of the product, place of purchase, colour and packaging of the product.

Table 5. Factors influencing the decision to buy red meat and meat products (average)

Factors	I	II	III	Total
Useful for Health	4.07	4.52	4.35	4.37
Fidelity	4.04	4.41	4.54	4.34
Purchase Place	3.83	4.38	4.32	4.23
Guaranteed meat is healthy	4.01	4.17	4.32	4.17
Labelled	3.77	4.18	4.15	4.07
Etin Rich	3.65	4.2	4.08	4.03
Packaged	3.68	4.16	3.88	3.98
Ecological / Organic	3.8	4.07	3.89	3.96
Recommended by experts	3.72	4.1	3.68	3.9
Ethine protein additive	3.37	4.1	4.00	3.89
Whether or not it is oily	3.27	3.85	3.65	3.66
Price	3.54	3.78	3.35	3.62
Brand	2.86	3.5	3.74	3.39
Advertisement / Promotion	3.01	3.35	3.35	3.27
Nutrition type	2.99	3.1	3.41	3.14
Animal age	2.95	3.11	3.23	3.1
Orijin	2.77	3.1	3.32	3.07
Race	2.48	2.88	3.15	2.84

Scale: *1. Not important 2. Somewhat important 3.Important 4.Quite important 5. Very important

Consumer habits should also be focused on, for the choice of buying place. It has been stated that consumers are directed from traditional places such as butchers, to supermarkets and hypermarkets to buy food products (Gracia, 2005) [5].

In this study, it was also found that consumers prefer traditional places of fresh meat such as butchers. Purchasing channels used by interviewed individuals; 48.13% were from butchers for beef, 34.69% were from the discount-market and 42.19% from supermarkets. It was found that consumers bought the sheep and goat meat mostly from supermarkets and bought white meat from the supermarkets with 89.06%. Consumers bought fish from supermarket with 45.63% from the fishermen with 44.06% and from the district market with 37.19%. Other meat products were mostly purchased from supermarkets (Table 6).

Consumers generally assess product quality according to physical characteristics, brand image, price, packaging, advertising, retailer image, manufacturer image, and product origin (Schiffman and Kanuk, 2004) [11].

When the brand loyalty levels of consumers were evaluated; it can be said that brand loyalty of meat and meat products is high. The share of brands with high brand-loyalty (2 and 3 brands) was 31.88%.

Table 6. Meat and meat products purchase channels

	Butcher	Discount-market	Supermarket	District market	Fishery
Beef	48.13	34.69	42.19	-	--
Sheep and goat meat	31.56	27.50	55.00	-	-
Chicken meat	38.44	25.00	89.06	-	-
Fish meat	2.19	5.94	45.63	37.19	44.06
Sausage	18.44	20.94	75.34	-	-
Bacon	13.03	27.55	59.42	-	-
Salami	8.96	16.41	74.63	-	-
Sausage	8.66	18.27	73.07	-	-
Offal	25.51	7.66	66.83	-	-

The rate of those who always buy the same (one) brand is 4.69%. However, 5.00% of the consumers were moderate brand loyalty and 1.25% of the independent consumers who did not prefer a certain brand.

In the case of consumers using branded products; the fact that branded products do not contain hormones, geographically the location of the flesh is obvious, the taste is better, the fat is lower, the risk for human health is low, the animals are fed under control, And the fact that using branded products is a popular and prestige icon is important for consumers. Consumers who do not use branded red meat products said that the reasons about this preference were high prices of branded products, the same quality of branded and unbranded products, difficulty in finding branded products and suggesting that experienced people should use unbranded products.

Red meat and meat products consumption

The 47.81% of the consumers in the study emphasized that consumption of red meat was consumed because of habits. About 52.19% of the interviewed eat red meat to be cheap, to have high nutritional value, to be easily accessible, for health and protein, and for quality. The interviewers prefer red meat preferences and red meat consumption patterns, sausage made from red meat, salami, sausage, and so on. The 74.69% of consumers said they bought and consumed red meat in pieces, 75.75% of them in minced meat, 43.75% in sausage, salami, sausage and 34.06% in offal. The 7.49% of consumers consumed meat with vegetables food, 11.88% of them in plain foods and 80.63% of them in both types of foods.

If you look at the monthly meat consumption in the dynasties, it is seen that the

consumption of meat is higher in the high income households. The monthly average consumption of meat products was 3.16 kg and was determined as chicken meat. Secondly, the consumption of fish was determined with an average of 1.77kg per month. The average monthly consumption of red meat in the densities was found to be third at 1.45 kg in beef meat and 0.71 kg in sheep-goat meat. In all income groups, the average monthly consumption was the lowest meat product and the bacon meat product was 0.11 kg (Table 7).

Table 7. Household consumption of meat and meat products per month (kg)

	I	II	III	Total
Beef	1.05	1.48	1.83	1.45
Sheep and goat meat	0.41	0.67	1.11	0.71
Chicken meat	3.09	3.15	3.26	3.16
Fish meat	1.59	1.72	2.06	1.77
Sausage	0.50	0.83	1.03	0.79
Bacon	0.05	0.13	0.16	0.11
Salami	0.15	0.32	0.46	0.31
Sausage	0.25	0.28	0.49	0.32
Offal	0.20	0.35	0.43	0.33

The relation between the education levels of the consumers, the income levels and the characteristics such as individual groups and per capita consumption of meat were examined and hypotheses were established. The determinations obtained in the latter were as follows.

The relationship between per capita consumption of meat and educational levels was explored:

H_0: There is no relation between the amount of red meat consumed per capita and the education levels of consumers.

H_1: The relationship between the amount of red meat consumed per capita and the educational level of consumers is not a coincidence. It is important as a statistic.

According to the findings , it was determined that the consumption of red meat consumed per capita per capita in the households in the city centre is related to the education levels ($p < 0.00$, χ_h^2 15.073> χ_c^2 9.5).

Consumption of per capita consumption of meat was examined in relation to income groups.

H_0: There is no relationship between the amount of red meat consumed per person and the income groups of consumers.

H_1: There is no relation between the amount of red meat consumed per capita and the income groups of consumers.

According to the findings, it was determined that there is a relationship between monthly consumption of red meat consumed per capita and income groups in households interviewed in the city centre ($p < 0.00$, χ_h^2 18.767> χ_c^2 9.5).

The relationship between per capita meat consumption and household size groups was examined.

H_0: There is no relation between the amount of red meat consumed per person and individuals groups among the 320 households interviewed.

H_1: The relationship between the amount of red meat consumed in 320 households and individual groups is not a coincidence. It is important as a statistic.

According to the findings obtained, it was shown that there is a connection between the consumption of red meat consumed per capita and the individual groups in the households interviewed in the city centre ($p < 0.00$, χ_h^2 46.535> χ_c^2 9.5).

Judgments on the reliability of red meat and meat products

With increase in population and the demand for healthy, reliable and affordable meat and meat products is also increasing, steadily. In Turkey, with the increasing population, red meat and meat products food safety must be provided in order to provide healthy and balanced nutrition (Tosun et al., 2012) [14].

Food safety can be defined as the whole of the measures taken to prevent physical, chemical, biological and all kinds of harm that may occur in food (Mucuk, 2001) [9]. In this study, it was determined that about 54.68% of the consumers think that the fruits are less reliable in terms of health compared to the fruit products of previous years. However, 27.18% said that the reliability of food items is increased in recent years. Only about 18.14% said they did not see any change in terms of food safety in recent years. Again, the opinions about the reliability of meat and meat were also asked; 43.75% of consumers found that beef was moderately reliable for

safety, sheep meat was moderately reliable, chicken meat was less reliable and fish was found to be very reliable.

When the consumers were asked about the reliability of food in terms of health, 62.19% was medium reliable, 24.06% was less reliable, 10.00% was very reliable and 0.31% was very reliable, While 3.44% said they did not find food products as reliable in general.

Consumers' attention to meat and meat products at the top of the list is that the price is right, meat colour is good in the second, fat is low in order not to raise cholesterol in the third place, and the meat brand name in the fourth place (Table 8) .

Table 8. Ranking of items to be taken into consideration for red meat and meat products (%)

	I	II	III	Total
Brand name	17.28	48.48	59.46	43.13
Fat rate	45.68	76.36	68.92	66.88
Price	80.25	87.27	70.27	81.56
Meat colour	64.2	83.64	89.19	80

The food reliability values that consumers perceive for some special processed food items are shown in Table 9. Generally, it was found that the worries about the reliability of these products increased as the income groups went from the low income group to the high income group. The most uncomfortable of the consumers was stated that the meat was mixed with other meat and offered for sale (Table 9).

The awareness of the certificates (TSE, ISO, HACCP) that help consumers to evaluate the quality of food products was identified. ISO (International Organization for Standardization) is an organization that prepares international standards in all matters other than electrical and electronic issues. The aims of the ISO are to promote standardization and related work in order to facilitate the circulation of international goods and services, to promote cooperation in scientific, technological and economic activities, and to engage in initiatives to harmonize standards and related activities worldwide.

ISO standards for food safety management system are called ISO 2200.

Table 9. Table 10. Food safety values of subjects worried about consumers of red meat consumption

Conditions	I	II	III	Total
Mixing and selling meat with other meat	4.27	4.57	4.46	4.47
Cooking of meats in places that are not hygienic enough	4.16	4.48	4.42	4.38
Use of hormone in animal production	4.1	4.34	4.24	4.26
Imported meats	4.09	4.35	4.16	4.24
Conservation and evaluation of meat sales locations	3.96	4.3	4.16	4.18
Inadequacy of veterinary control in captives	3.95	4.26	4.22	4.17
Feeding of animals with artificial feeds	3.95	4.27	4.15	4.16
Antibiotic use in the treatment of animals	3.96	4.26	4.12	4.15
Stables are not healthy and clean	3.84	4.23	4.03	4.08
Other diseases	3.91	4.15	3.97	4.05
News about meat is not trusted in the media	3.9	4.09	3.99	4.02
Bad conditions in the transport of animals	3.74	4.16	3.99	4.01
Beef disease risk	3.83	4	3.76	3.9

Scale : *1. Not exactly…… 2. Rarely ……3.Moderate ……4.Quite …5. Too much

Consumers interviewed within the scope of the research; 92.19% were TSE (Turkish Standards Compliance Certificate), 74.06% were ISO, 31.88% were EUROGAP (European Good Agricultural Practice Certificate), 30.31% were Hazard Analysis and Critical Control Points-Hazard Analysis and Critical Control Points) and 36.56% had knowledge about organic and ecological product certifications (Table 10).

Table 10. Consumers' knowledge of some standards (%)

Standards	I	II	III	Total
TSE	92.59	90.91	94.59	92.19
ISO	69.14	72.12	83.78	74.06
HACCP	16.05	30.91	44.59	30.31
GAP	23.46	26.06	54.05	31.88
Organic-ecological	37.04	29.70	51.35	36.56

The 46.88% of consumers were informed about which organization controls the harmful effects of red meat and meat products sold on the market. About 53.12% of interviewed individuals were found not to have information.

Findings obtained in other researches related to red meat can be expressed as follows. Yıldırım et al. (1998) [17] found that 49.1% of 120 households preferred sheep meat and 34.22% preferred beef meat at different income levels in Van province. The authors found that 16.7% of their families did not prefer red meat. The authors also calculated the proportional distribution of meat

purchasing places. The authors found that 82.52% of the interviewed consumers found that they were bought meat and meat products from butcher, 12.5% of them from supermarkets and 5% of them purchased meat and meat products from the Meat Fish Institution.

Atay et al. (2004) [2] studied red meat consumption habits in the urban area of Çine district of Aydın province. The authors determined that 33.1% of the respondents prefer red meat preferentially.

Karakuş et al. (2006) [7] revealed the consumption habits of red meat in the district of Gaziantep. In 2006, the author surveyed 516 samples. The author calculated that 50.6% of the respondents preferred red meat and 1.7% did not consume red meat. The most preferred red meat species were sheep (77.9%), cattle (6.2%) and goat (2.3%), respectively.

Şeker et al. (2010) [12] determined the red meat consumption habit of Elazığ province centre and the opinions of consumers about animal welfare. In 2010, 463 people surveyed. The authors found that 58.4% of participants preferred red meat preferentially, and the most preferred red meat was "cattle" (55.3%), "sheep" (15.3%) and "goat" (11.7%).

Akçay et al. (2010) [1] examined consumers' preferences for red meat consumption and effective factors in consumption by using the data obtained from the questionnaires made in 2010 from 384 households living in Kocaeli. They found that there was a statistically significant relationship between red meat consumption and consumers' gender, income level, total expenditure, and food expenditure.

Yalçınkaya (1999) [15] conducted a study with 140 families in the province of Van province Ercis, and found that 50.87% of the animal food consumption was red meat consumption.

Şengül (2002) examined the food demands of the households according to the income groups in urban and rural areas in Turkey. The author found that the food demand parameters of the middle, high, and high income groups were sensitive to prices, to income and to socio-demographic variables. The food parameters of the lowest and low income groups were only susceptible to price and to income.

CONCLUSIONS

This study was conducted to analyse the factors affecting red meat consumption habits and red meat consumption preferences of consumers in the urban area of Isparta. The data were obtained via face-to-face interview.

Red meat consumption was analysed on the basis of gender, income, total expenditure, and food expenditure as factors influencing consumer consumption. The 50.65% female, 49.35% male interviewed had different education levels and different incomes. In Isparta province, 36.64% of the consumption of meat and meat products was identified as chicken, 18.85% as cattle and 20.49% as fish meat. It was found that consumers strongly consider meat price, colouring, fat ratio and brand when purchasing these products. Individuals interviewed have learned about sources of red meat mainly from the media channels such as TV, magazines, newspapers. Consumers with a high education level and high income level were found to consider quality, brand and reliability of the red meat products during the purchasing and consumption.

In Turkey, increase in red meat prices in recent years had a negative impact on consumption. There are many reasons for this price increase. First of all, feed costs are high. Due to the meadows and the pasture, which are not suitable for adequate and regular grazing, the producers have had to turn to the feeds. For this reason, it is necessary to solve meats problem by improving meadow and pasture. Another reason for the increase in red meat prices is the excessive number of intermediaries in marketing and supply channels. To decrease the number of intermediaries and associated costs related to this, producers need to form a cluster and market their products directly to the end consumers. In this way, producers will be able to sell their products with a sustainable price and value and the consumers will be able to purchase more affordable red meat.

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COST AND PROFIT ANALYSIS IN COTTON PRODUCTION IN ŞANLIURFA PROVINCE, TURKEY

Bahri KARLI[1], Fidan Merve KART[1], Mevlut GUL[1], Metin Göksel AKPINAR[2]

[1]Suleyman Demirel University, Engineering Faculty, Food Engineering Department, Faculty of Agriculture, Department of Agricultural Economics, 32260 Isparta, Turkey
[2]Akdeniz University, Faculty of Agriculture, Department of Agricultural Economics, 07070 Antalya, Turkey

Corresponding author: fmervekart@gmail.com

Abstract

Cotton is a strategically important plant, widely grown in 53 countries in the world with a wide area of uses. It is an industrial plant of high economic value with a lot of direct and indirect use in different sectors. Therefore, it provides important contributions to the development of a region or the country in terms of both employment and added value to overall economy. According to the International Cotton Advisory Committee's report on 2015/2016, Turkey ranks ninth in the cotton plantation area, eighth in cotton production, second in cotton yield, fourth in cotton import and fourth in cotton consumption in the world. Cotton is mainly grown in South-eastern Anatolia, Çukurova, Antalya and Aegean regions. In recent years, although the planting area has diminished, production has increased with yield. As Turkish textile industry grew after 1980s, the need for cotton in the textile production has expanded. This lead to decrease in cotton exports and increase in cotton imports. As a matter of fact, Turkey, which is a net cotton exporter until 1991, has become a net importer since 1992. About 48 thousand tons of fiber cotton was exported worth 76 million dollars in 2015, while 803 thousand tons of fiber cotton was imported with 1.24 billion worth. About 2.16 million tonnes of cotton were produced on 416 thousand hectares of land in 2016. When looked at the different regions, it can easily be seen that Şanlıurfa province has an important potential in cotton production. Şanlıurfa province accounted for 43.3% of Turkey's cotton plantations and 40.5% of its production in 2016. In this study, the development of cotton production cost and profitability in the case of Şanlıurfa province where significant cotton production was realized in Turkey was analysed. The data was obtained from the Şanlıurfa Provincial Directorate of Food, Agriculture and Livestock. The dataset covers the period 1996-2016.The cost of cotton production per hectare was calculated as 6,447 TL in 1996 and 6,289 TL in 2016 in real prices. There was a decrease in the cotton production cost. The most important cost elements were land rent and harvest-marketing. The relative profit was calculated as 1.78 for 2016. It can be concluded that it is important to ensure the sustainability of cotton production. The proper treatment of land, the appropriate seed variety, the use of adequate amounts of fertilizer, the correct application of the irrigation and the effective fighting of plant diseases are important factors for sustainability.

Key words**:** *cost, profit, Şanlıurfa, cotton, Turkey*

INTRODUCTION

According to the International Cotton Consultative Committee (ICAC) Between the 2011/12 production period and the 2015/16 season, an average of 33.4 million hectares of in land cotton production has been produced in the world, indicating a recent contraction in sowing areas. In the 2015/16 season, 37% of the 31 million hectares planted in cotton was planted in India. Cotton is considered as an important industrial plant for the economy of the country through job creation and value added, as well as significant contributions to exports. Cotton production is being made in 53 countries around the world. During the 2015/2016 production period, 30.5 million hectares of in area cotton were produced in the world. India ranks 1st in cotton production and China, the US, Pakistan and Uzbekistan comes next. Turkey is in the eighth place in production amount in the world.

In the world, about 21.8 million tons of fiber cotton is produced on an area of 30.5 million hectares. India ranks first in terms of total planting area as it is in production. Turkey ranks ninth in the world in terms of cotton cultivation area.

Textile and textile products play an important role in the Turkish economy. The

development of the textile and apparel industry and the increasing demand in parallel with this development made the cotton more important. Currently, cotton production does not meet domestic demand. As a matter of fact, in the 2015/2016 season, Turkey ranks fourth in world fiber cotton import and fiber cotton consumption [10].

Cotton is important for Turkish economy as it add value by job creation in textile and ready ware industry as well as income generation through exports.

In 2015, 738 thousand tons of fiber were produced in 434 thousand hectares. This amount could not meet the demand and in the same year so 803 thousand tons of fiber cotton was imported amounting to 1.233 billion dollars [19;7]. When textile and textile products are analysed in the world trade, in 2014 world exports in the textile sector amounted to 356 billion USD and ready-made clothing exports amounted to 473 billion USD. China takes the first place in world textile and apparel exports. Turkey, on the other hand, ranks seventh with an export value of 29.4 billion dollars [16]. In Turkey, cotton is mainly cultivated in the Aegean region, Mediterranean region (Antalya and Çukurova regions) and Southeast Anatolia region. Within the context of the South-eastern Anatolia Project (GAP), the South-eastern Anatolian region has taken its first place in cotton production with the opening of dry farming areas to irrigation gradually since 1995. In this region, Şanlıurfa province is the largest producer of cotton. According to TurkStat data, in 2016, 43.3% of the cotton cultivation areas in Turkey are located in Şanlıurfa province. The 40.5% of the total cotton production was carried out by Şanlıurfa province. Therefore, Şanlıurfa province has an important place both in cotton cultivation areas and in cotton production.

As in all economic sectors, cost is important in the agricultural sector in terms of assessing the results of business activities [9]. Different methods are used for the calculating the costs of agricultural products in Turkey. Although these methods look similar to each other, there are differences in detail. Cost calculations of agricultural products; The product variety varies depending on such factors as the cost of the calculation, the method of calculating the cost, and the purpose of the person or institution making the calculation [3] .

In this study, the change in cost and profitability of cotton production covering the period 1996-2016 in Şanlıurfa province was analysed.

MATERIALS AND METHODS

The main input for the study was the statistical records of the Şanlıurfa Provincial Directorate of the Ministry of Food, Agriculture and Livestock. The cotton product cost data set selected for the province covered the period 1996-2016. In addition, TURKSTAT data, research institute data, relevant national and international research findings were also utilized. Change in gross, absolute and relative profitability of the products are calculated. The following formulas were used for these indications. Gross profit = gross production value - changing costs, Net profit = gross production value - production costs, Relative profit = gross production value / production costs [1;12].

Different calculation methods can be used to calculate the costs according to the diversity of the products. In agricultural cost calculations, simple cost calculation method and combined cost calculation method are generally used. If a single product is obtained at the end of the production process, simple cost calculation method is used. At simple cost, the sum of the costs incurred for the activity is divided by the amount of the product obtained after the activity [12].

Unit product cost (TL / kg) = Total production costs (TL) / Production quantity (kg)

In the combined calculation method, if more than one product is obtained from a production activity, the products or products with low relative share in the total income from the products obtained from this activity are considered to be by-products. Other products or products are regarded as main,

purpose or compound product [12].

The proportional share of the cost elements in the total cost was calculated for the products considered. Thus, the weights within the total cost were determined. Moreover, the change in product production cost and profitability over the years were presented with simple index. Cost and profitability indicators were converted to real values in 2016 using the Producer Price Index (UFE, 2016 = 100) calculated by TURKSTAT. Thus, over the years, the changes in profits, costs and elements, developments were determined and the causes were tried to be revealed. In addition, the current cotton cost and revenues for international comparisons were also divided by the current US dollar value, also calculated in US dollars.

RESULTS AND DISCUSSIONS

Agricultural Structure in Şanlıurfa Province Agricultural Land Asset

The total amount of land used in agriculture in Şanlıurfa province is 11,543,201 decares according to the data of 2016. When the distributions according to usage areas of these lands were analysed, 76.70% of the total land was made of cereals and other cereals and other vegetable products, 12.88% were fruit, drink and spice plants, 14.12% fallow and 1.80% vegetable horticulture area (Table 1).

In Şanlıurfa province, the share of cereals and other herbal products in the total agricultural area has decreased in general, whereas there has been an increase in vegetables, fruits, beverages and spice.

Table 1. Agricultural land property of agricultural in Şanlıurfa

Years	Cereals and other herbal products		Fallow field		Vegetable gardens		Fruit, beverage and spice plants		Total area	
	Decare	%	Decare	%	Decare	%	Decare	%	Decare	%
1995	8,987,970	82.14	772,050	7.06	170,980	1.56	1,010,620	9.24	10,941,620	100
2000	9,802,750	89.59	871,480	7.96	201,140	1.84	969,840	8.86	11,845,210	100
2005	9,524,330	87.05	1,079,250	9.86	209,997	1.91	1,051,562	9.57	11,859,780	100
2010	9,951,744	90.95	1,423,814	13.01	178,284	1.63	1,037,615	9.48	12,591,457	100
2013	8,974,899	82.03	1,875,700	17.14	201,793	1.84	1,148,097	10.49	12,200,499	100
2014	8,837,904	80.77	1,627,989	14.88	203,148	1.86	1,146,839	10.48	11,815,900	100
2015	8,830,851	80.71	1,549,086	14.16	204,450	1.87	1,230,508	11.25	11,814,940	100
2016	8,392,152	76.70	1,544,997	14.12	196,550	1.80	1,409,477	12.88	11,543,201	100

1 decares equal 0.1 hectares
Source: TÜİK, 2017

Cotton foreign trade of Turkey

In Turkey, with the developments in the textile sector over the years' cotton demand of the sector has increased significantly and domestic production couldn't keep up with the increased the demand.

Therefore, the amount of cotton imports increased in 1992 and Turkey became one of the net importer countries. The import quantity and values between 1989-2015 of Turkey are given in Table 2.

While imports of fiber cotton in Turkey were 60 thousand tons in 1989, this increased gradually and reached 803 thousand tons in 2015. The increase in fiber cotton imports is mainly due to the increasing usage of cotton in textile and clothing industry firms and the inability of domestic cotton production to meet the demands of industrial firms. Turkey mainly imports cotton from USA, Greece, Brazil and Turkmenistan.

In Turkey in 2015, 48 thousand tons of fiber cotton exports were worth 76 million dollars. On the other hand, 803 thousand tons of cotton was imported, worth about $ 1.24 billion.

In 2015, import value decreased by 12.05% and export value decreased by 13.64% compared to the previous year. Turkey is a net cotton importer since 1992. The import coverage ratio of exports has decreased from 167% to 6%.

Costing in Agricultural Production

The agricultural is an important sector for Turkey. By 2015 the agriculture sector's share in total employment is 20.60%, its share in exports is 9.96% and its share in gross domestic product is 6.90% [19].

Table 2. Turkey fiber cotton export and import

Years	İmport quantity (tonnes)	Import Value (Million $)	Export quantity (tonnes)	Export Value (Million $)
1989	60	100	100	133
1990	76	136	95	161
1991	46	79	101	169
1992	135	174	34	45
1993	201	247	132	144
1994	147	239	27	31
1995	183	381	3	6
1996	168	300	76	124
1997	357	629	37	57
1998	380	600	45	55
1999	277	351	80	87
2000	567	676	27	36
2001	454	497	30	37
2002	540	492	33	38
2003	556	666	89	113
2004	585	836	48	77
2005	776	908	38	52
2006	754	970	62	69
2007	946	1,277	66	71
2008	613	1,000	60	111
2009	753	1,002	36	62
2010	889	1,720	29	64
2011	604	1,850	53	146
2012	614	1,274	52	106
2013	869	1,681	48	100
2014	913	1,750	46	88
2015	803	1,233	48	76

The 8% of the from total Gross domestic product is obtained from agriculture. The 23% of the active population is employed in agriculture sector. This data demonstrates the importance of agriculture for Turkey and shows that the agriculture sector can be analysed in every direction. This deliberation begins at the production stage and continues until the final consumer reaches. Because agriculture is an indispensable sector for every country. Improving the conditions of producers living in the agricultural sector and increasing the level of their prosperity has become an indispensable policy in almost all over the world. This forces governments to follow the link between agricultural prices and their costs. Agricultural policy decision makers and practitioners have to follow closely the cost studies of agricultural products [7].

In general, the concept of cost is the sum of production expenditures used in the production of a certain quantity of goods or services. The cost of agricultural production refers to the resources that must be consumed for the production of a particular product, in other words, the monetary value of goods and services. In general, the gross production value obtained during a production period is compared with the costs to try to determine the economic activity of the activity. Costs are divided into variable (variable) and fixed costs.

(i)Variable cost: Depending on the breadth of production activity used in crop production; variable costs such as increasing or decreasing seeds, fertilizers, agricultural combatants, water charges, tools and machinery fuel, repair and maintenance costs, temporary worker wages, product insurance premiums, marketing expenses and revolving fund interest.

(ii)Fixed costs: The costs incurred due to the existence of production factors, which are not dependent on production volume. For example; machinery, buildings, irrigation facilities and land are fixed costs. The interest and depreciation costs calculated for the fixed capital elements used in vegetable production are taken into consideration [12]. In order to calculate real costs in agricultural products, cost accounting is required to be implemented. Costs in agricultural enterprises vary from region to region and from operation to operation. Standard costs in agriculture are not possible. So every business has its own cost price [3]. Agricultural market conditions and price movements, as well as the changing nature of the conditions are under the influence. In order to have a successful working order in the field of agricultural activity intertwined with risks and uncertainties and to maintain this scheme and to adapt to the changing conditions, agricultural enterprises in more than one production activity have to keep accounting records. It is impossible to plan production and make decisions without accounting records [12]. In Turkey, only large size agricultural holdings hold agricultural accounts register.

Cotton

Developments in cotton harvested area and production for the Şanlıurfa province were given in Table 3. According to this, cotton planted area was 515,280 decares and 113,362 tons of cotton were produced in 1991. Cotton harvested area increased by about 3.5 times and reached 1,802,857 decares in 2016.

Şanlıurfa province constituted 43% in 2016 which constitutes 8.61% of the cotton harvested area at the beginning of the period. Improvement of irrigation facilities in GAP area was effective in this increase. The cotton production was 852,391 tons in 2016. The reason for production increase was the increase in the yield and the increase in the harvested area. Şanlıurfa accounted for 40.50% of Turkey cotton production in 2016. There was a decline in the cotton harvested area compared to the previous year in 2001, 2005, 2009, 2012, 2013, 2015 and 2016. Based on 1991, cotton production rose by 651% to 852,391 tons in 2016. The cotton yield was 473 kg in Şanlıurfa province, which was below Turkey's average yield in 2016.

Table 3. Developments in cotton harvested area and production in Şanlıurfa province

Years	Area harvested (da)	İndex (1991=100)	Share in agricultural areas of Turkey (%)	Production (ton)	İndex (1991=100)	Share in agricultural areas of Turkey (%)	Yield in Ş.Urfa (kg/da)	Yield in Turkey, kg per da
1991	515,280	100.00	8,61	113,362	100.00	7.50	220	253
1992	566,790	110.00	9.47	113,889	100.46	7.42	201	241
1993	623,750	121.05	10.42	168,299	148.46	10.78	270	275
1994	673,290	130.66	11.25	187,099	165.05	11.55	278	279
1995	919,200	178.39	15.36	277,696	244.96	12.49	302	294
1996	1,098,930	213.27	18.36	334,084	294.71	16.04	304	280
1997	1,233,930	239.47	20.61	401,603	354.27	19.08	325	292
1998	1,526,590	296.26	25.50	488,038	430.51	21.18	320	305
1999	1,749,340	339.49	29.22	462,655	408.12	22.84	264	282
2000	1,793,000	347.97	29.95	661,950	583.93	29.28	369	346
2001	1,572,000	305.08	26.26	566,775	499.97	24.04	361	344
2002	1,775,000	344.47	29.65	639,475	564.10	25.16	360	353
2003	1,686,000	327.20	28.16	649,960	573.35	27.71	386	368
2004	1,880,500	364.95	31.41	736,625	649.80	30.00	392	384
2005	1,837,500	356.60	30.70	734,532	647.95	32.79	400	410
2006	1,886,351	366.08	31.51	835,011	736.59	32.75	443	432
2007	1,896,270	368.01	31.68	821,896	725.02	36.13	433	429
2008	2,105,330	408.58	35.17	799,014	704.83	43.90	380	368
2009	1,623,592	315.09	27.12	668,951	590.10	38.78	412	411
2010	2,052,023	398.23	34.28	862,256	760.62	40.10	420	448
2011	2,096,688	406.90	35.03	970,771	856.35	37.63	463	476
2012	2,067,928	401.32	34.54	953,246	840.89	41.09	461	475
2013	2,033,195	394.58	33.96	948,464	836.67	42.15	466	499
2014	2,170,700	421.27	36.26	1,022,213	901.72	43.50	471	503
2015	2,060,353	399.85	34.42	916,298	808.29	44.70	445	472
2016	1,802,857	349.88	43.00	852,391	751.92	40.59	473	505

Source: TÜİK, 2017

The values and the changes in the cost elements of cotton production per hectares were given in Table 4 between the years 1996-2016 in Şanlıurfa province. The total cotton production costs calculated as 6,289 TRL in 2016 and TRL 6,447 in 1996. Therefore, cotton production costs decreased by 2.44% per period with real prices. The most important cost factor was the land rent with 1,500 TRL. The harvest-marketing cost was the second place with 1,356 TRL. Fertilizer costs were ranked third with 787 TRL. These were followed by irrigation with 573 TRL and ploughing cost with 508 TRL, respectively. Over the years, there were fluctuations in the total cotton production cost and its elements. The share of cost elements in production cost covering the years 1996-2016 was also examined in Şanlıurfa province. It was found that during the period 1996-2016, the components of cotton production costs showed fluctuations in the share of production costs in 2004-2016 period. Between 1996 and 2003, it was found that the cost elements increased in their share in the total cost. During the 2016 production period, 35.19% of the total cotton production costs were fixed costs and 64.1% of them was the variable cost. The land rent share was 35.19% in the production costs for 2016. In the period covered, it was determined that the most change was at the fertilizer cost. In 1996, this cost component accounted for 6.57% of total costs, while it was 11.92% in 2016.

Land Rent

Land prices were the most important cost

factor in the total cotton production costs at real prices in Şanlıurfa province. The land rent was 1415 TRL in 1996 and increased by 6.03% and rose to 1,500 TRL in 2016. There was a fluctuating course in the cost of land rent over the years, there was an upward trend. Land lease generated 21.9% of total costs in 1996. This rate rose to 23.9% in 2016. Land rent for cotton production increased from $ 305.64 in 1996 to $ 496.12 in 2016. So the cost of cotton production increased by about 1.62 times the cost of renting land. The highest rental rates were in 2008 ($ 962.16), 2009 ($ 964.92) and 2010 ($ 1,061.28) of the years. In his study, Chahudry [4] analysed the input costs of nine countries in cotton farming. According to Chahudry [4], the cost of land in cotton production is more than $ 500 in Spain while in the US, Iran, Pakistan, Syria, South Africa, Colombia and the Philippines the cost of this is around $ 200. In his study for ICAC in Chahudry [5], he found that land rent for cotton production was over $ 700 in Egypt, while in India, Syria and Turkey it was 514 dollars, 209 dollars and 313 dollars respectively. Varoğlu et al. [20] found that the most important cotton production cost elements were land rent and labour costs.

Fertilizer Cost

At real prices, the cost of fertilizer production in Şanlıurfa province in total cotton production costs increased from 456 TRL in 1996 to 787 TRL in 2016 with an increase of approximately 72.70%. Over the years there was also a fluctuation in the cost of fertilizers. Overall there was an upward trend. However, it was the lowest value in 1999 with 254 TRL. This cost was 328 TRL in 1998 and 399 TRL in 2000. The highest cost of fertilizer received in 2015 with 1,201 TRL. The fertilizer was found to account for 12.51% of total production costs. In calculations made in US dollars, the cost of hectare fertilizer for cotton production was 97.80 dollars in 1996 and rose to 260.20 dollars in 2016. The US dollar denominated fertilizer rate increased about 2.66 times. Fertilizer costs were highest in the years 2015 ($ 422.58) and 2010 ($ 386.26).

Chahudry [4] reported that fertilizer costs in the North Cape region of South Africa were at the highest level in the world. Chahudry calculated that the cost of fertilizer was $ 300 per hectare. He also calculated that the fertilizer cost was more than $ 200 in the Peru, Spain, the United States and Israel. He pointed out that it was costly in the China and Turkey because of the usage of higher nitrogenous fertilizers doses. Indeed, fertilizer costs in Turkey were over $ 300 hectares. In addition to high fertilizer cost, importing gibbons, as well as the development of irrigation facilities in the region, is effective in starting to use too much. Chahudry [5] calculated that the average cost of fertilizer for the first nine cotton producing countries in the world was 253 dollars.

Ploughing/Sowing Cost

The real ploughing/sowing cost in Şanlıurfa province was 289 TRL in 1996. In 2016, this figure increased by about 76.06% to 588 TRL. Over the years there was a fluctuation. Ploughing cost share was 4.5% in the total production costs in 1996, while in 2016 it was 8.1%. The change in energy costs in the world caused increases in this cost element and showed a fluctuating change. In calculations made in US dollars, ploughing/sowing cost per hectare increased from $ 62.35 in 1996 to $ 168.05 in 2016. This cost item increased by about 2.69 times. Ploughing/sowing cost was highest in 2010 ($ 2,719.55), 2011 ($ 2343.30), and 2012 ($ 2,457.33) years.

Seed Cost

Within real cost, Şanlıurfa province's seed costs per hectare increased from 113 TRL in 1996 to about 160 TRL in 2016, increasing by about 41.37%. While seed costs accounted for 1.8% in the total costs in 1996, this rate was 2.5% in 2016.

In the calculation of the US dollar, the seed cost was $ 52.92 in 2016, while compared with $ 24.51 in 1996. The seed cost was increased by about 2.15 times. The years of highest seed costs were 2012 ($ 76.66), 2013 ($ 78.72), and 2014 ($ 75.26). Seed is the basic input that has the greatest effect on yield and quality formation in plants. According to the study by Chahudry [5], the highest seed cost was in Colombia. He calculated that per hectares seed cost was 102 dollars. He reported that seed costs were high in China and in the United States. He also stated that

seed cost was high in India and Pakistan due to the high competition among hybrid seed varieties.

Harvesting – Marketing Cost

Within real prices, Şanlıurfa province's harvest costs per hectare increased from 1,511 TRL in 1996 to about 1,356 TRL in 2016, decreasing by about 10.26%.

Over the years there is also a fluctuating course in harvest costs. While the harvest cost constituted 23.4% of total costs in 1996, this ratio decreased to 21.6% in 2016.

In the calculations made in US dollars, the harvest cost was 326.42 dollars in 1996 and 448.40 dollars in 2016. This year's cost was about 1.37 times higher than 1996 years. Harvest costs were highest in 2008 ($ 958.35) and 2014 ($ 788.98). According to the Chahudry [5] report, Pakistan was the lowest cotton harvesting cost with $ 63 per hectare in the world, and Syria was the highest cost with $ *433.*

Irrigation Cost

Within real price, irrigation cost per hectares in Şanlıurfa province was 951 TRL in 1996 and decreased by 60.27% to 573 TRL in 2016. While the increase was between 1996 and 2000, there were fluctuations between the years 2000-2016. Irrigation costs accounted for 14.7% of total costs in 1996, while in 2016 this rate was 9.1%. There was not much change in irrigation costs in the examined period. It can be said that the reason for the decrease in irrigation costs is the development of the irrigation facilities in the region and the increase in the usage.

In calculations made in US dollars, per hectare irrigation cost was 195.61 dollars in 1996, and 189.52 dollars in 2016. Cotton production costs decreased by 3.12% in irrigation costs. The highest irrigation costs are in the years 2010 ($ 391.35) and 2007 ($ 374.68). According to Chahudry [5], the highest irrigation cost with $ 600 per hectare was Syria. The irrigation costs in the US in irrigated areas were reported to be $ 114.

Hoeing Cost

In Şanlıurfa province, the hoeing cost per hectare was 272 TRL in 1996 while it decreased by 24.96% in 2016 to 231 TRL. The share of hoeing cost was 4.2% of total costs in 1996, while in 2016 it was 3.7%. In calculations made in US dollars, the hoeing cost per hectare was $ 58.68 in 1996 and $ 76.40 in 2016. This cost was increased by about 1.30 and highest was in 2006 ($ 111.26) and 2012 ($ 126.81) years.

Chahudry's [6] concluded that the highest hoeing cost was in Syria with $ 135 per hectare. Yilmaz et al. [22] compared the cotton production cost and income between the regions in Turkey. They found that there were significant differences between the costs and the income components among the provinces.

Pesticide Cost

Within real cost, pesticide cost was 184 TRL in 1996 in Şanlıurfa province, which increased by 158.66% to 501 TRL in 2016. It was determined that there was an increase in pesticide cost between 1996 and 2001 and fluctuations between 2000 and 2016. While the pesticide cost was constituted 3% of total costs in 1996, this ratio was increased to 8% in 2016. In calculations made in US dollars, the pesticide cost for cotton production was increased from $ 41.57 in 1996 to $ 165.57 in 2016. It was found that the pesticide cost was increased by about 3.98 times. The highest pesticide costs were in 2013 ($ 241.42) and 2014 ($ 246.77.68).

Chahudry [5] stated that the pesticide cost for cotton producing cotton in the world was 219 dollars.

Changes in cotton production cost items were calculated based on 1996 year in Şanlıurfa province. According to this, the highest increases were found in the pesticide cost (158.66%) and the ploughing/sowing cost (76.06%). Likewise, the fertilizers costs, seeds, land rent were increased compared to these periods. Other cost items (harvest-marketing, irrigation, hoeing) decreased compared to the beginning of the period.

For example, irrigation costs decreased by 39.73%. It can be said that the increase in the prices of the inputs used, the applied agricultural policies, the changes in the interest rates and the exchange rates were very effective on the fluctuation course in the cost items.

Table 4. Cotton production cost per hectare (with real cost TRL in 2016) and price growth rate (%) 1996=100

Years	Land rent	Seed	Ploughing/Sowing	Fertilizer	Pesticide/herbicide	Irrigation	Hoeing	Harvesting-marketing	Operating interest rate	General administrative expenses
1996	1,415	113	289	456	194	951	272	1,511	1,092	156
1997	1,556	101	285	532	212	1,899	254	1,555	1,343	192
1998	1,811	127	341	326	226	1,513	272	1,235	1,228	175
1999	1,775	118	325	254	266	1,515	320	1,296	1,233	176
2000	1,719	137	500	399	277	1,516	293	1,309	1,292	185
2001	3,143	121	1124	740	411	1,982	532	1,973	3,760	301
2002	2,416	97	899	596	329	1,585	425	1,575	1,584	238
2003	2,181	92	752	544	269	1,283	346	1,276	607	202
2004	2,309	69	643	539	240	1,070	216	1,362	580	193
2005	2,347	64	646	501	235	992	203	1,355	571	190
2006	1,962	59	477	461	216	883	314	1,733	549	183
2007	1,846	66	491	574	227	904	157	1,811	547	182
2008	2,047	64	508	639	213	770	216	1,679	552	184
2009	2,426	146	582	768	461	857	218	1,812	654	218
2010	2,385	164	611	760	507	880	209	1,759	655	218
2011	1,798	148	550	684	456	792	188	1,583	558	186
2012	1,265	175	560	880	540	491	289	1,095	476	159
2013	1,513	182	533	853	557	466	266	1,307	511	170
2014	1,504	181	531	823	594	432	242	2,307	595	198
2015	1,564	167	530	1,201	309	431	241	1,964	577	192
2016	1,500	160	508	787	501	573	231	1,356	505	168
1996	100	100	100	100	100	100	100	100	100	100
1997	110	89	99	117	109	200	93	103	123	123
1998	128	112	118	72	117	159	100	82	113	113
1999	125	105	113	56	138	159	118	86	113	113
2000	122	121	173	88	143	159	108	87	118	118
2001	222	107	390	162	212	209	196	131	344	193
2002	171	85	311	131	170	167	157	104	145	152
2003	154	82	260	119	139	135	128	84	56	130
2004	163	61	223	118	124	113	79	90	53	124
2005	166	57	224	110	121	104	75	90	52	122
2006	139	52	165	101	112	93	116	115	50	117
2007	130	59	170	126	117	95	58	120	50	117
2008	145	56	176	140	110	81	80	111	51	118
2009	172	129	202	169	238	90	80	120	60	140
2010	169	145	212	167	262	93	77	116	60	140
2011	127	130	191	150	236	83	69	105	51	119
2012	89	154	194	193	279	52	106	72	44	102
2013	107	160	185	187	288	49	98	87	47	109
2014	106	160	184	181	307	45	89	153	55	127
2015	111	147	184	264	160	45	89	130	53	123
2016	106	141	176	173	259	60	85	90	46	108

Source: ŞGTHB, 2017

Table 5. The share of cotton production costs in total production cost

Years	Land rent	Seed	Ploughing/Sowing	Fertilizer	Pesticide /herbicide	Irrigation	Hoeing	Harvesting-marketing	Operating interest rate	General administrative expenses
1996	21.9	1.8	4.5	7.1	3.0	14.7	4.2	23.4	16.9	2.4
1997	19.6	1.3	3.6	6.7	2.7	24.0	3.2	19.6	16.9	2.4
1998	25.0	1.7	4.7	4.5	3.1	20.9	3.7	17.0	16.9	2.4
1999	24.4	1.6	4.5	3.5	3.7	20.8	4.4	17.8	16.9	2.4
2000	22.5	1.8	6.6	5.2	3.6	19.9	3.8	17.2	16.9	2.4
2001	22.3	0.9	8.0	5.3	2.9	14.1	3.8	14.0	26.7	2.1
2002	24.8	1.0	9.2	6.1	3.4	16.3	4.4	16.2	16.3	2.4
2003	28.9	1.2	10.0	7.2	3.6	17.0	4.6	16.9	8.0	2.7
2004	32.0	1.0	8.9	7.5	3.3	14.8	3.0	18.9	8.0	2.7
2005	33.0	0.9	9.1	7.1	3.3	14.0	2.9	19.1	8.0	2.7
2006	28.7	0.9	7.0	6.7	3.2	12.9	4.6	25.3	8.0	2.7
2007	27.1	1.0	7.2	8.4	3.3	13.3	2.3	26.6	8.0	2.7
2008	29.8	0.9	7.4	9.3	3.1	11.2	3.1	24.4	8.0	2.7
2009	29.8	1.8	7.2	9.4	5.7	10.5	2.7	22.2	8.0	2.7
2010	29.3	2.0	7.5	9.3	6.2	10.8	2.6	21.6	8.0	2.7
2011	25.9	2.1	7.9	9.9	6.6	11.4	2.7	22.8	8.0	2.7
2012	21.3	2.9	9.4	14.8	9.1	8.3	4.9	18.5	8.0	2.7
2013	23.8	2.9	8.4	13.4	8.8	7.3	4.2	20.6	8.0	2.7
2014	20.3	2.4	7.2	11.1	8.0	5.8	3.3	31.1	8.0	2.7
2015	21.8	2.3	7.4	16.7	4.3	6.0	3.4	27.4	8.0	2.7
2016	23.9	2.5	8.1	12.5	8.0	9.1	3.7	21.6	8.0	2.7

Table 6. Cotton production cost (per hectares, USD) and cotton production cost growth rate (%), 1996=100

Years	Land rent	Seed	Ploughing/Sowing	Fertilizer	Pesticide/herbicide	Irrigation	Hoeing	Harvesting-marketing	Operating interest rate	General administrative expenses
1996	306	24	62	98	42	205	59	326	236	34
1997	327	21	60	112	45	399	53	327	282	40
1998	381	27	72	69	47	318	57	260	259	37
1999	355	24	65	51	53	303	64	259	247	35
2000	351	28	102	82	57	310	60	267	264	38
2001	528	20	189	124	69	333	89	331	631	51
2002	496	20	184	122	67	325	87	323	325	49
2003	567	24	195	141	70	333	90	332	158	53
2004	700	21	195	163	73	324	65	413	176	59
2005	816	22	225	174	82	345	71	471	199	66
2006	695	21	169	163	76	313	111	614	195	65
2007	765	28	203	238	94	375	65	750	227	76
2008	962	30	239	300	100	362	102	789	260	87
2009	965	58	232	306	183	341	87	720	260	87
2010	1061	73	272	338	226	391	93	783	291	97
2011	799	66	244	304	203	352	83	703	248	83
2012	555	77	246	386	237	215	127	481	209	70
2013	656	79	231	370	241	202	115	567	222	74
2014	625	75	221	342	247	180	100	958	247	82
2015	550	59	186	423	109	152	85	691	203	68
2016	496	53	168	260	166	190	76	448	167	56
1996	100	100	100	100	100	100	100	100	100	100
1997	107	87	96	114	106	194	91	100	120	120
1998	125	109	115	70	114	155	97	80	110	110
1999	116	97	104	52	127	148	109	79	105	105
2000	115	114	164	83	135	151	102	82	112	112
2001	173	83	303	126	165	162	152	102	268	150
2002	162	81	296	124	161	158	149	99	138	145
2003	185	98	313	144	167	162	153	102	67	156
2004	229	86	313	166	174	158	111	126	75	174
2005	267	91	361	177	195	168	120	144	84	196
2006	228	85	271	166	183	152	190	188	83	193
2007	250	113	326	242	225	182	111	230	96	224
2008	315	123	383	305	239	176	173	242	110	257
2009	316	237	371	310	438	166	148	221	110	257
2010	347	298	436	344	539	191	158	240	124	288
2011	261	268	392	309	485	171	142	215	105	245
2012	182	314	394	392	566	105	216	147	89	207
2013	215	322	370	376	577	98	197	174	94	219
2014	204	308	354	347	590	87	171	294	105	245
2015	180	240	299	429	260	74	144	212	86	201
2016	162	216	270	264	396	92	130	137	71	165

The main reason for the increase in agricultural inputs in dollar terms was the increase in exchange rates. In addition, in the increase in chemical fertilizers, agricultural chemicals and ploughing/sowing costs which constitute production input costs were based on imported goods (chemical fertilizers, agrochemicals, diesel) and exchange rates was increased in these periods. The increase in irrigation opportunities in the region and the use of mechanized harvesting in the system have also resulted in improvements in the total costs.

Yılmaz et al. [21] determined that net income could not cover cotton production costs. They found that the most important cost items were labour, machinery costs, land rent and agricultural chemicals costs. Gul et al. [9] calculated that the technical efficiency of cotton-growing enterprises in Çukurova region was 0.80. According to the findings they obtained that the cotton producers could increase efficiency scores with 20% by the same inputs and.

ICAC [11]reported that the land rent and management cost of many countries were not included in the production cost. It was also found that there was no difference in productivity between the countries. The cotton production cost was high in the US and Zimbabwe. The cost was found to be lower in Australia, Pakistan and Argentina.

Sağlam [17]determined that 28.23% of the total material costs were in fertilizer, 54.19% in pesticide, 7.12% in seed, and 10.47% in irrigation in Çukurova region. In the study conducted in Antalya region, 29.32% of the total material costs were found to be fertilizer, 57.42% of pesticide, 5.10% of seed and

8.17% of irrigation cost in 2001 [22]. Yilmaz and Gul [24] found that the labour cost with 36.18% as the biggest share of cotton production costs per unit area in Antalya and the second most important cost was the machinery rent costs and it was changed between 8.92-17.05% in the farms groups and 14.11% in the average. They reported that fertilizer, land rent, pesticide, irrigation, were proportionally important. They calculated that their share in the production cost of per hectare was 13.62%, 11.58%, 11.22% and 4.74%, respectively. They found the relative profit to be 1.02 in cotton production.

According to the works carried out in the year 2000, the share of fertilizer and irrigation costs were increased, and the share of pesticide and seed costs was decreased. It can be said that this factor was caused by the changes in the amounts of input and the changes in prices.

Cotton Supports

The first application for premium payment to cotton producers was made by the Ministry of Industry and Trade in the 1993. In this context, a premium of 3,000 TL per kg was paid to the producers of 1993 cotton seed cotton. The system, which was restarted in 1998, has been up to date and has been carried out by the Ministry of Food, Agriculture and Livestock. Despite positive results from the differential payment system in 1993, this practice was terminated. Since the 1998/99 production period, the cotton premium system has begun to be reapplied and a premium payment has been made to the producers for a certain amount of documents.

Since 2001, 10% of the premium amount to be awarded in addition to the premium amount has been started to be paid to the producers who produce and certify the mass cotton by using certified seed, and since 2004, the certificate difference has started to be paid at 20%. As of 2012, support has been given to producers using seeds produced and certified only, and should be supported with the Agricultural Law, which entered into force in 2006; direct income support, differential payment support, compensatory payments, animal husbandry support, agricultural insurance payments, rural development support, environmental agri-food protection program support and other support payments. Under this law, differential payment support continued to be granted. Firstly, the fuel-oil given in 2003 and the fertilizer support given for the first time in 2005 have continued regularly since 2007. In addition, it is necessary to carry out soil analysis in order to benefit from the fertilizer subsidy payment of 50 decares registered on the Farmer Registration System and every agricultural land. Support for soil analysis was 2.5 TL per decares. Today, the "Agricultural Basin Production and Support Model" developed by the Ministry of Food, Agriculture and Livestock in 2011 was being used and as of 2011, payments have started to be made under the name of "Differential Payment Support for Agricultural Villages Production and Support Model" in Turkey. Today, this model is still used. It is decided to realize difference payment for cotton producers of year 2012 based on TUİK district yield productivity.

The Ministry of Food, Agriculture and Livestock has been included in the support of difference payment of cotton production in 13 basins. These basins are; GAP Basin, Western GAP Basin, Eastern Mediterranean Basin, Coastal Mediterranean Basin, Aegean Basin, and Euphrates Basin are the basins of the Southern Marmara Basin, Coastal Aegean Basin, Ida Basin, Inner Aegean Basin, Gediz Basin, Karacadağ Basin, Zap Basin. Ministry of Food, Agriculture and Livestock determined the difference payment support given to cotton in 2015 as 0.65 TL per kg. Also cotton producers can benefit from 7.90 TL per decares of diesel fuel and 8.25 TL per decares of fertilizer support [15].

Profitability Indicators in Cotton Production

The developments in the profitability per hectare cotton production for 1996-2016 in Şanlıurfa province were given in Table 7. The yield per hectare of cotton was 4,750 kg in the 2016 and it was below the average of Turkey. Cotton yield was 3,000 kg per hectare in 1996. It was increased by 1.58 times to 4750 kg per hectare. This was due to the increase in irrigation facilities and the increase in the use of inputs.

Cotton production cost was TRL 6,288 at real

prices for 2016. In 1996 it was 6,446 TRL. It was determined that the year 2001 (14,086 TRL) was the highest cotton cost in the 20-year period, and the year 2012 was the lowest (5,929 TRL). Gross production value was calculated as 7,280 TRL for 1996, and as 11,210 TRL in 2016. The per hectare gross production value was lowest in 2000 (5,275 TRL) and the highest in 2011 (12,681 TRL). The absolute profit, which sets forth the difference between gross production value and production costs, was determined to be 4,921 TRL hectare for 2016 and 853.43 TRL for 1996. Absolute profits were negative in 2001, 2000 and 2002. It can be said that premium support is not implemented in these years and increases in foreign exchange price and interest rates were effective in the negative profit.

Table 7. Profitability indicators for cotton per hectares (TRL)

Years	Yield per hectare (kg)	Index (1996=100)	Production cost per hectare (TRL)	Index (1996=100)	Gross production value per hectare (TRL)	Index (1996=100)	Absolute profit per hectare (TRL)	Index (1996=100)	Relative profit	Index (1996=100)
1996	3,000	100	6,446.52	100	7,299.95	100	853.43	100	1.13	100
1997	3,500	117	7,927.78	123	8,061.75	110	133.97	16	1.02	90
1998	3,500	117	7,252.96	113	8,242.08	113	989.12	116	1.14	100
1999	3,500	117	7,278.81	113	7,870.07	108	591.26	69	1.08	95
2000	2,700	90	7,627.53	118	5,275.16	72	-2,352.36	-276	0.69	61
2001	3,500	117	14,086.33	219	7,277.03	100	-6,809.30	-798	0.52	46
2002	4,180	139	9,742.70	151	9,155.89	125	-586.80	-69	0.94	83
2003	4,000	133	7,552.32	117	9,235.43	127	1,683.10	197	1.22	108
2004	4,000	133	7,223.70	112	10,160.70	139	2,937.00	344	1.41	124
2005	4,600	153	7,104.10	110	8,832.77	121	1,728.66	203	1.24	110
2006	4,600	153	6,837.36	106	8,575.35	117	1,737.99	204	1.25	111
2007	5,150	172	6,805.83	106	10,361.84	142	3,556.01	417	1.52	134
2008	5,000	167	6,870.67	107	10,644.53	146	3,773.86	442	1.55	137
2009	4,500	150	8,143.88	126	10,555.14	145	2,411.26	283	1.30	114
2010	4,500	150	8,147.57	126	10,733.04	147	2,585.47	303	1.32	116
2011	4,500	150	6,943.74	108	12,681.34	174	5,737.60	672	1.83	161
2012	4,930	164	5,928.61	92	12,471.73	171	6,543.12	767	2.10	186
2013	4,600	153	6,358.52	99	10,692.28	146	4,333.76	508	1.68	148
2014	4,800	160	7,408.74	115	10,805.11	148	3,396.37	398	1.46	129
2015	4,750	158	7,176.69	111	7,629.40	105	452.71	53	1.06	94
2016	4,750	158	6,288.91	98	11,210.00	154	4,921.09	577	1.78	157

Source: ŞGTHB, 2017

Relative profit was calculated by divided the gross production value to the production cost. The relative profit was calculated as 1.78 for cotton in 2016. That is, it was determined that 1.78 TRL income was obtained for 1 TRL made in cotton production. While the income of 1.13 TL was obtained in 1996 compared to 1 TL for cotton production, this value increased by 57.5% in 2016. The highest relative profit in cotton production in 1996-2016 was obtained in 2012 (2.10) and the lowest was in 2001 (0.52). Absolute profit was seen to increase by 477% compared to the beginning of the term. The relative profit rate was found to increase by 57%.

According to calculations made in U.S. dollars, the cost production per hectare increased from US $ 1.393 in 1996 to US $ 2,080 in 2016 with an increase of 49%. The lowest production cost was in 1996 and the highest year was 2010 with 3,625 dollars. The gross production value per hectare was increased by 135% from $ 1577 in 1996 to 3,708 dollars in 2016. The highest gross production value was in 2011 with $ 5,632. The lowest was with 1077 dollars in 2000 year. There were fluctuations in cost and profitability ratios relative to calculations made in dollar terms. These fluctuations were due to the changes in interest rates and exchange rates applied. While the fixed exchange rate was applied in Turkey until 2000, the free exchange rate policy started to be applied from 2000. In this case, as of many years, costs have been fluctuating, leading to an upward trend.

Sağlam [17] found that the absolute profit in cotton production was negative and relative

profit was 0.83 in Çukurova region. Absolute profit in the study carried out in Antalya again in 2001 was negative and the relative profit was 0.85 [22]. Budak et al. [2] found that the net profit in the cotton production enterprises was positive in Çukurova region. As a result, it was seen that in Şanlıurfa province, after the year 2002, they have improved their cotton.

Table 8. Profitability indicators for cotton per hectares ($)

Years	Production cost		Gross production value		Absolute profit	
	Value per hectare ($)	Index (1996=100)	Value per hectare ($)	Index (1996=100)	Value per hectare ($)	Index (1996=100)
1996	1,393	100	1,577	100	184	100
1997	1,667	120	1,695	107	28	15
1998	1,527	110	1,735	110	208	113
1999	1,457	105	1,575	100	118	64
2000	1,557	112	1,077	68	-480	-260
2001	2,366	170	1,222	78	-1,144	-620
2002	1,999	144	1,879	119	-120	-65
2003	1,962	141	2,400	152	437	237
2004	2,189	157	3,079	195	890	483
2005	2,472	177	3,073	195	601	326
2006	2,423	174	3,039	193	616	334
2007	2,819	202	4,292	272	1,473	799
2008	3,229	232	5,003	317	1,774	962
2009	3,239	233	4,197	266	959	520
2010	3,625	260	4,776	303	1,150	624
2011	3,084	221	5,632	357	2,548	1,382
2012	2,602	187	5,474	347	2,872	1,558
2013	2,756	198	4,635	294	1,879	1,019
2014	3,078	221	4,488	285	1,411	765
2015	2,525	181	2,684	170	159	86
2016	2,080	149	3,708	235	1,628	883

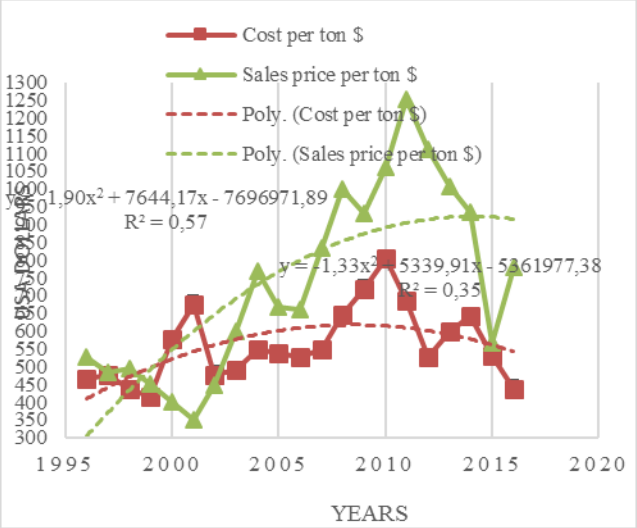

Fig.1. Change in cost and selling price ($)

The change in cotton sales price and cost per ton was given in Chart 1 on a US dollar. It was seen that they were a fluctuating course. The cotton selling price was $ 525.70 per ton in 1996 while it rose to $ 780.57 in 2016. The lowest sales price was 2001 with $ 349.22. The highest was in 2011 with $ 1251.45. The cotton cost per ton was also fluctuated between 1996 and 2016. While the cost was $ 464.24 in 1996, it decreased to $ 437.91 in 2016. The highest cost was in 2010 with $ 805.64. The lowest was in 1999 with $ 416.26. The sales price made on a dollar basis was higher than the real TRL price according to calculations. This was due to the fact that calculations made on a dollar basis were made at current prices and the exchange rate was different by the years.

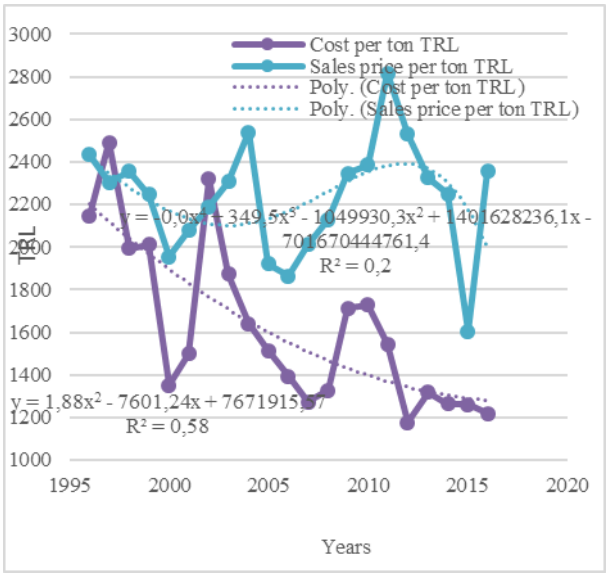

Fig. 2. Change in cost and selling price (TL)

The real price TRL based change in cotton

sales prices was shown in Graph 2. In real TRL-based calculations, the cotton sales prices were fluctuating. According to the calculations made, the selling price which was 2,433.32 TL in 1996 increased to 2,360 TL in 2016. The lowest sales price was in 2006 with 1,864.21 TL. The highest was in 2011 with 2,818.08 TL. In the cotton cost per ton, it was seen a downward trend with a fluctuating course during the period of 1996-2016., While the cotton cost per ton was 2,148.84 TL in 1996, it decreased to 1,220 TL in 2016. The highest cotton cost per ton was in 1997 with 2,490.12 TL. The lowest was with the 1,262.01 TL in 2015.

Yilmaz and Gul [24] found that the gross production value of cotton production was 8,174 TRL in the 2011 production period in Antalya province and the cotton yield per hectare was 3,913 kg. They calculated one kg cotton cost as 2.05 TL, and absolute profit as 163.5 TRL. They found that relative profit was 1.02. In the province of Antalya, the cotton relative profit was found to vary between 0.93-1.36 between 1992-1998 [13].

Şanlıurfa province has the highest yield in cotton production, compared to 1996, with an increase of 166.67% in 2008. The lowest production cost was realized in 2015 with a decrease of 91.97%.

CONCLUSIONS

In this study, change in cost and profitability of cotton production was analysed in Şanlıurfa province. Data obtained from the statistical records of the Ministry of Food, Agriculture and Livestock Şanlıurfa province and TURKSTAT used together with the related national and international research findings.

The cost items for cotton production, their proportional share in the total cost and profits were analysed by years. Cost and profitability indicators were expressed in terms of real values. Over the years, the changes in profit and, cost elements were looked through and the main causes of the changes are determined accordingly.

According to results, it was found that the most important cost factor in cotton production was land rent. In the period, Şanlıurfa cotton production cost was declined but according to years these declines showed a fluctuating course. Gross production value was showed a fluctuating trend.

In recent 20 years, cotton production in Turkey does not meet the cotton demand. Cotton consumption has increased rapidly in Turkey with the development of the textile and ready ware industry, especially after the 1990s. During this period, the same rate of increase in cotton production couldn't keep up with the increase in demand. On the contrary, the production increase in the limited area has been realized due to the increase of the yield and also the harvested areas have decreased. Currently, Turkey is among one of the world's largest consumer of cotton and importer countries.

Despite high productivity in cotton production, the increase in input prices lead to decline in production and threatens its sustainability. Input prices, problems brought by small scale farm structure, labour costs are important cost elements of the cotton production. In this context, multifaceted studies should be carried out in order to increase the yield and quality in cultivated areas. For this reason, it is important to ensure sustainability in cotton production in Turkey.

Sustainability can be achieved, through the efficient processing of land, the identification of certified and appropriate seed species, the use of the required amount of fertilizer in sufficient quantities, the correct method for irrigation, the effective fighting of plant diseases, and the maintenance and harvesting. These applications with better cotton production incentive policies will help to reduce production costs, increase productivity and will lead to sustainability.

In regards to ensure environmental sustainability; the implementation of a good crop monitoring system, protection of soil for future generations, and reduction of environmental pollution are very important. The sustainability of cotton farming in terms of social aspects can be ensured by ensuring that producers continue production, improving their living conditions of creating on-site employment.

As a result, the production of cotton, an important industrial plant for the Turkish economy, needs to be sustainable for all the parties including the producers, industrial companies and exporters.

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THE ROLE AND IMPACT OF INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT (IFAD) ON THE RURAL AREAS DEVELOPMENT OF THE REPUBLIC OF MOLDOVA

Aurelia LITVIN, Svetlana PETRASCU

State Agrarian University of Moldova, 44 Mircesti str., Chisinau, Republic of Moldova, MD2049, Emails: a.litvin@uasm.md, s.sasu@uasm.md

Corresponding author: s.sasu@uasm.md

Abstract

The paper aimed to present the role and impact of International Fund for Agriculture on the development of the rural areas of the Republic of Moldova. Till the present the rural development are on the law level. The farmers were facing significant problems in running the business and a lot of poor people still lived in rural areas. These people could potentially be employed only in Agriculture as other economic activities are less developed in the rural areas. The Rural Financial Services and Agribusiness Development Project (RFSADP) is the fifth International Fund for Agricultural Development (IFAD) program in Moldova and became effective on July 4, 2011. The implementation of the RFSADP was divided into four main components, to address various issues identified for reducing the poverty in rural areas. Each component and subcomponent describes a certain approach to improve business development in rural areas, with focus on agriculture and to improve the quality of lives for the people in rural areas. International Fund for Agriculture Development provided funding, consultancy and organized a set of activities to target poor people in rural areas to improve their living, to increase their knowledge about the most recent technologies in agriculture and to provide practical information about how to run their business and increase output.

Key words**:** *rural development, project management, investment projects*

INTRODUCTION

The Agriculture sector in the Republic of Moldova have been experiencing positive development prior to the start of the Rural Financial Services and Agribusiness Development Project (RFSADP).
However, the investments in Agriculture were at a low level, still the farmers were facing significant problems in running the business and a lot of poor people still lived in rural areas.
These people could potentially be employed only in Agriculture as other economic activities are less developed in the rural areas.
The RFSADP provided funding, consultancy and organized a set of activities to people from rural areas in order to improve their living, to increase their knowledge about the most recent technologies in agriculture and to provide practical information about how to run their business and increase output.

MATERIALS AND METHODS

In order to present the role and impact of international fund for agricultural development on the rural areas development of the Republic of Moldova within the Rural Financial Services and Agribusiness Development Project, a set of indicators with baselines, including gender disaggregation have been established and monitored.
The data, collected from Ministry of Agriculture and Food Industry, IFAD programs Steering Committee and Credit Line Directorate have been statistically processed and interpreted, by using a methodology of assessing the initial situation, establish baselines, monitor the intermediate results and making a final assessment.

RESULTS AND DISCUSSIONS

The general features of the development of agriculture in the Republic of Moldova are:[5]
1.Widespread development of small, family

owned production enterprises, particularly engaged in production of fruit (apples, pears, cherries, table grapes), intensively grown vegetables (greenhouse production) and intensively produced livestock (piggeries, chicken farms and intensive dairies). However, these kind of farms represent a low share of total number farms. A lot of land plots are not processed at all, some of them are very small and processed using labor-intensive methods, which yields low output per ha. The land in most rural areas is not consolidated enough to implement effective agriculture, which would provide more income to the local population.

2.The emergence of numerous small-scale cold storage and fruit packing facilities which operate both as a service for small-scale farmers and for their own larger scale farm enterprises. These typically store produce for a period after harvest to take advantage of out of season price increases. However, the packaging of such produce remains relatively rudimentary. The progress registered during the last years is measured by the increased period of storing and selling the fruits and vegetables on local markets and for export. Previously, the local agricultural production could have been seen on local markets only during the harvest periods and shortly after, while now, the period was extended significantly.

3.The development and operation of dairy processing factories which mainly derive their raw materials from numerous small-scale farmers, most with herds in the range of 2-10 cows. These factories normally process 10-20 tons of milk per day, producing mainly cheese and other durable dairy products. They often provide supplying farmers with financial and technical support, although the relationship with farmers is generally based on personal knowledge and social responsibility. However, there are limited number of such companies in rural areas and there is a potential for growing. There are some limits to opening or extending such businesses because of uncertain quality of the supplies, uneven distribution of quantities of milk supplied during different period of year, necessity to invest in the technology for processing the milk/producing dairy products and packing them and also to have a distribution point or network.

4.The formation and operation of processing companies that purchase and add value to extensively produced agricultural commodities such as wheat, sunflower and beef cattle.

5.Increased supply of machinery and inputs from local companies, mostly supplying imported goods on a cash basis.

6.Some development of contract farming, mainly on an informal basis, and mainly within the fruit and vegetable production sub-sectors.

Despite these positive developments, there are many severe constraints on production, marketing of production, inputs supply, and capital equipment supply, processing of production, information for marketing, tracking and tracing through commodity chains, and gaining access to appropriate financial products. While the demand for agricultural commodities for both import substitution and exports remains robust, the ability of the agricultural sector to meet this demand remains suppressed.[4]

It is very important to notice that the European Bank for Reconstruction and Development (EBRD) is among the most important funders of investment projects in rural areas. [2]

According to the annual reports of IFAD, the Rural Financial Services and Agribusiness Development Project (RFSADP) is the fifth IFAD program in Moldova and became effective on July 4, 2011.[6]

The Project is fully aligned with Moldova's Economic Stabilization and Recovery Program and Agriculture Strategy 2006-2015 and other national strategies developed during the project implementation.

The implementation of the RFSADP was divided into four main components, to address various issues identified for reducing the poverty in rural areas. Each component and subcomponent describes a certain approach to improve business development in rural areas, with focus on agriculture and to improve the quality of lives for the people in rural areas, in general:[1]

1.**Pro-Poor Agribusiness Development**, with three sub-components:
1.1. Contract Farming Development
1.2. Conservation Farming Development
1.3. Agribusiness Equity Fund Development
2.**Rural Financial Services**, with three subcomponents:
2.1.Loan and equity financing of SME investments in Project-prioritized agricultural value chains.
2.2. Youth Entrepreneurship Financing
2.3. Pro-Poor Microfinance through Saving and Credit Associations
3.**Small-Scale Rural Infrastructure**
4.**Project Management**.

The women participation in the project as beneficiaries was higher than expected. The percentage of women from total was considered for comparison, no matter the absolute numbers. The total number of beneficiaries was almost double as expected, although this target over-achievement is not evenly spread across all the activities, some of which had less beneficiaries than expected.

Table 1. Progress results of Contract Farming Development

Indicators	Appraisal	Actual by the end of 2015	Actual vs appraisal
Training, seminars & round tables	n/a	242	n/a
National experts training visits	n/a	236	n/a
International expert training visits	n/a	15	n/a
International study tours	n/a	9	n/a
Trained participants, total	820	1482	+662 (+81%)
of which women	164	115	-49 (-30%)
Contract farming,	570	284	286 (-51%)
of which women	114	49	-65 (-57%)
Conservation farming,	250	1198	+948 (x4.7 times)
of which women	50	66	+16 (+32%)
Conservation farming arrangements (no. of grants to farmers)	20	23	+3 (+15%)
Total number of beneficiaries	840	1505	

According to data from table 1 the Project has achieved significant results, including an increased number of total beneficiaries comparing to the plan (1,505 vs 840, or +79%). The women participation, however was lower than expected during the trainings, just 164 participants comparing to 278 targeted. This could show also a gender problem in rural areas or in agriculture in general, where men are more likely to engage in farming or to learn about it. The results regarding the training for conservation farming are promising, as the number of participants was almost 5 times higher than planned. On another side, twice less participants have attended the contract farming trainings comparing to the plan.

Although the targets have not been set for these indicators, a total of 9 international study tours have been organized, 15 international expert training visits and 236 local expert training visits have been conducted and a total number of 242 seminars, round tables and trainings held.

The main goal of the RFSADP was to reduce the poverty in Moldova. Specifically, two indicators have been selected.[1,3]

According to the NBS data, the income per person in Moldova in rural area increased from 1,067 MDL at the beginning of 2011, until 1,688 MDL in the first quarter of 2016, i.e. by 58%. However, because of the depreciation of the Moldovan leu against the USD, in US dollar terms, the average income decreased from $87.8 to $85.6, or by 2.5%. The progress was significant until 2013, when the income had grown in both MDL and USD terms, however, because of the economic crisis, war in Ukraine, embargo from Russia and internal financial problems, the income per person in USD has diminished. [7]

From another perspective, because of the parity purchasing power and considering that the inflation during 2011-2016 has not reached the same level of depreciation, we can state that:

- The people in rural area live better than in 2011 and have higher incomes in MDL.
- In USD terms, people earn about the same level of money in 2016 as in 2011, however this may not be representative as the rural persons can buy more, as inflation wasn't as high as the Moldovan leu depreciation.
- The indicator can be considered partially achieved, depending on how the definition is interpreted.
- At least 20% of households involved in RFSADP activities increase household asset ownership.

According to the survey of 346 households – beneficiaries of RFSADP, some of the households have increased their wealth by having bought some items, such as fridges, washing machines or laptops/PCs.[3]

An important part of the project was a positive dynamics in the employment by micro entrepreneurs the total number of employees increased by 3.4%, including a significant increase by 17.4% of the full-time employment and a slight decrease of the family employment. These evolution show that these beneficiaries are most stable, relying more on full-time employees and less on family members, also the business are growing in size.

Table 2. Employment progress by SCA beneficiaries before receiving IFAD assistance and as of the beginning of 2016

Indicators	M.U.	Before IFAD	2016	Dynamics %
Average number of employed persons	persons	5.2	5.4	+3.4
Including, family members	persons	2.4	2.3	-2.2
Including, full-time employed	persons	0.2	0.3	+17.4
Including, temporary employed	persons	2.6	2.8	+7.2
Percent of women employed, from total	%	41.3	44.4	+3.1 p.p.
Percent of women temporary employed	%	55.3	54.7	-0.6 p.p.
Average salary, full-time employment	MDL/month	2,100.0	2,219.6	+5.7
Average salary, temporary employment	MDL/day	140.7	150.8	+7.2
Average period of employment	Days	14.7	14.6	-0.6

The average salary paid increased by 5.7% for the full-time employees and by 7.2% for the seasonal employees. The daily rate paid for the seasonal employees climbed from 140.7 MDL to 150.8 MDL, on average, however, the average employment period is only 14.6 days – about the same level as before receiving assistance from IFAD.

The women participation was at a reasonable level for the full-time employment and even slightly increased in 2016, by 3.1 p.p. until 44.4%, while the share in the temporary employment was relatively high and remained about at the same level of 55%. This dynamics show that women are more vulnerable in rural areas and they are more exposed to temporary jobs than full-times. This means that their income is not as stable as the income of men from rural areas. Giving that the number of saving credit association (SCA)' members that received support from IFAD was 1,282 , we can estimate the total number of extra employees as 236.

The salaries are comparable to micro-entrepreneur, however, after the IFAD support, the increase in salary was more robust – by 19.2% and currently, the small and medium enterprises (SMEs) employees receive on average 2,530 MDL per month. From another perspective, this indicator is still low comparing to the economy average and is just less than two times the minimum of existence – a statistics indicator showing the level of poverty in Moldova (note: in 2015, in rural areas, a person needed at least 1,650 MDL to cover its basic expenses).

During the project activity a lot of training, seminars, round tables, visit of national and international experts and for international study tours have been accomplished, including 240 trainings and seminars, 220 training visits by the national experts, 15 international expert training visits and 8 international study tours.[1,3]

The number of trained participants was significantly higher than appraisal, i.e. almost double. However, from 1,472 participants, only 8% were women, including 17% which attended trainings related to contract farming and just 6% - related to conservation farming. These represent very low rates of women participation, even if the appraisal was also low (20%). We can conclude that women have a small role in managing farming projects in rural area and there is a huge potential to develop this area.

Unfortunately, no beneficiaries of grants to farmers for conservation farming have been

granted, although it was expected that 20 grants would be offered.

If the participation in contract farming trainings was very low – 274 participants comparing to 570 expected, at the conservation farming trainings, the number of attendees was almost 5 times the target of 250 persons.

It is very important to notice that during the project implementation, some important changes were noticed in the structure of the main categories of agricultural goods produced.

•The share of cereals output in total decreased from 28% to 25.4%, but still remains the main agricultural output category.

•The share of livestock and poultry production increased from 14.5% to 18.5%. However, meat production is still low in Moldova.

•The share of potatoes significantly dropped from 7.1% (2011) to 2.4% (2013), but started to recover in 2014 – 4.4%.

•The sugar beet (industrial) doubled its share in total agricultural output from 1.6% to 3%.

•The production of tobacco decreased significantly and its share shrank from 0.5% to 0.1%.

Table 3. Structure of agricultural production by branches, total, 2011-2014, % of total

Agricultural product	**2011**	**2012**	**2013**	**2014**
Cereals	28.0	17.9	28.9	25.4
Production of livestock and poultry	14.5	21.5	15.4	18.5
Milk	10.0	11.1	8.0	9.8
Sunflower	8.9	10.5	12.7	7.9
Vegetables and melons and gourds	8.1	6.0	5.5	7.5
Grapes	6.1	10.4	9.0	6.8
Fruits, nuts and berries	6.8	6.7	5.4	6.4
Forage crops and other	4.6	5.3	5.8	6.3
Potatoes	7.1	2.5	2.4	4.4
Eggs	3.3	4.2	3.0	3.1
Sugar beet (industrial)	1.6	1.9	2.4	3.0
Tobacco	0.5	0.3	0.2	0.1
Wool	0.0	0.1	0.1	0.0
Total	100.0	100.0	100.0	100.0

The data from the table 3 shows that the total area of fruit and berry plantations has increased from 118.8 thousand ha to 135.6 thousand ha. The berry plantations area increased threefold, from 900 ha to 3,000 ha. The area of walnut plantations increased more than two times from 11,300 ha to 25,200 ha. There was a slight increase of the area of vineyards of table grapes from 19.7 thousand to 19.9 thousand ha, while the total area of vineyards decreased from 139.9 thousand ha to 135.4 thousand ha. Thus, most of the dynamics is positive.

Table 4. Area of fruit plantations and vineyards, thousand ha, 2011-2015

	2011	**2012**	**2013**	**2014**	**2015**
Fruit and berry plantations - total	118.8	119.5	122.1	122.3	135.6
Orchards total	117.9	118.8	121.3	119.6	132.6
seed orchards (apple, pear, quince and others)	66.6	66.0	66.3	59.2	65.3
orchards stone fruit (plum, cherry, cherry, apricot, etc.)	40.0	40.4	41.1	36.2	42.0
walnut (walnuts, almonds, etc.)	11.3	12.3	14.0	24.2	25.2
Berry plantations (strawberries, raspberries, currants, gooseberries, etc.)	0.9	0.8	0.8	2.7	3.0
Vineyards	139.9	140.7	136.7	140.4	135.4
Vineyards of table grapes	*19.7*	*20.2*	*19.2*	*20.5*	*19.9*

In the table 4 we can see that comparing to 2011, there is a decrease in the livestock by all kind, mostly – horses (-19%) and cows (-16%). The number of pigs, sheep and goats remained at the same level with a slight reduction. The only position that enjoyed a positive dynamics was poultry which increased by 10% in number.

Data from the table 5 shows that comparing to 2011, there is a decrease in the livestock by all kind, mostly – horses (-19%) and cows (-16%). The number of pigs, sheep and goats remained at the same level with a slight reduction. The only position that enjoyed a positive dynamics was poultry which increased by 10% in number.

Table 5. Investment in long term tangible assets in agriculture, MDL, 2011-2015, current prices

	2011	2012	2013	2014
Investments in long term tangible assets by premises with production purpose	**1,808.2**	**1,641.8**	**1,851.7**	**2,298.5**
of which:				
Public	47.5	46.1	34.0	75.5
Private	1,444.2	1,434.7	1,709.4	2,087.9
Mixed (public and private), without foreign participation	3.0	0.7	0.5	2.0
Joint ventures	234.6	92.4	27.4	120.9
Foreign investors	78.9	67.9	80.4	12.3

CONCLUSIONS

At the community level, the project indirectly contributed to the job creation and contribution to local budget. During the analyzed period, on average the number of new created jobs increased with 14%.

On the other hand, the profitability is about 26% on the average which means that members of the client groups operate on an efficient way, even if there is more room to development.

The Project aimed at creating groups of producers who would develop their businesses and acquire new knowledge and technology.

The number of activities of promoting conservation farming development exceed by far the initial goals and the number of participants at the trainings and seminars was also very high. Overall, in Moldova, there is more land processed using conservation farming technologies than before. This area increased almost 4 times, from 40 to 150 thousand ha in just five years.

For the IFAD financed SMEs, asset ownership has improved with 14% compared to baseline period, first of all, due to investment in assets imposed by the project, as well as own investments in post project intervention. Asset improvement has also been financed by accessing loans, and as consequence, the total debt has increased with 25%. Enterprise final profitability, meaning gross profit, has increased with 60% compared to baseline period.[4]

The main goal of the Project was to reduce poverty in rural areas. As the result of the analysis of the 2011-2015 macroeconomic indicators, we can state that people in rural area live better now than in 2011, have more available income in MDL terms, but about the same level in USD terms because of the Moldovan leu depreciation. Thus, considering the purchasing parity power, now people in rural areas live slightly better than in 2011, which is in line with the goal of the Project.

We estimate that IFAD have contributed through this program to creating 1,852 new jobs, thus reaching its initial target of at least 1,500 jobs by the end of the project.

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STUDIES AND STRATEGIES REGARDING THE EVOLUTION OF CROP YIELDS PER UNITOF LAND AREA IN ROMANIA

Aurel LUP, Liliana MIRON, Indira Deniz ALIM

The ,,OVIDIUS" University of Constanta, Romania, 124 Mamaia Boulevard, Constanta City, Romania, Phone: (40-41)614576; Emails: lupaurel@yahoo.com, miron_stroe_liliana@yahoo.com, alimindira@yahoo.com

Corresponding author: lupaurel@yahoo.com

Abstract

The crop yields' index – aka the agricultural output per unit area (hectares – ha) of cultivated land – is the best and most synthetic tool for analysing the agricultural sector's technological level and/or its overall competitiveness. In this regard, Romania is a truly special case. Before WW2, the country's main crop yields were largely comparable to those of other European countries. After the war, Romania invested greatly in its agriculture as it was finding it increasingly difficult to keep pace with the most agriculturally advances nations in Western Europe. Yet, rather than diminishing, the gap registered with regard to crop yields per hectare grew increasingly larger. At present, the cereal crop yields per hectare in Romania compares negatively to agriculturally advanced countries in Western Europe reaching only between 3-4 tonnes/ha. Aware of this dire situation, Romanian specialists proceeded to draft agricultural strategies that made the higher productivity yields envisaged wholly dependent on the proper allocation of inputs to this end. This paper is a synthesis of the studies and strategies carried out over the past decades aiming to meet a host of envisaged performance indicators in the area of crop yields/agricultural outputs per unit area (ha) of cultivated land. Rehabilitating irrigation systems while observing the existing environmental protection measures in place, doubling (at least) the quantities of chemical fertilizers used to this end and solving a host of apparently intractable management issues are the main factors that may help with reaching such indicators.

Key words**:** *crop yields per hectare, indicators, performance, strategy*

INTRODUCTION

The crop yields' index is the main qualitative indicator of agricultural economic efficiency. At the same time, seeded and harvested yields per hectare represent a direct productivity component which, in turn, measures work rate efficiency at all levels i.e. per economic unit, productivity sector, economic branch and/or nationwide even. On the other hand though, leaving aside the work rate productivity issue for now, it is useful to remember that land productivity multiplied by the areas of cultivated land must ensure the world's ever-growing population's means of sustenance.

The ratio juxtaposing the world's population growth against that of the agricultural production has long been researched since the bedrock of every form of societal organisation rests with securing the population's means of sustenance. Though we shan't be discussing here the infamous Malthusian spectre of an impending return to subsistence levels, given that the population increases geometrically while the production of food resources only increases arithmetically, there are plenty of competent studies forecasting either that humanity can secure its sustenance or is, in fact, on the brink of starvation [9,10].

Those most engrossed by the food security issue are the politicians and the civil servants requesting solutions to increasing the land's productivity mainly because of the significant costs involved in land reclamation (while considering land as a means of production, the agronomics specialist, Popovici-Lupa, opined that "the breadth of land is limited"[2]).

Out of the literature published on the subject, we will consider the Report on the Limits of Growth [10] – where it is shown that the best half of the 3.2 billion hectares of land suitable for cultivation is already in use as the preparation i.e. the soil tillage of new plots of land is prohibitely expensive. As such, it is hardly surprising to see the researchers' quest for extending the breadth and the productivity

of cultivated areas being echoed by the civil servants and the politicians' undertakings of extending such areas while increasing the yields per surface units.
This paper is important as it is timely since the cultivated land's lesser productivity is the main problem facing Romania's agricultural sector at the present time.

MATERIALS AND METHODS

Economics' research materials compile data available in a host of papers informing this field. Official documents were consulted to ascertain the given subject-matter's long-term evolution. The materials that were eventually selected were then interpreted using specific methods of selection, analysis, synthesis, drawing conclusions and suggesting concrete proposals.

RESULTS AND DISCUSSIONS

Outputs per surface unit and the zoning of agricultural production.

One of the factors that may bring a decisive contribution to the growth of outputs per surface unit is that of zoning agricultural production i.e. cultivating only the types of cultures or raising the cattle best suited to a particular region [2].
In accordance to this principle, over the 1975–6 period, an ample territorial allotment programme – involving Romania's entire agricultural production – was undertaken on the occasion of the Eleventh Congress of the Romanian Communist Party. This agricultural development programme was meant to set out the country's long-term outlook, according to its national economy planning strategy, until the 1990s horizon. (Fig.1)
Every one of the country's research institutes and experimental stations researchers together with the Ministry of Agriculture and County DGs specialists had taken part in the drafting of this (White) Paper.
This Paper was coordinated by a central zoning commission led by the incumbent Minister of Agriculture together with a host of local county commissions that were, in turn, led by the heads of their respective DGs. The resulting drafts were edited and compiled into one Country Synthesis (namely, The Study Book no.105 IEA - ASAS) accompanied by some forty papers for each one of the constituent counties by the Academy of Agricultural and Forestry Sciences' (ASAS) Agrarian Economy Institute. The Research Paper's temporal horizon was 1980–1985–1990.

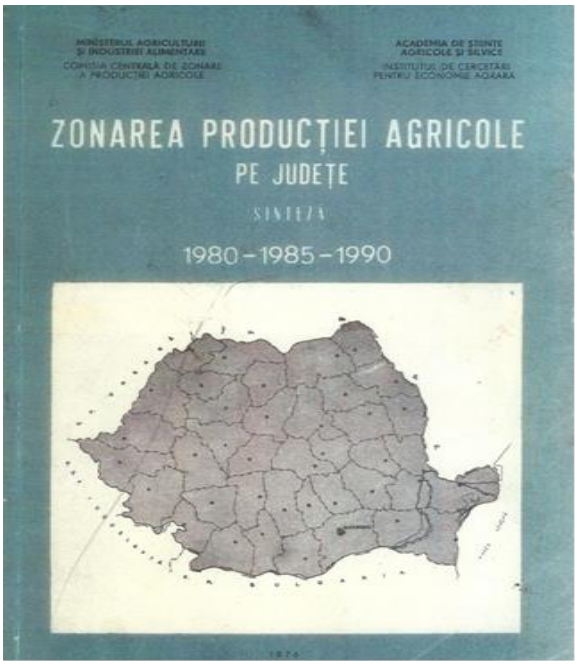

Fig. 1. The Cover of The agricultural production zoning

From this paper, which had been conceived as a social ordering manifesto, resulted that the yields produced by the agricultural sector were to cover the internal consumption needs as well as provide a surplus big enough to be exported, based on using, with maximum efficiency, the available natural, technical and human resource factors.
From a methodological standpoint, linear programming had been modelled nationwide using 40 models for each of the country's counties, in one or two versions. Also, mathematical economic models were used for the first time ever using electronic calculation techniques – with the Felix 235 computers being used to this end. [4]
While specifically important as well as being a world premiere, too, this 1975–1976 Zoning Project did not stop at allotting territorial units while structuring the entire agricultural sector into socio-economic sectors (the state sector,

the cooperative one and the small, non-cooperatively assembled – hence, privately-owned – plots of land).

Social and economic resources were being zoned now based on product-specific technologies for which economic and technical indicators – including the net income (profit), used as the main target function in economic and mathematical modelling.

Based on the available mathematical and economic models, in the '90s, agricultural yields had been forecasted to reach between 29.1% and 36.6% nationwide. Following zoning works that combined an entire complex of natural, economic and social factors, twenty republican zones with a more or less complex profile were created (Fig.2).

Zone's profile

1. Meat , milk , maize , sugarbeet , sunflower
2. Meat , milk , maize , sugarbeet
3. Meat , milk , maize , sunflower
4. Meat , milk , maize , vegetables
5. Meat , maize , sunflower
6. Meat , maize , sugarbeet
7. Meat , maize
8. Meat , maize , vineyards
9. Meat , maize , soyabean
10. Milk , meat
11 Vineyards , meat
12 Vineyards , milk , meat
13 Orchards , meat , wheat
14. Milk , potatoes, wheat
15 Milk , potatoes , wheat , flax
16. Milk , wheat
17. Wheat , milk
18. Wheat , milk , orchards
19. Meat , milk , wool , potatoes
20. Meat , milk , wool

Fig. 2. Romania's Production Macro-zones
Source: Lup A. (2007): An Introduction into the rural-agrarian economy and politics [7].

Aside from the zoning of land parcels according to designated uses, the setting up of macro-zones was aimed at zoning various groups of cultures (for ex. vegetables), and the grouping of the principal cultures: wheat, maize, sugarbeet, according to existing ecological conditions and/or their importance considering that a variety of cultures vie for the most fertile parcels of land (Fig. 3).

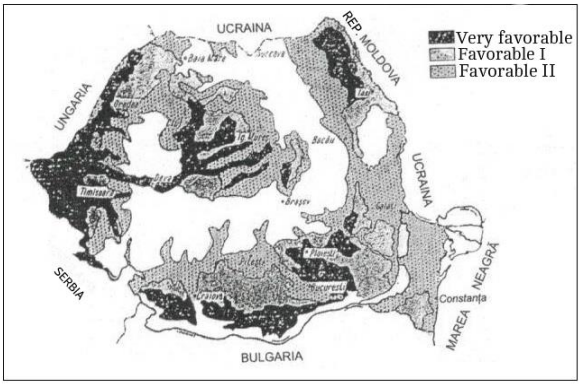

Fig. 3. The ecological zoning of wheat cultures
Source: The Institute of Pedology and Agrochemistry

Though agricultural production zoning was meant as a long-term development strategy, it was beset by a host of less appealing aspects – inherent to the centralised command conditions under which it operated.

Firstly, productivity parameters' projection was unduly optimistic as were the much reduced production costs all of which resulted in such high levels of economic efficiency.

Overall, the set objectives were overly ambitious, even when considering their being set against the 1990's horizon, at a time when they were supposed to reflect the ongoing agricultural modernising and intensifying processes (such as the completion of the reclamation works, the modernisation and growth of the numbers of tractors and other agricultural machinery and/or the modernisation of animal husbandry facilities so to enable a substantial growth of the livestock).

Table 1. Outputs per surface units forecasted in the Zoning Paper compared to levels prior to the drafting of this Paper and compared to the final years of the command economy in Romania.

Cultures	Years				
	1973-1975	1980	1985	1990	Real 1987-1989
Wheat	2,150	3,240	3,744	4,320	3,246
Maize	2,597	4,440	5,920	7,400	2,651
Sunflower	1,417	2,176	2,368	3,200	1,533
Sugarbeet	22,396	40,150	51,100	65,700	22,049

Source: Zoning agricultural production in Romania's Yearbooks of 1976 and 1990 [13]

For example, cereal production ought to have reached by then in excess of 30 million tonnes – with wheat yields of over 7 million tonnes

and maize yields of over 21 million tonnes – while livestock ought to have numbered in excess of 10 million bovines, almost 20 million porcine and some 21 million ovines.

The Methodology used for calculating yields. To ensure that the reported yields per hectare had been properly reasoned prior to their release, The Pedology Institute's Quality Assurance Certificates – issued on zones and sub-zones – were used here. [11]

Thus, the starting point to our research endeavour rests with the natural QA Certificates – whose value (measured in yield kilos per QA point) rose as technological and other agricultural production factors (such as the use of fertilizers, for instance) were underscoring the soil quality improvements being undertaken at the time.

In the end, five successive yield scenarios, that were dependent on assuring the above-mentioned conditions, came out of this:

Scenario 1: 2,750 thou ha irrigated; 3,000 thou tonnes chemical fertilizers etc.; 125 thou tractors (1990 level);

Scenario 2: 3,700 thou ha irrigated; 3,400 thou tonnes chemical fertilizers etc.; 150 thou tractors;

Scenario 3: over 5,000 thou ha irrigated; 3,960 thou tonnes chemical fertilizers etc.; 185 thou tractors. N.B. This scenario, which had been envisaged for the 1990 temporal horizon, fell in line with the Romanian Communist Party's XIth Congress directives;

Scenario 4: over 5,000 thou ha fully operational land reclamation works; approximately 4,850 thou tonnes of chemical fertilizers etc.; 200 thou tractors, meaning full agricultural mechanization; high-standard biological agricultural materials;

Scenario 5: over 5,000 thou ha irrigated, completing all land reclamation works started, eliminating soil salinization / acidity, using 5,500–6,000 thou tonnes of chemical fertilizers; products with a high content of soil mineral substances (mineral oil, sugar); highly qualified workers. 2000s' temporal horizon.

Of the five scenarios, the first one corresponds to the 1980s temporal horizon, whereas Scenario 3 corresponds to the 1990s horizon. Meanwhile, Table 2 presents the main economic indicators in the agricultural production zoning context. Considering this data globally, at an agricultural sector level, renders the differences between these five scenarios largely insignificant. It is interesting to note that while the resulting yields hovered around the estimated values (V_2), the material costs incurred as a result were considerably higher than planned, which diminished the net income. [13]

Table 2. The main economic indicators of zoning (Billion lei)

Economic indicators	Central proposals 1990			Resulted from zoning works			Achieved 1984
	V_1	V_2	V_3	$V_{2.1}$	$V_{2.2}$	$V_{2.3}$	
Global agricultural production	194	219	241	223	226	220	197
-vegetable	102	114	123	121	120	120	107
- livestock	92	105	118	102	106	100	90
Material costs	98	113	124	126	130	117	106
Net production	96	106	117	97	96	103	
Payroll costs	41	43	48	43	45	44	
Net income	55	63	69	54	51	59	
Productivity rates %	39.6	40.4	40.1	32.0	29.1	36.6	

Source: Zoning agricultural production in Romania's Yearbooks of 1976 and 1990 [13]

Zoning Agricultural Production in Romania is the only Research Paper of this kind tackling the issue of evaluating the economic effects of such works. On the last of the table's (eight) columns, the figures registered there correspond to the global and net yields achieved between 1986–8 [5] showing that the zoning estimates had been too optimistic still despite the fact that over the more than twenty years' period separating the time when the Paper had been published and the final years of planned agriculture, the evolution of prices had a positive effect on those figures.

In reality, the economic indicators which the Romanian agriculture grew accustomed to had been negative mainly because of a failure to achieve the planned production quotas.

In turn, this failure owed to the fact that the allocated resources were well below the level required by those designing these scenarios. For instance, as regards Scenario 1, designed for the 1980 temporal horizon, the irrigated surfaces had been of a mere 1611 thousand ha, instead of the 2750 thou ha required, while the chemical fertilizers allocated were a mere 1,114 thou tonnes instead of the 3,000 thou

tonnes that would have been needed.
Likewise, in 1989 (with the 1990 horizon in mind) only 2,527 thou ha were irrigated instead of the more than 5,000 thou ha needed, while there were 30 thou fewer tractors than were required [6]. Similar to nationwide zoning, forty county-level zoning works were now undertaken.

Table 3. The production zone's profile in the Constanta county

Zone	Agricultural products characterising the geographical zoning profile (in order of their respective percentages)
1	Meat, grapes, fruits, wheat, sunflower, linseed, veg. oil
2	Meat, grapes, maize, wheat, suflower, linseed, veg. oil
3	Meat, maize, milk, sunflower
4	Meat, maize, milk, sugarbeet, sunflower
5	Eggs, meat, milk, maize, vegetables
6	Meat, maize, vegetables, sunflower, soya
7	Meat, maize, soya, vegetables
8	Meat, maize, soya
9	Maize, meat, milk, soya
10	Meat, maize, milk, grapes, fruits

Sursa: Agricultural production zoning in the Constanta county

Fig. 4 illustrates the zoning of the vegetable and livestock production in the county of Constanta, whereas table 5 presents a profile of these ten county zones [5].

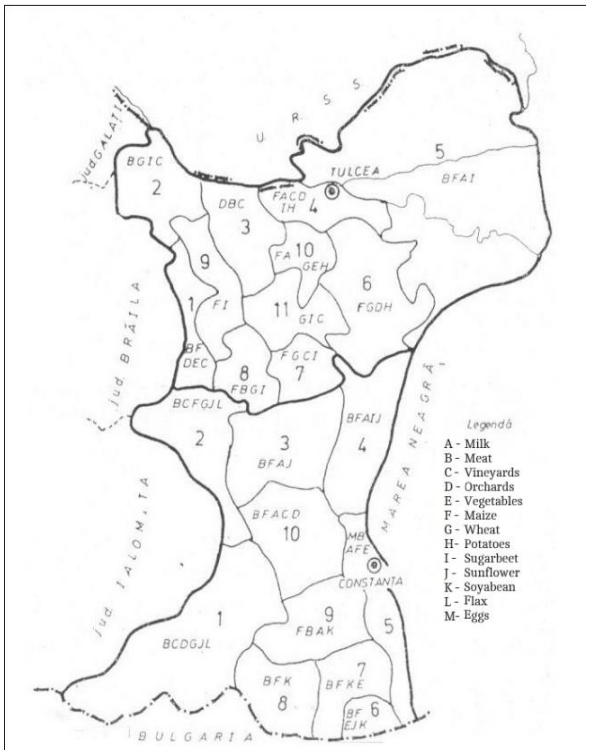

Fig. 4. The disposition of agricultural production zones in the Constanta county
Source: Agricultural production zoning in the Constanta county

Studies, proposals and strategies regarding the evolution of yields per ha in market economy conditions (after 1990). The political decision taken to adopt a market economy upon adhering to the European Union was taken in the context of abolishing the old, planned agriculture system and, with it, doing away with all of the old structures of production. It is fair to note that the old agricultural cooperatives' system had been a functional one whereby the agricultural sector would benefit from a moderate allocation of production factors, irrigation systems, a steady if largely insufficient supply of fertilizers, tractors and a decades-old managerial experience asked to compete on a safe if none-too-advantageous market.
Given these conditions the lowering of yields became but a logical consequence. A redressal of sorts did take place eventually yet, it did so with varying results given that while, on the one hand, large farming enterprises, practicing agriculture at the highest European standards, have since been reconstituted, these are being swamped by no fewer than 3.6 millions small family businesses, where subsistence farming is being undertaken using traditional farming techniques that generate extremely low yields. A weighted average between these two types of farming and their respective yields remains modest. As such, specialists, administrators, local government officials and foreign firms are all trying to decipher the likely tendencies of the resulting yields given the Romanian breeds' potential and the technological progress to be had.
The Romanian cereals' market and its exporting outlook. In 1997, the World Bank did a market study by trying to put to the test Romania's cereals' production and storage capacity [6]. This study's conclusions are being presented in the Table below.

Table 4. World Bank proposals with regard to the yields' tendencies in 2000, 2005 and 2010 (kg/ha)

Culture		2000	2005	2010
Wheat	Min.	3,400	3,700	4,000
	Max.	3,400	3,900	4,400
Maize	Min.	3,600	4,000	4,500
	Max.	3,600	4,300	5,000

Source: Romanian Grain Market and Export Project, Buharest,1997

Extrapolating the 1970–'90 period reveals a positive trend if, and only if, the dramatic drop in yields after 1990 remains unaccounted for.

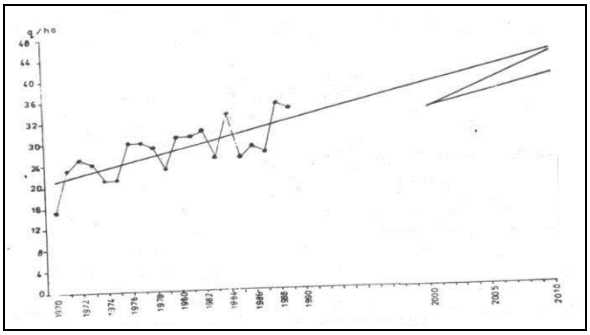

Fig. 5. Simulating possible trends of average yields of wheat in Romania, based on the 1970–'90 yields.
Source: Romanian Grain Market and Export Project,Bucharest,1997

Nevertheless, the authors still appeared to believe there was scope for improvement in Romania's agriculture though the yields for the 2000 horizon remain relatively optimistic.

The Agrarian Economy Institute's Forecasts [3]. In chapter 29 of *The Ago-alimentary Economy* study, A. Gavrilescu and Daniela Giurcă publish a series of forecasts regarding the evolution of the principal cultures' yields under four scenarios: ideal, moderat, pesimistic and crisis. The results of the first three scenarios are presented in Table 5.

Table 5. Different yields' proposals for the 2005–2020 period (kg/ha)

Culture	2005	2010	2015	2020
A Pessimistic Evolution				
Wheat	3,000	3,100	3,300	3,300
Barley	3,500	3,800	4,000	4,300
Maize	4,200	4,500	4,800	5,000
Soya	2,000	2,100	2,200	2,400
Sunflower	1,300	1,500	1,800	2,200
Sugarbeet	19,000	21,000	24,000	25,000
Potatoes	15,000	16,000	17,000	19,000
A Moderate Evolution				
Wheat	3,200	3,300	3,400	3,600
Barley	3,800	4,200	4,500	4,700
Maize	4,500	4,700	5,000	5,400
Soya	2,000	2,100	2,300	2,500
Sunflower	1,500	1,700	2,000	2,500
Sugarbeet	20,000	23,000	25,000	30,000
Potatoes	15,000	16,000	18,000	20,000
The Ideal Scenario				
Wheat	3,300	34,000	3,600	4,000
Barley	4,000	4,500	5,000	5,000
Maize	4,800	5,300	5,800	6,000
Soya	2,000	2,200	2,500	2,700
Sunflower	1,500	1,900	2,400	2,800
Sugarbeet	22,000	25,000	30,000	35,000
Potatoes	18,000	20,000	22,000	25,000

Source: Gavrilescu D., Giurcă Daniela, 2000, Agro-alimentary Economy

The Development Strategy of Romania's Agriculture, Food Industry and Silviculture [14]. This strategy was drafted by the line ministry's specialists in 2001 and it encompasses the 2000, 2005 and 2010 horizons. The figures in Table 8 indicate a significant rise from the 2000s level to that of 2010, being seen as a fairly reasonable bet.

Table 6. The yields being put forward by Romania's Ministry of Agriculture and Rural Development with regard to wheat, barley, maize and sunflower cultures for the 2000, 2005 and 2010 horizon (kg/ha)

Culture	2000	2005	2010
Wheat	2,280	3,300	4,000
Barley	2,700	4,400	5,000
Maize	2,600	4,100	4,500
Soya	600	1,850	2,000
Sunflower	820	1,600	2,000

Source: The Ministry of Agriculture and Rural Development [14]

Romania's National Strategic Framework for Sustainable Rural Development [17]. This is a remarkably complex study drafted by a highly qualified team of specialists. Regarding yields forecasting it focuses on the 2020–'30 horizons using the 2010 yields as a starting point (Table 7).

Table 7. Main cultures yields forecasting for the 2020–2030 period by comparison to the 2010 yields (kg/ha)

Culture	Romania			The European Union		
	2010	2020	2030	2010	2020	2030
Wheat	2,688	4,000	6,300	5,909	6,346	
Barley	2,540	3,500	4,600	4,387	4,646	
Maize	4,310	5,500	7,300	7,185	7,348	
Oleaginous plants	1,687	1,834	2,790	2,651	2,798	
Potatoes	13,354	20,000	26,000			
Vegetables	14,704	21,000	27,000			

Source: The National Strategic Framework 2010-2020-2030 [17]

It is considered that by 2030, the main culture yields in Romania might reach the levels reached by 2020, in the rest of the European Union.

CONCLUSIONS

Analising the crop yields per unit area of land's long-term evolution reveals the fact that, over time, their growth had become highly accelerated being influenced by a multitude of factors, the most important of which being the extension of irrigated land

surfaces, the creation of high-performance biological materials, the use of ever-larger quantities of fertilizers and last, but by no means least, the increasing use of high yield farming techniques.

If one considers the fact that more than two millennia were needed to reach yields of 1,000 kg/ha of wheat – starting from yields of around 300 kg/ha in classical, Greek–Roman antiquity – a mere century-and-a-half would be needed to raise 1,000 kg/ha yields to yield levels of 3,000 kg/ha, with the next tripling of yields being possible in just another half century – fifty years, more precisely.

On the other hand, regional differences have a significant role to play here. Considering things from this perspective makes Romania a rather special case. Significant crop yields per unit area of land's evolution takes a lot longer to occur in Romania despite its researchers' best efforts to bring about tehnologies that would enable high-yield farming agriculture.

As with inter-regional differences, the gap between the experimental yields, obtained in controlled research conditions and production yields in the field are considerable. The quality of the techniques and the technologies employed to this end greatly influences the land's productivity performance.

In Romania, for example, the considerable investment effort that had been made over the latter half of the twentieth century reflected poorly in terms of the yields that were generated mostly due to chronic management deficiencies.

At present, the reduced national yield average owes to the improper weighting of the two categories of farmland exploitation – whereby millions of subsistence farming on plots of privately-owned land are weighing heavily on the few if high-performance exploitation enterprises. The solution to this conundrum rests with incorporating the former into the latter types of agricultural concerns, including pooling them together, eventually.

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RURAL TOURISM IN THE NORTH WESTERN REGION OF ROMANIA

Ancuța MARIN[1], Daniela Ileana GODJA (DĂNILĂ)[2]

[1]The Research Institute for Agricultural Economics and Rural Development, 61, Mărăști Blvd, District 1, Bucharest, Romania, Email: marin.ancuta@iceadr.ro
[2]Bioterra University Bucharest, 81, Gârlei Street, District 1, Bucharest, Romania

Corresponding author: marin.ancuta@iceadr.ro

Abstract

This paper aims to analyse the data related to tourism and agro-tourism in the North-Western region of Romania and the number of Romanian and foreign tourists. This analysis represents partial data from the paper entitled "Research regarding the management of quality of activities and agro-tourism services in the North West region of Romania" which will be sustained and published soon.The data were collected from National Institute of Statistics and processed according to the study purpose, namely the establishment of a agrotourist boarding house in a village in the county of Maramures.In order to accomplish this, it was necessary to analyze the tourism potential, types of tourism from the region and the local market. From the present paper resulted a multitude of reasons to set up a agrotourist boarding house in an area of a rare natural beauty. Almost in no other area in Romania you will not see traditions better maintained than in Maramures. One possible explanation for the high percentage that agrotourist pensions have in the total number of accommodation in Maramures County is the fact that it could be exploited the existing buildings that have been modernized and adapted to the current rules.The second explanation could be that they provide the visitor welcoming accommodation facilities, warm or even unusual for foreigners.

Key words**:** *agro-tourism, tourists, North-Western Region, Romania*

INTRODUCTION

The tourism exploits the natural and anthropic potential of a country having a multiplying effect by introducing into the economic circuit, unusual sides such as the landscape, hospitality, solicitude and geographical information, cultural, historical, culinary, artistic, etc [1],[4].

The rural tourism includes a wide range of ways of accommodation, activities, events, celebrations, sports and entertainment, all taking place in a typical rural environment.It is a concept that includes tourist activity organized and led by local rural population and is based on a close connection with the natural and human environment [5].

Rural tourism capitalizes traits involved in tourism development act by the following elements:

-precincts of the village and the family estate as the basis of the process of living and carrying out specific activities;

-rural population;

-natural assets that meet personal requirements and those of the tourism offer.

Rural tourism has a receiving heterogeneous structure that is not represented by farms but by the holiday villages, bungalows or villas. All of which are clustered around common areas for meals, travel plazas, camps for environmental activities, art camps, amusement and sports not ultimately recreation.

There were identified several types of touristic villages, namely:

(i)*Villages of artistic creation:* the villages where the basic concern are popular archaic techniques: painting on glass, wood and stone carving, weaving traditional clothing and traditional sewing, ceramics, etc. (Săpânța - Jud Maramures).

(ii)*Villages ethnographic folklore:* the villages where traditional costumes, architecture and interior decoration, popular music and choreography prevails (Bogdan Voda - Maramures County).

(iii)*Villages of fishery and hunting interest:* the villages which can offer besides accommodation also culinary services typically for hunting and fishery (villages from Bistrita valley and Viseu valley).

(iv)*The Villages for sports:*are villages from mountainous and hill areas where there are facilities for winter sports and water sports (Cavnic) [2].

The agritourism in Romania represents an opportunity especially for the local people taking into account the crisis in the agricultural sector are willing to try a new activity using the infrastructure already available to improve profitability. But equally true it is that rural tourism can be an opportunity to make a deal for those who, tired of the pace stressful life of the city and eager to make a change, may be interested in the idea of moving to the country along with his family to work the land and provide hospitality to tourists [6].

In terms of entertainment, rural tourism is a form of tourism with more variety and uniqueness in achieving of services that are offers people who love nature, culture and peasant art [3].Therefore agrotourism is closely related to farming activities that may constitute a complementary solution to support direct its development with good results social and economic.

MATERIALS AND METHODS

In order to characterize tourism and agrotourism in Maramures County, North Western region of Romania, were used the following indicators: the number and percentage of agrotouristic pensions in the northwestern region and particularly in Maramures County, the top of localities in Maramures County based on the number of pensions, the number and percentage of Romanian and foreign tourists in the North West region. The period under review is 2012-2016. Data were collected from National Institute of Statistics and processed according to the study purpose.

RESULTS AND DISCUSSIONS

The impact of tourism development has the effect of regional development that is oriented according to studies on the following issues:

-increasing the size of the household;

-technical endowment of households constitutes a condition of raising the efficiency of resources utilization;

-professionalisation and education, which constitute a lever to improve the living standards of citizens through efficient utilization of resources.

Simultaneously both official statistical records and official documents of the functionality of rural tourist guesthouses present terms such as: the characteristics of pension, expenses and income, inputs, etc.

Research by the World Tourism Organization in order to establish and identify the impact of tourism development on national and regional economies have enabled grouping them into two categories of indicators (Table 1).

Table 1. Indicators for evaluating agro tourism

Result Indicators	Impact indicators
➢ the number of households equipped for agro-tourism	➢ increasing the value of the construction through amenities
➢ the number of tourists/year	➢ the complementary amount of revenues
➢ the number of new jobs created or maintained	

Table 2. The number of agrotourist boarding houses

The reference years	Total for northwestern Region		Maramureș county	
	Number	%	Number	%
2012	252	100%	78	30.95%
2013	231	100%	78	33.77%
2014	226	100%	71	31.42%
2015	246	100%	79	32.11%
2016	284	100%	104	36.62%

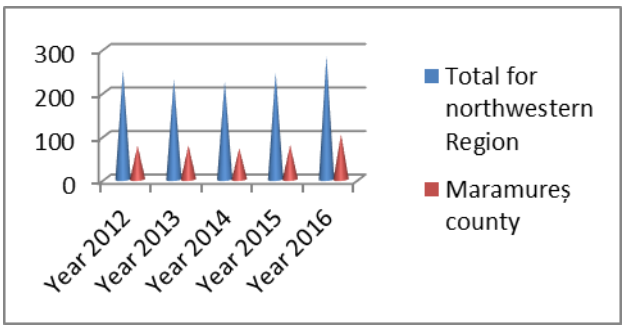

Fig. 1. The share of agrotouristic pensions from Maramures County in the total of NW Region

Analyzing the number of rural tourism units

from Maramures County in the 2012-2016 period, on settlements, show the following (Table 2, Figure 1):
-in Maramures county are 40 localities where pensions were established in 2012-2016;
-by averaging at county level it ranged between 1.77 guesthouses / village in 2014 and 2.6 guesthouses / village in 2016;
-We note that there are places (eg. Sighetu Marmaţiei) where there was only one pension and therefore that pension not resisted, but also places where their number has increased sharply, from 7 to 10 in the town of Poienile Izei;
We can establish a ranking of settlements with agrotourist boarding houses; so first place is occupied by Ocna Şugatag, followed by Poienile Izei, Botiza and Vadul Izei are on 3rd place and 4th place is situated Bârsana village (Table 3).

Table 3. The top five localities in Maramures County

Maramureș County						
		2012	**2013**	**2014**	**2015**	**2016**
1	***Ocna Sugatag***	12	14	12	11	13
2	***Poienile Izei***	7	7	7	7	10
3	***Botiza***	8	8	8	6	8
4	***Vadu Izei***	8	7	6	8	8
5	***Barsana***	4	4	3	8	7

During 2012-2016, in Maramures County, the number of tourist accommodation structures ranged from 168 in 2014 to 221 in 2016. The number of tourist boarding houses and agrotourism units, which constitute the majority (78.73%), practically exploded. In the case of pensions, the minimum recorded was 53 in 2012 and the maximum of 72 was recorded in 2015. Regarding the number of agrotourist boarding houses, the minimum number recorded was 71 in 2014, and the maximum of 104 in 2016. There is an increase of 19 units in tourist guesthouses in 2016 compared to 2012 (minimum compared to maximum) and 33 units in the case of rural tourism units (Table 4). From the total of tourists structures recorded in Maramures County in the 2012-2016 period, the share of rural tourism units in the total varied between 40.51% in 2015 and 47.06% in 2016. In tourist guesthouses, the variation was between 30.99% in 2012 and 36.92% in 2015 (Table 4).

Table 4. The share of main accommodation structures in Maramures County

Maramureș County							
Year	**Guesthouses**		**Agrotouristic guesthouses**		**TOTAL**	
	Number	**%**	**Number**	**%**	**Number**	**%**
2012	53	30.99%	78	45.61%	171	100%
2013	64	35.56%	78	43.33%	180	100%
2014	58	34.52%	71	42.26%	168	100%
2015	72	36.92%	79	40.51%	195	100%
2016	70	31.67%	104	47.06%	221	100%

One possible explanation for the high share that agrotourist pensions have in the total of accommodation from Maramures County is the fact that existing buildings could be exploited after they have been modernized and adapted to the rules in force. The second explanation could be the fact that provides tourists with welcoming accommodation facilities, warm or even unusual for foreigners. Either way, Maramures is famous for hospitality of the hosts. In order to complete our image of the competition among the accommodation from the northwestern region of Romania, we must consider the number of tourists staying in them as well as stays duration which they spend.

Table 5. Share of Romanian and foreign tourists

Reference years	North Western region		TOTAL
	Number	Percent	
2012	137,078	15.12%	906,504
2013	148,634	14.92%	996,475
2014	167,927	15.53%	1,081,521
2015	221,995	16.22%	1,368,992

Whether the growth at the country level was 51.01% in 2015 compared to year of reference, at the northwestern region level the increase was 61.94%.The increase by 462.488 tourists at the country level could be attributed to the rise in tourists' interest to know

Romania, increase in revenues and/or external conditions (attacks in Nice and Berlin, political and economic crisis in Greece, Brexit) that discouraged the tourism abroad (Table 5).

CONCLUSIONS

It follows that the decision to build a guesthouse, for example in the area of Bârsana, will prove difficult because direct competition (7 pensions) and indirect (39 agrotourist boarding houses) within a radius of 20 km around Barsana, is extremely serious.Positioning, conditions and facilities must be more than what they offer.

From this paper follows a multitude of reasons to set up an agrotourist pension in an area of a rare natural beauty. Almost in no other area in Romania you will not see traditions better maintained than in Maramures.

Hospitality of the people that welcomes you in the door with a warm smile, offering you the dishes prepared in house with lot of hard work, but with a lot of heart, lodging in room appointed with wooden furnishings, crafted by local carpenters, adorned with counterpanes and pillows and weaved carpets crafted bu skilledwomens, complete the idyllic image of Maramures.

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SEED SUPPLY AND SEED PREFERENCES OF POTATO FARMERS: NIGDE CENTRAL AND IZMIR ODEMİS PROVINCES

M. Çağla ÖRMECİ KART , Canan F.ABAY, Selina GÜNGÖR, Zeynep ÖZER

Ege University Faculty of Agriculture, Department of Agricultural Economics, İzmir, Turkey, Email: caglaormeci@yahoo.com

Corresponding author: caglaormeci@yahoo.com

Abstract

Potato is one of the most important staple food crops with a significant role for food security and a potential commercial crop in Turkey. As of 2015, Turkey's potato production amounted to 4.76 million tonnes, and approximately 14.18% of the production occurred in Nigde and 8.57% in Izmir provinces. High-quality seed is the main input for potato production. Import of seed potatoes (rootstock) has increased by 145% and certified seed potato production has increased by 156% in the last 10 years in Turkey. The aim of this study is to determining seed preferences for potato producers in major potato production area, Niğde and İzmir, in Turkey. The study is based on the sample of 141 farmers (69 from the Central district in Nigde and 72 from Odemis district in Izmir) calculated according to the proportional sample size method for 10% error margin and 90% confidential intervals. Conjoint analysis was employed to examine farmers` seed preferences, using seed price, yield, resistance to diseases, production type, maturation time and storage time as the seed attributes. According to the conjoint analysis results, production type has found the first important factor in both research regions such as the cooking type in Nigde, industrial type in Odemis are preferred by farmers. This shows that marketing options affect farmers' potato seed choices. Disease resistance has found the second important factor in Nigde and third in Odemis after the yield performance when buying seeds.

Key words**:** *conjoint analysis, farmers' preferences, potato seed, Turkey*

INTRODUCTION

Potatoes are consumed as human food and animal feed, processed (chips, finger potatoes, etc.) in various forms. It is known that potato is a valuable nutritional source, especially for underdeveloped and malnourished countries. The United Nations Food and Agriculture Organization (FAO), who believes that potatoes are at the top of the list of products that are currently making a contribution to the resolution of these problems, faces the inauguration and malnutrition of millions of people and has announced 2008 as "World Potato Year" to raise awareness. It is known that potato is one of the most important agricultural product for our country; primary income source for tens of thousands producers' families and the most important food item for many families. It has been determined that about 56% of the potatoes produced in Turkey consume freshly and the fresh potato consumption is around 36 kg per person (Çalışkan, 2014) [5].

Seed is an important input in potato growing as in all crop production. Seed is the main input for plant production and high-quality seed is the first condition of yield productivity. During the production process, a seed problem can be negatively affected not only producers and consumers and many sectors (transport, storage, agricultural employment, industry etc.) between of them. Vegetative propagation of the potato with the lump can cause disease and pests to transport easily by the seed, deterioration of the seed quality more rapidly. Because of this feature of the potato seeds, the use of high-quality seeds is more effective on yield than on other field crops (İşler, 2012) [12].

It has known that potatoes with a history of about 150 years in Turkey; are becoming a sector in itself by the production, marketing and consumption phases. Thanks to the agro-ecological resources that Turkey has, it has proved to be a very privileged position in terms of potato production (İşler, 2012) [12].

The potato is grown in more than 70 provinces of Turkey. As of 2015, Turkey's potato production amounted to 4.76 million tonnes, and approximately 14.18% of the production were occurred in Nigde, 10.37% in Konya and 8.57% in İzmir provinces (TÜİK, 2016) [24]. In order to ensure sustainable production of such an important agricultural product, it is necessary to supply quality seeds at the quality and quality desired by the potato producers. Soil structure, choosing the right potato variety, healthy potato seeds and cultural precautions are the main factors affecting production yield in potato farming.

It has been determined that potato seed is an optimum ambience for many diseases because of 80 per cent water contains. Vegetative propagation with seed made potato seed more sensitive to other plant pathogens that other cultural crop (Taşkın and Erkan, 2013) [22]. Experts forecast that 12% of the potato varieties become extinct in the forthcoming 50 years. For this reason, desired potato seed features and seed supplying places have to be chosen very carefully by potato producers according to the production purposes with the sufficient knowledge consciously. If the chosen seed variety regardless of how high yield potential, does not have the characteristics desired by the producer, it will not be possible to reach the targeted yield. For this reason, potato seed needs to be produce in desired features by potato producers to obtain high quality and sufficient quantity. It is important to determining potato producers' seed usage and seed preferences and seed purchasing behaviour because of that reason. It is important that to know seed supply sources and seed preferences to generate a good supply chain compatible with the farmers' preferences. This is the main point of this research. It has been determined that various studies have been done in several countries related to potato seed usage and farmers preferences (Batt, 2001; Fuglie et al., 2005; Fuglie et al., 2006; Kivuva et al., 2014) [4, 7, 8, 14].

It has not found any research in Turkey related to potato seed supply preferences and affecting factors.

This research is also important at that point. The main aim of this study is to determining seed supply sources of potato producers in Nigde which are the ranked the first in terms of potato production and İzmir provinces; also put forth which factors are considered for seed choices. Auxiliary aims of the study are listed below depending on study main aim.

-Determining usage rate of certificied potato seed and reason of nonusage of certificied seed,

-Determining seed supply places and the reasons of chosen this places

-Determining importance level of seed variety features and which are considered by potato producers comparing features by two important (Nigde and İzmir) production regions,

-Determining problems arise from seed and comparison problem by two important production regions

-Determining problems which producers encounters during the supplying process

-To give suggestions on seed production and supply by considering effective factors on farmers' preferences.

MATERIALS AND METHODS

It is known that potato produce in every region of Turkey with the planting area of 17966 hectares in 2014 Nigde is the biggest (14 per cent) producer city in Turkey.

It has been determined that İzmir city is ranked the third (8 per cent) in Turkey with the 10590-hectare potato production area (TÜİK, 2015) [23].

Main data are obtained in the face-to-face survey, which was carried out with the potato producers in Nigde (Central) and İzmir (Odemis) in December 2015.The sample size is calculated according to the proportional sample size method which formula is given below (Newbold, 1995) [18].

This sample size method is most applicable for the initial survey in an investigation and for studies, which involve sampling from a small area where the sample size is relatively small (Jayaraman, 1999) [13].

As determining sample volume, calculations were made by including the values for 10% error margin and 90% confidential intervals

into the formula given below.

$$n = \frac{Np(1-p)}{(N-1)\sigma^2_{\hat{p}_x} + p(1-p)}$$

n=sample volume
N= number of potato farmers (Nigde Central: 2455; İzmir Odemis: 5818)
p= rate of potato producers (p is taken 0.5 to reaching maximum sample size)
= population variance (%90 confidential intervals and %10 error margin).
According to these calculations, the sample size was totally found 66 farmers in Nigde Central and 67 farmers in Odemis, which should be interviewed. Survey forms were arranged for required information and filled in by face-to-face interviewing. It was determined that 133 potato producers would be sufficient to negotiate. However, 69 surveys were conducted in Nigde and 72 surveys were conducted in Odemis. Besides the survey, relevant literature such as statistical bulletins, research reports, thesis, articles, and public records has been used for dissection. Villages have been chosen according to the records and Food, Agriculture and Animal Husbandry Ministry experts' opinions. Finally, Konaklı, Alay and Kiledere villages in Nigde Central; Karakova, Çaylı, Kazanlı villages in Odemis province has been chosen which are the dominant in potato production. Numbers of interviewed farmers has been distributed proportionally according to the numbers of producers.
Conjoint analysis is used to determining factors which affected farmers seed choices. Conjoint analysis is used in marketing research to analyse consumer preferences for products and services.
Conjoint analysis is a popular marketing research technique. It is used in designing new products, changing or repositioning existing products, evaluating the effects of price on purchase intent, and simulating market share (Kuhfeld, 2005) [15].
Conjoint measurement is used to investigate the joint effect of a set of independent variables on an ordinal scale of a measurement dependent variable.
It is determined conjoint analysis is widely used producers seed preferences (Baidu Horna et al., 2005; Prasad et al., 2006; Nelson, 2013) [11, 17, 19].
The first step of the conjoint analysis is to determining probable seed factor and features which are affected farmers' decision.
This stage is important due to the statistical adequacy and reliability of the analysis results (Çelik, 2003) [6].
Generally, a number of variables are six or seven in the conjoint analysis (Saraçlı, 2004) [21].
According to literature many factors affect farmers' potato seed choices.
According to the literature and expert' remarks important potato seed features are seed price, yield, disease resistance, production type (industrial, cooking), harvesting time and storage duration. Seed features and levels are listed in Table 1.

Table 1. Seed features and levels on farmers seed choices

Feature	Number of level	Explanation
Seed price (TL/kg)	3	1.5 TL/kg 2.0 TL/kg 2.5 TL/kg
Disease resistance	2	Resistant Delicate
Yield	3	Low: 2,5 ton Medium: 3,5 ton High: 4,5 ton
Production type	2	Industrial Cooking
Harvesting time	3	Medium early Early Latent
Storage duration	3	Short 2 months Medium 5 months Long 8 months

When the six specified features and all variables of each features are taken into consideration, the number of selection cards including all combinations is 3x2x3x2x3x3 = 324.
16 cards were created with the help of orthogonal design calculated by SPSS package program because it is not possible to get reliable and healthy answers by offering all the 324 selection cards to the potato producers.
Generally, the number of cards is 16-18 for 3 and / or 2 levels, and it becomes tradition to use 20 cards in the case of more factors (Yalnız and Bilen, 1997) [25].

RESULTS AND DISCUSSIONS

Characterictics of potato producers

Descriptive statistics are given to draw a profile of the potato producers in Table 2. he interview with potato producers emphasized that an average potato producer is 47 years old in Nigde and 52 years old in Odemis. General age average is 49 years old. Interviewed producers have a primary education (7 years) in both research areas. Average household size is calculated 5 individuals in Nigde Province, and 6 individuals in Odemis district.

The number of individuals engaged in agriculture in the interviewed households was approximately four in both regions. Agricultural experience is averagely 29 years; potato-growing experience is 28 years in Nigde Central. These numbers are 31 years and 26 years in Odemis District respectively. Agricultural and potato experience durations are very near in both regions. This shows that potato is the main agricultural crop in these regions (Table 2).

Table 2. Demographics of potato producers

	Nigde			**Odemis**			**Total**
	Min.	Max.	Mean	Min.	Max.	Mean	Mean
Age (year)	27	76	46.59	26	80	51.22	48.96
Education (year)	5	12	6.38	5	12	6.87	6.63
Household size (individuals)	2	12	4.99	3	12	6.25	5.63
Family work force (individuals)	1	12	3.97	1	8	4.12	4.05
Agricultural experience (year)	8	60	29.26	5	60	31.11	30.21
Potato growing experience (year)	8	55	28.30	4	60	26.07	27.16

General features of potato farms

General features of interviewed farms are given in Table 3. According to the study results, average farm size is 19.32 hectares in Nigde Central. It has been calculated that 64.66 per cent of the farm is property land and the rest of it constitute from collective land. The rate of irrigated land is calculated 94.84 percent in total farmland in Nigde province. The average farm is calculated 12.05 hectare in Odemis district. 48.05 per cent of farmland is property land, 49.01 percent is rented lands and the rest of it is collective lands in Odemis. The rate of irrigated land is calculated 89 percent in total farmland in Nigde province. Average farm size is calculated 12.12 hectares considering two research regions. 3.08 percent of the farmland is fallowing lands. 57.80 percent is property land, 40.99 per cent is constituted rented land and the rest comprises of collective lands. 92.42 percent of the farmland is irrigated. The rate of collective lands is higher than Turkey's average in both study regions this is because of farmers generally growing field crops such as potato, wheat and maize. This kind of field crop is breeding in the larger land.

Table 3. General features of interviewed farms

	Nigde				**Odemis**				**Total**	
	Min	Max.	Mean	%	Min	Max.	Mean	%	Mean	%
Total farm land (hectares)	24	650	19.32	100	6	749	13.05	100	16.12	100
Total fallow land (hectares)	0	100	0.67	3.47	0	100	0.33	2.54	0.50	3.08
Total barren land	0	100	0.33	1.70	0	440	1.10	8.46	0.72	4.49
Total irrigated land (hectares)	4	600	18.33	94.84	0	749	11.61	89.00	14.90	92.42
Property land (hectares)	0	500	12.45	64.66	0	400	6.27	48.05	9.32	57.80
Rent land (hectares)	0	425	6.82	35.34	0	671	6.39	49.01	6.61	40.99
Collective land (hectares)	0	-	-	-	0	100	0.38	2.93	0.20	1.21
Number of plots	1	52	12.58	6.51	1	52	10.60	8.13	11.57	7.18

Production pattern of interviewed farms

Crop pattern of the interviewed farms in 2016 is given in Table 4. According to that in Nigde province potato is ranked the first with

8.76-hectare production area, following with wheat by 7.04 hectares' production area. Potato area is constituted 46.97 percent of the total farmland. Potato is ranked the first in terms of production area with 5.76 hectares, following with wheat by 3.46 hectares. Potato area is constituted 45.29 percent of the total farmland. Considering 2-research regions potato is averagely grown on 7.23 hectares and this land is constituted 46.27 percent of the total farmland.

Table 4. Crop pattern on interviewed farms (2016)

	Nigde (Hectare)		**Odemis (Hectare)**		**Total (Hectare)**	
	Mean	%	Mean	%	Mean	%
Potato	8.76	46.97	5.76	45.29	7.23	46.27
Wheat	7.04	37.76	0.15	1.17	3.52	22.55
Maize	0.35	1.90	0.35	27.21	1.94	12.42
Barley	0.56	2.99	1.70	13.38	1.14	7.30
Legume family	1.48	7.93	0.01	0.11	0.73	4.68
Feed crops and other cereals	0.31	1.66	0.91	7.19	0.62	3.94
Fruits	0.004	0.02	0.03	0.26	0.02	0.13
Vegetables	0.15	0.78	0.68	5.36	0.42	2.69
Swede turnip (secondary product)	-	-	0.02	0.17	0.01	0.07
Maize (secondary product)	-	-	3.3	25.89	1.68	10.76
Total farm land	18.65	100.00	12.72	100.00	15.62	100.00

*Sum of percentage is higher than 100 because of secondary products

Produced potatoes varieties in interviewed farms

Produced pototoes varieties in interviewed farms is given in Table 5. According to the study results; farmers on Nigde mostly preferred Granola, Madeleine, Van Gogh, Proventa, Agria, Marfona, Banba, Jelly, Concordia, Melody and Sante potato seed varieties in 2015. These varieties are used for cooking, peel color is light yellow or yellow, rate of dry matter is high, rate of starch is very low, seed are generally long and oval shaped, high quality and yield performance, seed color is yellow, cooking quality is high, after the cooking they don't easily change their color, most of them are harvesting medium-early than other varieties, they have high protein rate.

Table 5. Distribution of potato area of interviewed farms according to the seed varieties in 2015

	Odemis		**Nigde**		**Total**	
Varieities	Area (decares)	%	Area (decares)	%	Area (decares)	%
Madeleine	0.20	0.40	30.30	38.36	14.94	22.77
Granola	0.42	0.80	18.67	23.64	9.35	14.25
İnnavator	17.74	33.64	-	-	9.06	13.81
Melody	-	-	14.20	17.98	6.95	10.59
Provento	-	-	8.78	11.12	4.30	6.55
Agata	5.56	10.54	-	-	2.84	4.33
Lady Olympia	4.85	9.20	-	-	2.48	3.78
Alegria	4.86	9.22	-	-	2.48	3.78
Hermes	4.07	7.72	-	-	2.08	3.17
Marabel	3.43	6.50	-	-	1.75	2.67
Desiree	2.88	5.46	-	-	1.47	2.24
Lady Amberalla	2.71	5.14	-	-	1.38	2.10
Agria	-	-	2.70	3.42	1.32	2.01
Triplo	2.07	3.92	-	-	1.06	1.62
Challenger	1.93	3.66	-	-	0.99	1.51
Van Gogh	0.76	1.44	0.58	0.73	0.67	1.02
Concordia	-	-	1.35	1.71	0.66	1.01
Marfona	-	-	1.09	1.38	0.53	0.81
Sante	-	-	1.04	1.32	0.51	0.78
Alegran	0.92	1.74	-	-	0.47	0.72
Latona	0.32	0.63	-	-	0.17	0.26
Banba	-	-	0.14	0.18	0.07	0.11
Jelly	-	-	0.14	0.18	0.07	0.11
Total potato area	52.74	100.00	78.99	100.00	65.60	100.00

Madeline is the first choice according to the production area with the rate of 38.36 per cent of Nigde potato farmers, following by Granola (23.94 per cent) and Melody (17.98 per cent). Lady Amberalla, Agata, Marabel, Lady Olympia, Alegria, Desiree, Alegran, İnnovator, Hermes, Challenger, Latona and Triplo varieties are preferred by Odemis farmers in 2015. These three varieities are constituted 79.98 per cebt of Nigde's total potato production area. General features of these varieties are describes as below; (Anonymous, 2016) [2].

These varieties mostly use in potato chips industry, peel colors are yellow and light yellow, rate of dry matter is generally low, rate of starch is high, seed are generally short and oval shaped, high quality and yield performance, seed color is white, cooking quality is low, after the cooking they easily change their color, most of them are harvesting late, they have low protein rate. The top 5 seed choice of Odemis district are Innovator (33.64 per cent), Agata (10.54 per cent), Alegria (9.22 percent), Lady Olympia (9.20 per cent) and Hermes (7.72 per cent). These 5 varieties constituted 70.32 percent of the Odemis potato production area.

Farmers potato seed supplying places

Interviewed farmers' potato seed supplying places in 2015 are given in Table 6.

Table 6. Seed supplying places of potato farmers

	Nigde		Odemis	
	N	%	N	%
Seed retailer	65	94.20	17	23.61
Cooperatives	6	8.70	28	38.89
Farmers (certified seed producer)	5	7.25	4	5.56
Own seed	-	-	4	5.56
Company of contracted farming	-	-	23	31.94

According to the results of the surveys, 94 percent of Nigde farmers supply their seed from seed retailer, 9 percent from cooperatives and 7 per cent from other farmers (certified seed producers). Contracted farming is not used in Nigde Province so that it has not determined any company. Also, it has not found any farmers which use own potato seed. It has been determined that 23 percent of interviewed Odemis potato farmers supply their seed from seed retailer, 38 percent from cooperatives, 6 per cent from other farmers (certified seed producers) and own potato seed, 32 per cent from the company of contracted farming.

Farmers preferences reasons for potato seed varieities

According to the surveys, average scores of reasons for choosing potato seed varieties in Nigde Province and Odemis District are given in Table 7. It has been determined that yield is the most important factor with 4.92 points and potato seed price is the least important factor with the score of 3.75 in Nigde Province. It has been identified that similarly, the yield is the most important factor with 4.64 points and storage duration is the least important factor with 2.85 score point in Odemis District. It has determined that yield is the most important factor in both research regions.

Table 7. Farmers seed preferences reasons for potato seed varieities

	Yield	Disease resistance	Production type	Storage duration	Harvesting time	Seed price
Nigde	4.92	4.78	4.29	4.18	3.80	3.75
Odemis	4.64	4.49	4.30	2.85	4.33	4.32

Technical knowledge sources of producers about potato varieties

Technical knowledge sources of producers about potato varieties are listed in Table 8.

Table 8. Technical knowledge sources of potato farmers

Sources	Nigde		Odemis	
	N	%	N	%
Own experiences	62	96.88	25	45.45
Neighbour farmers	6	9.38	4	7.27
Agriculture Ministry	7	10.94	9	16.36
Seed retailers	1	1.56	12	21.82
Company of contracted farming	-	-	10	18.18

*One farmer can use more than one technical knowledge/information sources.

According to the survey results, it has been determined that 97 per cent farmers in Nigde Province benefited from their own experiences, 9 per cent from neighbour farmers, 11 per cent from Agriculture Ministry and only 2 per cent from seed

retailers. Similarly, it has been identified that 45 per cent farmers in Odemis District used their own experiences, 7 per cent from neighbour farmers, 16 per cent from Agriculture Ministry, 22 per cent from seed retailers and 18 per cent of contracted farming companies' officers for technical knowledge during potato production.

Reason for potato seed preferred buying places

The reason for potato seed preferred buying places by interviewed farmers in Nigde Province and Odemis District are listed in Table 9. It has determined that "selling high-quality seed" and "desired quantity" are the most important reasons to explained for farmers preferred buying places in two research regions. Also, other reasons such as "selling wanted seed varieties", "reachable location" and "comparably cheaper price" are found important for Nigde Province potato farmers. "More convenient payment method" reason was found unimportant for Nigde potato farmers. Reachable location of the seed seller was found unimportant for Odemis District farmers.

Table 9. Seed potato reasons of preferred buying places

Reasons of preferred buying places	Nigde	Odemis
Selling high quality seed	4.97	4.82
Desired quantity	4.56	4.85
Selling wanted seed varities	4.09	4.07
Reachable location	4.01	2.79
Comparably cheaper price	3.07	4.05
More convenient payment method	2.00	4.63

(1: Very unimportant 2: Unimportat 3: Undecided 4: Important 5: Very important)

Seed potato prices and payment method

According to the survey results, it has calculated that averagely in 2016 potato seed are cheaper that the year 2015 because of the low potato demand in 2015. Prices are closer in two years in Odemis District it has determined that because of contracted farming. It has calculated that seed potato prices were 1.44 TL/kg in Nigde Province and 1.70 TL/kg in Odemis District these prices are 2.13 TL/kg and 1.71 TL/kg in 2015 respectively. Interviewed potato farmers' payment method are given in Table 10. According to the survey results, all of the Nigde farmers pay in cash on the contrary of Odemis potato farmers. It has been determined that Odemis potato farmers pay their seed expenses on deferred. Besides that, some producers can also pay in cash.

Table 10. Seed potato expenses payment method

Region	Nigde		Odemis	
Payment method	N	%	N	%
Farmers pay in cash	69	100.00	2	2.78
Farmers pay in deferred	1	1.45	72	100.00

*Farmer can use 2 payment method together.

Preferences for potato seed features (Conjoint analysis)

Conjoint analysis is a technique widely used in marketing to measure relative contributions of different product attributes to the overall preference of a product (Hair et al., 2006; Rao, 2008; Hirpa et al., 2012) [10, 11, 21]. This analysis is also widely used outside of marketing, for example, to evaluate farmers' preferences for different characteristics of modern crop varieties (Baidu-Forson et al., 1997; Hirpa et al., 2012) [3, 11] and factors influencing smallholder farmers' adoption of dairy technologies (Makokha et al., 2007) [17].

In conjoint analysis, farmers were asked to ranked the seed cards, which are combinations of chosen levels of different individual attributes.

The selection of seed potato features and feature levels determined according to the literature and expert opinions. Finally, six features of potato seed are seed price, disease resistant, yield performance, production type, harvesting time and storage duration.

Six features and levels are given in Table 11. If the expected sign is linear, increase with the preferences rankings it is described as LINEER MORE, if the expected sign is negative it is described as LINEER LESS. Categorical factors are described as discrete.

For example, estimated sign is negative for seed prices so that seed prices factor is defined LINEER LESS. Disease resistance, yield performance, storage duration is defined LINEER MORE because of expectation is a linear increase. Production type and harvesting feature are defined as discrete because they are categorical.

Table 11. Features and features types using in conjoint analysis

Features	Feature level	Factor type
Price	3	Linear (less)
Disease	2	Linear (more)
Yield	3	Linear (more)
Production type	2	Discrete
Harvesting time	3	Discrete
Storage duration	3	Linear (more)

A full factorial design with the management attributes as factors would generate so many profiles that the full design would be too difficult to handle. Therefore, an orthogonal fractional factorial design (Addelman, 1972; Hirpa et al., 2012) [1, 11] was used to generate 16 seed profile cards. Figure 1 shows a pictograph of seed cards. In pictographs all attribute-levels were presented, so that respondents would get a good impression of the different options.

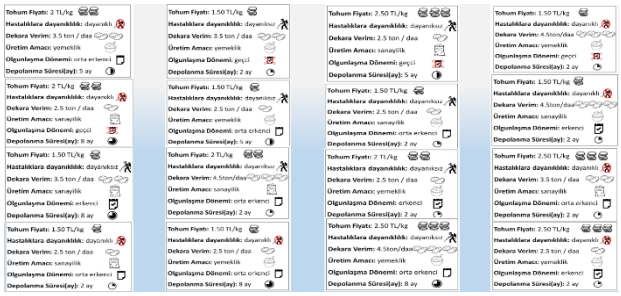

Fig. 1. Seed preference card

Preferences for potato seed features in Nigde province

Utility scores have been calculated for each attribute according to 69 interviewed potato farmers card rankings in Nigde Province. According to the results production type is the most important seed attributes in Nigde province with the 43.13 per cent. It has known that potato production is mostly for cooking in Nigde province because of that farmers found this attribute very important for them. Beside that, Nigde in a less developed province in terms of industry and transportation to another industry region can cause extra expenses for them. Industrial production type received a negative utility value (3.592), but this does not mean that industrial production type totally was unattractive. In fact, this type may have been acceptable to all respondents. But, all else being equal, cooking is better for Nigde potato farmers. The utilities are scaled to sum to zero within each attribute, so industrial production type has to receive a negative utility value.

Second important seed attributes have found disease resistance with the of % 17.58 in Nigde Province. Especially recent years' disease resistance is getting important by potato farmers due to soil pollution by diseases in Provinces such as Nigde and Nevsehir. It must be used the defeated seed to get high yield and quality production.

According to the model disease, delicate seeds are not affected farmers' choices and disease resistant get a positive utility value (2.946), this means that disease resistance seed is better for Nigde potato farmers. Yield performance has found the third important seed attributes with the rate of 16.56 per cent. Yield performance is important for producers because it is a result of all the material and moral sacrifices from the process with seed supply to marketing. Low yield seed performance increases 1.586, medium yield level increases 2.538 and high yield increase 4.441 of farmers' utility scores. The fourth important seed factor was found harvesting time with the rate of 9.46 per cent. It is not always possible to get producers to obtain the expected value of agricultural products, which is due to the price instability, which occurs very frequently in the market especially in agricultural products. In the marketing process harvesting time of seed such as early, medium early or latent are important, it can provide to potato producers to present their goods to the market at intervals. It has been determined that medium early harvesting time factor attributes increase 0.056, latent seed increases 0.084 utility scores of farmers' seed choices and early seed attributes decrease 0.028 points.

The fifth important factor determined by producers is storage duration with the importance rate of 7.238 per cent. Producers if they are not satisfied by market prices in harvesting period, they can have stored their products because of that reason storage duration is also important seed attributes. It has been determined that short storage duration increases 0.273, medium level

increases 0.545 and long storage increase 0.818 points of seed utility score. The last important seed factor is seed prices determined by potato producers with the rate of 6.051 per cent. Seed purchasing is mostly with cash in Nigde Province so that It has been observed that sometimes producers give up other income sources or selling their animals/livestock (live capital) for buying potato seed. According to the farmer's choices are the last important factor but when the utility score are taken into consideration, it has been found that the producers decrease seed preference to 0.280, 0.391 to be normal and 0.466 to be expensive (Table 12).

Table 12. Factor type, importance values and utility scores in Nigde Province

Factor type	Importance values	Levels of factors	Utility score
Production type	43.120	İndustrial	-3.592
		Cooking	3.592
Disease	17.577	Delicate	0.000
		Resistant	2.946
Yield	16.559	Low Yield	1.586
		Medium Yield	2.538
		High Yield	4.441
Harvesting time	9.455	Medium Early	-0.056
		Early	-0.028
		Latent	0.084
Storage duration	7.238	Short	0.273
		Medium	0.545
		Long	0.818
Price	6.051	Cheap	-0.280
		Normal	-0.391
		Expensive	-0.466
Constant	4.380		

It is possible to determine a preferable seed card by using utility score for each attribute. Each card average important values are calculated with the equation below by using utility scores of each utility coefficient.

UTILITY=Constant + (B1) Seed Price + (B2) Disease resistance + (B3) Yield+ (B4)Production type+ (B5) Harvesting time + (B6) Storage duration

Each card scores are given in Table 15. According to the results, the highest utility score is belonging to card 4 (15.436). This card is relatively cheap (1.50 TL/kg), disease resistant, have high yield potential (4.5 tonnes /daa), production for cooking, harvested late and suitable for short storage period (2 months). The lowest utility score is belonging the card 3 (2.537). this card is cheap, delicate to disease, medium yield potential, use for industry, early harvesting and suitable for long storage period. The constant term is found 4.380. Pearson R statistics and Kendal Tau statistics coefficients are found statistically meaningful. These results show that potato farmers seed choices are related to the selected attributes ($p<0.01$).

Table 13. Card scores according to conjoint analysis in Nigde Province

Card id	Score	Card id	Score	Card id	Score	Card id	Score
4	15.436	16	12.283	8	8.412	10	5.055
1	13.554	2	10.587	12	6.023	9	3.836
14	12.986	6	9.767	5	5.831	7	2.583
15	12.709	11	9.412	13	5.257	3	2.537

Preferences for potato seed features in İzmir province (Odemis District)

Utility scores have been calculated for each attribute according to 69 interviewed potato farmers card rankings in Odemis District. According to the results production type is the most important seed attributes in Nigde province with the 26.84 per cent. It has known that potato production is mostly for the industry in Odemis District because of that farmers found this attribute very important for them. Industrial production type received a positive utility value (0.123), but this does not mean that cooking production type totally was unattractive. Industrial is also very common in that region due to contract production. Yield performance has found the second important seed attributes with the rate of 24.36 per cent. Low yield seed performance increases 1.883, medium yield level increases 3.012 and high yield increase 5.272 of farmers' utility scores. Third important seed attributes have found disease resistance with the 15.26 per cent in Odemis District. According to the model disease, delicate seeds are not affected farmers' choices and disease resistant get a positive utility value (2.160), this means that disease resistance seed is better for Odemis potato farmers. The fourth important seed factor was found harvesting time with the rate of 13.91 per cent. It has been determined that late harvesting time seed factor attributes increase 0.401 points, early and medium early

harvested seed factor decreases utility score of farmers seed choices. In Odemis District due to climate conditions potato can be grown in three season. Producers' preferred to harvest late to protect from prices fluctuations in harvesting season. The fifth important seed factor is seed prices determined by potato producers with the rate of 11.685 per cent. It has been found that the expensive seed prices increase producers' utility scores 3.253 points beside that cheap seed prices are less affected farmers' choices. This is a result of contracted farming in Odemis district, companies supply farmers' input such as seed, fertiliser.

Table 14. Factor type, importance values and utility scores in Odemis District

Factor type	Importance values	Levels of factors	Utility score
Production type	26.836	İndustrial	.123
		Cooking	-.123
Yield	24.359	Low Yield	1.883
		Medium Yield	3.012
		High Yield	5.272
Disease	15.261	Delicate	0,000
		Resistant	2.160
Harvesting time	13.911	Medium Early	-.104
		Early	-.297
		Latent	.401
Price	11.685	Cheap	-1.952
		Normal	-2.733
		Expensive	-3.253
Storage duration	7.949	Short	.154
		Medium	.308
		Long	.462
Constant	6.637		

The last important factor determined by producers is storage duration with the importance rate of 7.949 per cent. It has been determined that short storage duration increases 0.154, medium level increases 0.308 and long storage increase 0.462 points of seed utility score. Potato production is mainly for the industry with the contracted farming in Odemis district, and potatoes harvested by companies because of that reason farmers don't need to store their products (Table 14).

It is possible to determine a preferable seed card by using utility score for each attributes. Each card average important values are calculated with the equation below by using utility scores of each utility coefficient.

UTILITY=Constant + (B1) Seed Price + (B2) Disease resistance + (B3) Yield+ (B4) + Production type+ (B5) Harvesting time + (B6) Storage duration.

The constant term is found 6.637. Pearson R statistics and Kendal Tau statistics coefficients are found statistically meaningful. These results show that potato farmers seed choices are related to the selected attributes ($p<0.01$).

Each card scores are given in Table 15. According to the results, the highest utility score is belonging to card 4 (12.795). This card is relatively cheap (1.50 TL/kg), disease resistant, have high yield potential (4.5 tonnes /daa), production for cooking, harvested late and suitable for short storage period (2 months). The lowest utility score is belonging the card 11 (5.521). This card is relatively normal price, delicate to disease, low yield potential, and production for cooking, early harvesting and suitable for short storage.

Table 15. Card scores according to conjoint analysis in Odemis District

Card id	Score	Card id	Score	Card id	Score	Card id	Score
4	12.795	14	8.963	12	8.729	7	6.741
8	12.251	5	8.933	2	8.129	6	6.649
10	9.349	13	8.901	9	7.985	3	6.099
1	9.157	15	8.891	16	7.161	11	5.521

CONCLUSIONS

Production type has found the first important factor in both research regions such as the cooking type in Nigde Province, industrial type in Odemis district are preferred by farmers. This shows that marketing options affect farmers' potato seed choices. Disease resistance is found the second important factor in Nigde Province and third in Odemis District after the yield performance. Many disease and pest are easy to transport due to the vegetative production of potato. Because of that in 2011 according to a new legislation rotation had become obligatory in potato fields. Therefore, that potato production is enlarged to other cities Konya, Kayseri and Adana provinces from Nigde and Nevsehir. Development of disease resistant varieties is also important to provide sustainable production in that regions.

In both research regions, producers prefer latent varieties after production type, disease

resistance and yield performance. This feature is also related to marketing options. In Turkey, potato price is one of the most fluctuated product from the market. Producers prefer latent varieties due to protect price fluctuation in harvesting period.

Agricultural lands and climate features of Turkey is fruitful for potato production in every season but there is a lack of local commercial varieties and ending up increasing external dependency. It is necessary to develop local varieties, which are adopted local conditions to increase yields performance and decrease external dependency. It is suggested that encourage cooperation activities, which can solve problems on marketing seed and other input supply chain, providing convenience credit option to farmer, get to buy desired seed in desired quantity and time with the desired payment method. In addition, other precaution, which can be helpful to get successful on seed potato production, can be summarised as below,

-Seed production system must emerge
-Give penal sanctions to people or companies, which produce unofficial potato seed
-Developed standards for seed potato production
-Determination of potato seed production area and these areas has to be closed for other consumption products
-Maintain continuity of seed production areas
-Support investment in free tissue culture for producing seed varieties production,
-Regulation has to be updated on domestic and external quarantine and overcome the deficiencies of infrastructure and technical officers related to this subject
-Seed certification process must accelerate, all the distributed seed must be certified,
-Premium quality seed in terms of disease resistant varieties have to be imported
-Provide estimation and early warning system in seed potato production areas.

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THE ANALYSIS OF THE CURRENT SITUATION OF WHEAT PLANTED AREAS IN THE TIGRIS BASIN AND THE CHANGE OVER YEARS (1991-2015)

Zeynep OYURYUZ[1], Burak SALTUK[2], Y. Kenan KOCA[3]

[1]Siirt University, Faculty of Agriculture, Department of Agricultural Economics, Department of Biosystem Engineering
[2]Siirt University, Faculty of Agriculture, Department of Biosystem Engineering
[3]Dicle University, Faculty of Agriculture, Department of Soil Science, Email: ykkoca@dicle.edu.tr

Corresponding author: ykkoca@dicle.edu.tr

Abstract

The Southeastern Anatolia Region has two basins, being the Tigris Basin and the Lower Euphrates Basin. According to the data for 2015, 9.5% of the wheat production in Turkey is performed in the provinces (Diyarbakır, Mardin, Siirt, Batman, Şırnak) in the Tigris Basin which is the subject of the study. Wheat production in the agricultural lands of the region stands out in terms of the indicators of droughts related to both geographical restrictions and global warming. Climatic changes resulting from the global warming are one of the most important factors affecting agricultural production. In this regard, the assessment of precipitation values originating from climatic changes enables us to have an opinion on wheat production in the Tigris Basin in the future. It is considered that the potential for wheat planting may increase due to the appropriate climatic conditions in the Tigris Basin and available productive lands. The mapping of the changes in precipitation and yield values of wheat planted areas by transforming them into digital data is possible thanks to current information technologies. In this study, it is aimed to identify the change of wheat planted areas in the provinces in the Tigris Basin for last 25 years, the condition of available lands and their efficiency in meeting the needs for wheat. In this context, Geographical Information Systems (GIS) and statistical analyses were used. The climatic data of the Tigris Basin for many years (annual precipitation) and the yield of wheat planted areas and the values of cultivated areas between the years of 1991-2015 were used for the study. Accordingly, Geographical Information Systems (GIS) were entered into the database and interpreted by being associated with the statistical analyses.

Key words**:** *wheat, GIS, Tigris Basin, precipitation*

INTRODUCTION

The wheat produced in almost all regions of the world and Turkey is an important agricultural product in terms of concerning a large producer group and constituting the raw material for bread which is the staple food of people. The contribution of cereals to the national economy is versatile. These contributions appear in the use of agricultural lands, agricultural production, nourishment of people, domestic and foreign trade and national income (Kızılaslan, 2004) [4].

Wheat as an important agricultural product for Turkey leads in the cereal group of agricultural products. Nowadays, most of the countries in the world accept wheat as a strategic product and apply their policies in this direction.

Turkey is one of the countries that will be mostly affected by climatic changes related to global warming. Different regions will be affected by possible climatic changes in different ways and at different levels. The Southeastern Anatolia Region under the threat of desertification due to rising temperature will be affected more when precipitation is inadequate (Özturk, 2002) [5].

While wheat can be grown in every region of Turkey, it is commonly produced especially in the Central Anatolia Region. Thus, the Central Anatolia Region is placed on the top with the 36% share in bread wheat production in 2013. Central Anatolia is followed by the Marmara Region with 15% and the Southeastern Anatolia Region with 14%. The Eastern Anatolia and Aegean Regions have the least share in production with 7%. The

Southeastern Anatolia Region is in the first place in durum wheat production with 46%, the Central Anatolia Region (28%) is in the second place, the Aegean Region (13%) is in the third place (Anonymous, 2013) [1].

When the soil assets and productivity in Turkey are considered, wheat production seems as an income-generating business in rural areas which reduces the unemployment. It seems that increasing the areas of wheat production and promoting the establishment of wheat-input food industries in the region may decrease the flow rate of rural to urban migration (for economic reasons) and increase the working potential for the Tigris Basin. Therefore, the projects in the Tigris Basin carried out for social purposes aim to provide employment. Recently, both development agencies have presented projects and the Ministry of Agriculture have provided producer support in the Southeastern Anatolia Region.

In a study conducted by Sönmez et al. in 2007[7], it was aimed to develop a sustainable land management plan and soil conservation plan by benefiting from the remote perception and geographical information systems technology instead of classical methods based on geodetic computation techniques. The basic soil characteristics of the lands were distinguished at the series and phase level, the current land use forms were introduced and the regional land ability classes were formed in a study conducted in Antalya, Altınova for this purpose by considering the Soil Conservation and Land Use Act.

It is an important obligation to do certain planning related to the use and management of lands and soils in terms of the conservation of both agricultural and non-agricultural lands (urban settlement, areas suitable for industry and trade) and soils and providing the continuity of productivity. One of these plannings is the Land Ability Classification which is an international technical classification system and indicates the relative suitability of the lands with various characteristics for different uses. Such a classification is created both directly on the basis of land studies and with the interpretation of the basic soil maps prepared with suitable methods (Soil Survey Staff, 1993; Dinç et al., 1997) [3,6]. The planning of agricultural production with classical methods gives its place to the methods performed with geographical information systems and remote perception which enable the examination in a shorter time and with more visual maps. Since GIS is a method which makes it possible to examine all factors together in countries such as Turkey which have numerous microclimates among the macroclimates and various slope, topographic and soil structures from the step conditions to the forest, it is inevitable to use the maps created with GIS technologies in planning.

Cereal production is performed on 106,5 million da in Turkey. While wheat is produced in 67% of this area, barley is produced in 24%, corn is produced in 6% of it. These products are followed by rye (1.3%), paddy (1.1%), oat (0.8%), triticale (0.3%) and other cereal products (einkorn, canary grass, panicum, sorghum, mixture at the rate of 0.1%) (Anonymous, 2016) [2].

When the data for 2015 within the boundaries of Diyarbakır province are examined, it is revealed that wheat is produced in an area of 3,867,141 da and when this amount is compared with the data for 1991 (2,626,420 da), it is indicated that there is an increase at the rate of 47.2%. When the wheat planting rates in the Tigris Basin are examined by the provinces, it is seen that Diyarbakır province has the largest production area (50%). Mardin province is at the second place with 26%, Batman province is at the third place with 10%, Şırnak province is at the fourth place with 9% and Siirt province is at the fifth place with 5%.It is considered that the fact that the results of the study can reveal the current situation in the region and the analyses to be carried out in this context will contribute to the development rate of the basin in the rural aspect, production amount and realization of the industrial deficit of the basin

MATERIALS AND METHODS

The study is conducted in the Southeastern Anatolia Region in Turkey and covers Diyarbakır, Mardin, Batman, Siirt and Şırnak provinces of the Tigris Basin (Figure 1).

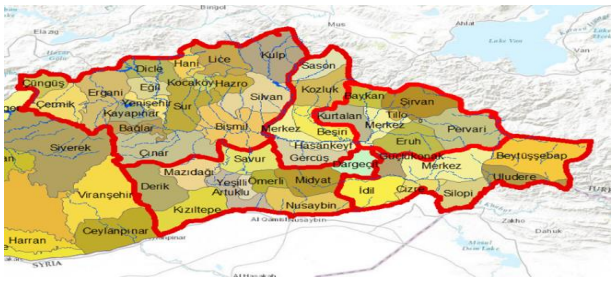

Fig. 1. Districts of the Tigris Basin

It is important to identify the amount of wheat production in the basin for many years (1991-2015) to be able to determine the change of wheat production lands over the years in this study conducted in cooperation with Siirt University, Faculty of Agriculture, Department of Agricultural Economics and Department of Biosystem Engineering. The available wheat production lands (da), the amount of production (ton) and the yield (kg/da) values between the years of 1991 and 2015 acquired from the system of the Turkish Statistical Institute (TSI) were used for the Tigris Basin which is the subject of the study. Our study consists of two stages. The first one of these stages is the evaluation of the precipitation and yield values of the last 25-year wheat production in the Tigris Basin by using GIS techniques and the yield values (kg/da) of the production areas for the last 25 years and the change of the production areas (da) in 5-year periods for 5 different provinces were presented with GIS techniques. All of these acquired data constitute the main material of the study. The satellite images for 2014 in ArcMAP environment were used as a basic determining criterion in GIS system in this study. The questioning and analysis parts of the Geographical Information Systems were benefited from. The wheat production areas and amounts were evaluated in the Geographical Information Systems environment and the change over the years was mapped. In this context, the study area was digitized in the GIS environment as a polygon being provincial borders in the first place. For this purpose, ArcMAP 10.0 software and WGS 84 coordinate reference system were used. All boundaries were divided as a separate layer on the basis of provinces to make the examinations of each province independently from the other provinces. A database (attribute data) was created by entering the wheat production areas provided from the TSI system into these layers prepared. At the second stage of our study, the precipitation values for 1991-2015, production areas, the amount of production and yield values were entered into SPSS environment and statistical analyses were made. The levels or grades of the relationship between the independent and dependent variables were measured with the help of the correlation analysis. The coefficient acquired as a result of the correlation analysis has a value varying between -1 and +1. While the coefficient takes a value of 0 or close to 0 when there is no interaction or little interaction between the variables, it takes the value of 1 if there is a full and strong interaction between the variables and it takes the value of -1 if there is a reverse and full interaction. The correlation coefficient is usually indicated with letter “r”. The affecting way and strength of the yield of the variables were analyzed for each province in the basin, and the correlation coefficients between the precipitation and yield values were calculated. In addition to this, the yield, precipitation, production area and the amounts of production of each term were compared with the 25-year averages of the basin by separating into 5-year periods in Excel program and the rates of decrease and increase were identified and interpreted

RESULTS AND DISCUSSIONS

When the findings in the study area were compared, it was revealed that Diyarbakır province had a significant place both are ally and in terms of the amounts of production. When the precipitation data of Diyarbakır province were examined, it was seen that precipitation decreased at the rate of 10,45% in the last 10 years according to the 25-year precipitation averages, however, wheat planted areas and yield increased. It was discovered that wheat production and yield had the lowest values between the years of 1996-2000 (Figure 2).

Table 1. The Precipitation-Yield Correlation in Diyarbakır Province

		Rain-fed	Yield
Rain-fed	Pearson Correlation	1	0.053
	Sig. (2-tailed)		0.800
	N	25	25
Yield	Pearson Correlation	0.053	1
	Sig. (2-tailed)	0.800	
	N	25	25

In this context, when Table 1. was examined, it was indicated that the fact that wheat production and yield values decreased below the average by years was not only related to the change in precipitation values.

Accordingly, since the value of r=0,053 obtained by entering the precipitation and yield values in the correlation analysis carried out in SPSS program is close to 0, it is possible to conclude that there is a weak correlation between the variables, in other words, precipitation over the years which constitute the subject of the study does not affect the yield of wheat (Fig. 2).

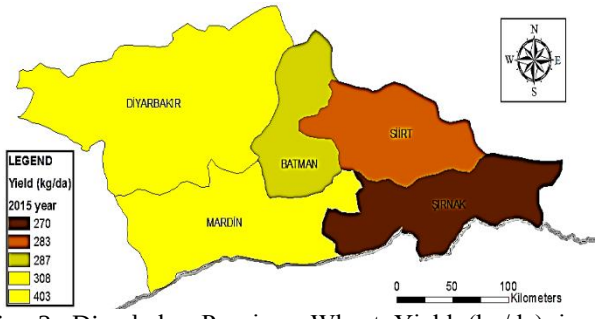

Fig. 2. Diyarbakır Province Wheat Yield (kg/da) in 2015

Although precipitation is known as the major factor affecting the yield of wheat, it is considered that factors such as seed, cultural struggle, fertilization, etc. are effective in the improvement of the conditions and the increase in the yield (Table 2).

Mardin is the second biggest province in the basin in terms of production area (Fig. 3) and potential While a decrease of 3.67% is seen in the amount of precipitation according to the average of 25 years between the years of 1999-2000 in Mardin, it is considered that the decrease of 110% in the yield amount is a result of the irregular precipitation regime and both global economic crisis and devaluation experienced in our country between the mentioned years.

Table 2. The Change of the Wheat Production Potential in Diyarbakır Province over the Years

Diyarbakir				
Years	Rain-fed (%)	Planting Area (%)	Productio n(%)	Yield (%)
1991-1995	9.92	-19.45	-42.05	-16.15
1996-2000	-2.87	-16.29	-61.12	-33.37
2001-2005	1.63	-0.72	-0.15	3.35
2006-2010	-3.4o	5.48	7.37	4.04
2011-2015	-7.05	20.13	37.39	23.81

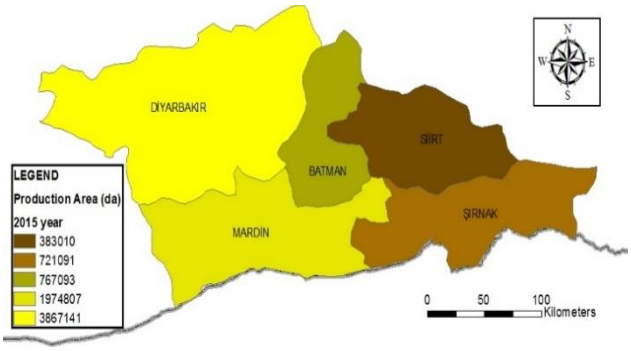

Fig. 3. Mardin Province Production Area (da) in 2015

The crisis experienced between the years of 1999-2000 caused an approximately 50-60% increase in the cost of fuel which had the biggest share in agricultural production and producers could not harvest and in this regard it was considered that the values of wheat production and yield decreased or there might be some mistakes in the data entry (Table 3).

Table 3. The Precipitation-Yield Correlation in Mardin Province

		Yield	Rain-fed
Yield	Pearson Correlation	1	0.006
	Sig. (2-tailed)		0.978
	N	25	25
Rain-fed	Pearson Correlation	0.006	1
	Sig. (2-tailed)	0.978	
	N	25	25

When the precipitation-yield correlation in Table 4 which verifies the decrease in the yield amount is examined, it can be expressed that the correlation is too weak with the value of r=0,006 and in this context, the precipitation between the years of 1991-2015 which are the subject of the study does not affect the yield of wheat.

It was concluded that the 17.14% decrease in the yield amount together with the 16.28% increase according to the average of 25 years in the amount of precipitation between the years of 1991 and 1995 in Batman province

originated from the fact that precipitation did not occur in the period when wheat needed water, quality seeds were not used and there was no cultural struggle in the mentioned years.

Table 4. The Change of the Wheat Production Potential in Mardin Province over the Years

Mardin				
Years	Rain-fed (%)	Planting Area (%)	Production (%)	Yield (%)
1991-1995	13.89	-20.29	-69.38	-34.81
1996-2000	-3.67	-3.58	-96.39	-80.45
2001-2005	-2.62	-6.56	-3.34	7.14
2006-2010	-14.16	-5.45	3.16	10.88
2011-2015	2.3	24.04	47.37	33.55

Moreover, according to the data recorded between the years of 2011-2015, there was a 39.01% increase in the yield.

It is considered that a relatively higher recorded increase in the yield is related to the fact that new agricultural technologies (harvest mechanization, fertilization, plant protection, etc.) started to be used by producers (Table 5).

Table 5. The Precipitation-Yield Correlation in Batman Province

		Yield	Rain-fed
Yield	Pearson Correlation	1	0.179
	Sig. (2-tailed)		0.392
	N	25	25
Rain-fed	Pearson Correlation	0.179	1
	Sig. (2-tailed)	0.392	
	N	25	25

The r value was calculated to be 0.179 as a result of the precipitation-yield correlation (Table 6). This value indicates that even if it is weak there is a positive interaction between the precipitation and yield in Batman province.

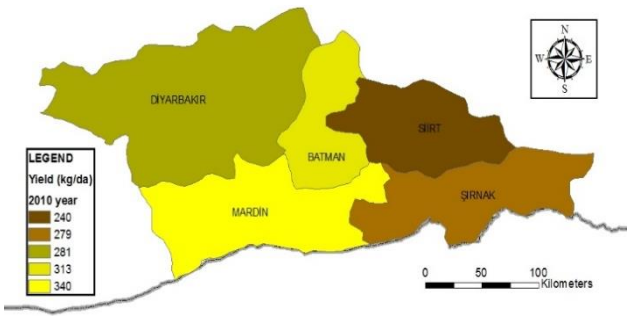

Fig. 4. Batman Province Yield (kg/da) in 2010

Table 6. The Change of the Wheat Production Potential in Batman Province over the Years

Batman				
Years	Rain-fed (%)	PlantingArea (%)	Production (%)	Yield (%)
1991-1995	16.28	-26.2	-53.28	-17.14
1996-2000	-9.41	-17.49	-48.4	-21.17
2001-2005	-3.4	-0.8	-4.42	0.2
2006-2010	-8.27	8.74	13.64	3.75
2011-2015	0.09	21.17	35.82	21.87

When the wheat planted areas in Şırnak province are compared by years, a 55,31% increase was calculated between the rates between the years of 2011 and 2015 and the rates between the years of 1991 and 1995 (Fig. 5).

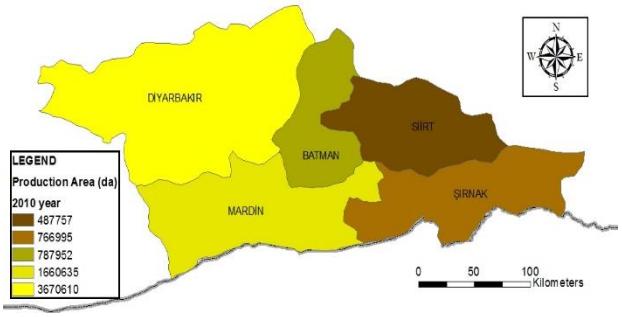

Fig. 5. Şırnak Province Production Area (da) in 2010

It is possible to say that this increase resulted from the fact that producers increased the planting areas to take an advantage of government aids and to meet the market demand for wheat. Moreover, it can be said that the increase in the production areas results from the fact that the inputs in the wheat production are less when compared to other agricultural products and the product is acquired more easily. It is considered that the producers of flour plants were directed to the cultivation of wheat in the last 10 years in the city center and county towns of Şırnak (Table 7). When the precipitation-yield correlation in Şırnak province is examined, the fact that the value of r=-0,281 is negative indicates that there is an inverse proportion between the yield and precipitation. The fact that the amount of precipitation increases is an indicator of a decrease in the yield. However, it is concluded that the fact that the annual precipitation is low especially during the tillering of wheat or grain filling may affect

this analysis negatively (Table 8).

Table 7. The Precipitation-Yield Correlation in Şırnak Province

		Rain-fed	Yield
Rain-fed	Pearson Correlation	1	-0.281
	Sig. (2-tailed)		0.173
	N	25	25
Yield	Pearson Correlation	-0.281	1
	Sig. (2-tailed)	0.173	
	N	25	25

Table 8. The Change of the Wheat Production Potential in Şırnak Province over the Years

Şırnak				
Years	Rain-fed (%)	PlantingArea (%)	Production (%)	Yield (%)
1991-1995	18.95	-31.37	-76.15	-29.01
1996-2000	-11.5	-40.37	-87.78	-26.79
2001-2005	2.39	-3.2	5.9	12.18
2006-2010	-13.11	19.52	24.19	9.2
2011-2015	-4.09	23.94	34.11	16.39

In the evaluation on the basis of the precipitation averages for 25 years in Siirt province, although the annual precipitation tended to decrease at the rate of 15.24% in last 10 years, a 45.48% increase occurred in the rates of the wheat yield and there was a 42,65% increase in the planted areas (Fig. 6).
Moreover, while there were negative decreases in the amount of wheat production in Siirt province between the years of 1991 and 2005, it was identified that this situation indicated a 74,95% positive increase in the last 10 years (Table 9).
When the precipitation-yield correlation in Siirt province is considered, it is possible to say that since the value of r=-0,029 is close to 0, even if it is negative, the interaction is too weak, in other words, the connection between the amount of precipitation and the yield of wheat is too weak (Table 10).

Table 9. The Precipitation-Yield Correlation in Siirt

		Rain-fed	Yield
Rain-fed	Pearson Correlation	1	-,029
	Sig. (2-tailed)		,890
	N	25	25
Yield	Pearson Correlation	-,029	1
	Sig. (2-tailed)	,890	
	N	25	25

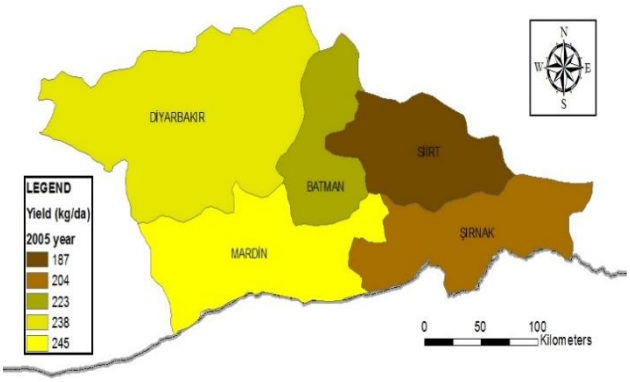

Fig. 6. Siirt Province Wheat Yield (kg/da) in 2005

Table 10. The Change of the Wheat Production Potential in Siirt Province over the Years

Siirt				
Years	Rain-fed (%)	PlantingArea (%)	Production (%)	Yield (%)
1991-1995	18.04	-10.47	-46.74	-25.87
1996-2000	-13.34	-31.82	-85.99	-32.99
2001-2005	3.72	-30.4	-73.56	-25.46
2006-2010	-9.5	29.4	34.74	10.4
2011-2015	-5.74	13.25	40.21	35.8

It seems that the arithmetic average of the amount of precipitation between the years of 1991 and 2015 in Mardin province is 508 mm/year and the average yield amount for 25 years is 256 kg/da. Despite the 10% increase in the amount of the annual precipitation in 1991, there was a 30% decrease in the yield amount.
It is considered that this situation resulted from the fact that certified seeds were not used, the annual precipitation did not occur in the vegetation period or from the producer mistakes (wrong fertilization, defects in harvest techniques, etc.). The amount of precipitation over the years is below the average of the basin especially in 2008 according to the regional average. The drought experienced around the world in 2008 can be accepted as a reference to this situation. (Fig.7).
The deviations in the precipitation regime together with the decrease formed in the precipitation averages by years in relation to global warming and climatic changes are the other factors that should be considered. If the deviations in the precipitation regime and the decrease in the amount of precipitation continue, wheat production in the study area

will be affected negatively.

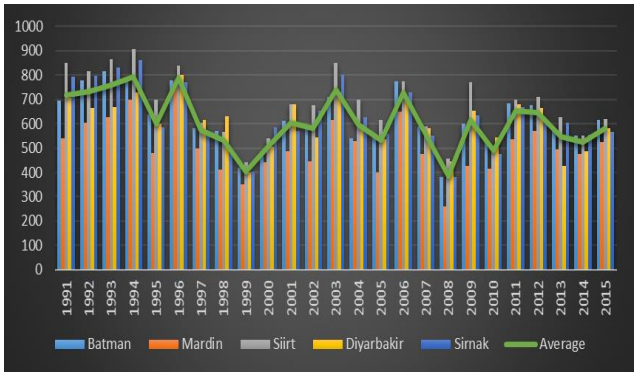

Fig.7. The Precipitation Values (mm/year) in the Tigris Basin between the Years of (1991-2015)

It is indicated that Diyarbakır province has the largest production area in the Tigris Basin. Between the years of 1991 and 2015, there was a 26% decrease in the wheat production area especially between the years of 2004 and 2008. It is considered that this decrease resulted from the lack of precipitation in the mentioned years. Then in 2009, while a 12,38% increase was recorded in the wheat production areas of the basin together with the increase of the total amount of precipitation, there was a 77.9% increase in the yield.

When the yield values in the Tigris Basin are examined by the years, it stands out that the change is positive. The facts that the producers using certified seeds are supported in the agricultural production and the level of the awareness of the farmers in the region increases are among the primary reasons for this situation.

In this context, it can be stated that the wheat yield values showed a 35% increase between the years of 1991 and 2015 in question (Fig.8).

When especially the year of 2013 is evaluated, it is seen that the relationship between the amount of the annual precipitation and yield is reverse. While the amount of precipitation was below the average of many years in 2013, there was not a significant decrease in the yield, moreover, there was a little increase.

It is possible to say that this inverse proportion resulted from the irregularity of the precipitation regime in that year, in other words, the wheat plant received precipitation in the months of April and May when it especially needed water (Fig.8.).

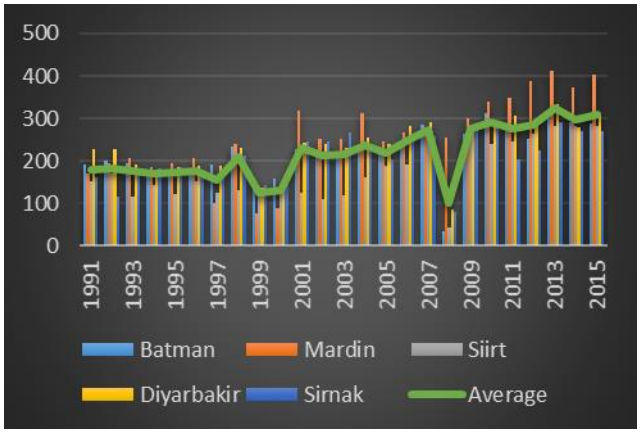

Fig.8. The Wheat Yield Values of the Tigris Basin between the years of 1991 and 2015 (kg/da)

CONCLUSIONS

When the period between the years of 1991 and 2015 in the Tigris Basin is examined, it is discovered that wheat planting areas, the amount of production and the yield values tended to increase especially in the last 10 years, however, the amount of the annual precipitation decreased on the basis of the basin. On the basis of this information, it is concluded that the amount of the annual precipitation does not affect the production alone but it is one of the components affecting the production. In the period of the mentioned 25 years, the lowest amount of precipitation was identified to be 260 mm/year in 2008 for Mardin; 380 mm/year for Batman; 455 mm/year for Siirt; 445 mm/year for Diyarbakır; 380 mm/year for Şırnak and the result of this situation is reflected as the loss of wheat yield in the Tigris Basin. There was the same decrease in the wheat production values in the basin between the years of 1998 and 1999.

It is seen that the wheat production areas in the Tigris Basin increased over the years due to the fact that agricultural support promotes the wheat production, wheat input food industrial facilities are supported in the region as a result of government policies, quality and certified seeds are used, the awareness of the producers has increased, etc.

There were increases in the production and yield as a result of the fertilization in the right

place, in the right time and in the right quantity together with the improvements in the agricultural techniques used to increase the yield values in a unit of area. The soil analysis support of the Ministry of Food, Agriculture and Livestock together with the diesel fuel, fertilizer and certified product supports caused the producers to be directed to more sensitive agricultural techniques in the wheat production, in other words, they take care of agricultural production and the amount of the products acquired from a unit of area increases.

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BOTTOM TRAWL SIZE SELECTIVITY METHODS IN THE TURKEY

Yaşar ÖZVAROL[1], Yıldız BOLAT[2]

[1]Akdeniz University, Faculty of Fisheries, Pınarbaşı Boulevard, 07059 Antalya, Turkey, Email: ozvarol@akdeniz.edu.tr
[2] Süleyman Demirel University, Eğirdir Fisheries Faculty, Isparta, Turkey

Corresponding author: ozvarol@akdeniz.edu.tr

Abstract

Trawling is an important fishing method used by the fishermen in the Turkey. Bottom trawling fisheries in this part of Mediterranean are essentially multispecies. Commercial fishing vessels use 44 mm diamond shaped mesh for trawl cod-end s in the Mediterranean Coast of Turkey. The trawl nets (cod-end) of the fishery retain a lot of juvenile individuals, which has negative effects on the population of fish species. Currently fishing boats use very low selectivity gears. Because of this reason, fishing ground is predominantly overfished. Although there are many selectivity studies carried out in the Mediterranean coast of Turkey, selectivity experiments results have not used into practice for management of fisheries yet.

Key words**:** *Bottom trawl, size selectivity, cod-end, Turkey*

INTRODUCTION

Turkey is surrounded by three seas: the Black Sea in the north, the Aegean Sea on the west, and the Mediterranean Sea on the south. In Turkish waters, while the main fishery of coast of Black sea was targeted on small and medium pelagic fish species [12] (anchovy, herring, Atlantic bonito) demersal fish species (mullet, lizardfish etc.) are main fisheries for the Mediterranean and Aegean coast of Turkey.

Fisheries in Turkey are characterized as multi-species, multi-gears and targeted both demersal and pelagic fish stocks as in most of other Mediterranean countries [20]. Trawling, purse seine, and trammel netting are three common commercial fishing methods in the Mediterranean coast of Turkey. Trawl and small-scale fisheries (gill net, trammel net, long line, trap etc.) are exploiting demersal fish stocks, while purse seiners are concentrating on small or large pelagic fish stocks. Lagoon fisheries also exist in the region focusing on sea bass, sea bream, eel and mullet [6]. Natural fish resources of Turkish waters have been damaged for a long time and most of fish stocks are fully fished and some are overfished [10]. Besides these, according to the Food and Agriculture Organization 33% of the Mediterranean and Black Sea fish stocks were fully exploited, 50% were overexploited. The main stocks of sole, most sea breams, and all hake and red mullet are over exploited during 2009, in the Mediterranean Sea [10].

In the Turkey, fishing regulations are based on minimum mesh size, minimum landing size or weight, closed area and terms for specified fishing gears and vessels, closed season, ban on catch to some species, gear restriction for identified species, gear or fishing method restrictions and some restrictions concerning pollutants [11].

Trawling is a method of fishing that involves actively dragging or pulling a trawl through the water behind one or more trawlers. Trawling methods is the most important capture method for exploitation of the demersal fish stocks around the Turkish coasts. Approximately 90% of demersal fish production is harvested by trawlers in Turkey [20].

There are many selectivity methods used in the world. These methods are:

(i) Covered cod-end method
(ii)Trousers trawl method
(iii)Parallel haul method
(iv)Twin trawl method
(v)Alternate haul method

(vi)Special selective devices

In this list, while special selective devices and covered cod-end method can be used only for a part of trawl net, trousers trawl method, parallel haul method, twin trawl method and alternate haul method can be used for whole trawl selectivity [22].

In this paper, bottom trawl size selectivity methods carried out in Turkey were presented. Also the structures of selectivity gears and cod-end s were summarized detailed.

MATERIALS AND METHODS

Traditional Mediterranean bottom trawl cod-end

Currently, Turkish Fisheries Regulations defines a minimum cod-end mesh size of 40 mm for the Black Sea, 44 mm for the Aegean Sea and the Mediterranean for demersal trawls [1]. Many published studies were showed the selectivity of commercially used cod-end s is rather poor in Turkish demersal trawl fisheries [20](Figure 1).

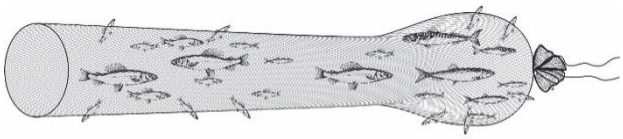

Fig. 1. A traditional diamond mesh cod-end used in the Mediterranean coast of Turkey

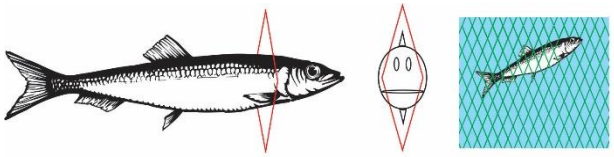

Fig. 2. Meshes stayed tightly closed during the haul

Because the rate of fish species retain in the cod-end were immature and smaller than the minimum landing size or first maturity size. In the traditional diamond shaped cod-end s, during the haul meshes stay tightly closed and individuals that try to escape through these meshes may squeeze (Figure 2) and this leads to an increase in the mortality rate [17, 18].

There are many selectivity studies carried out in the Mediterranean coast of Turkey, but only trousers trawl method and covered cod-end method (diamond and square shaped mesh cod-end s) were used in these experiments.

Covered cod-end method (Hooped covered cod-end)

In this method, a small – meshed bag, called as the "cover", fix surrounds the main cod-end in order to retain all of the specimens that escape through the main cod-end meshes (Figure 3). According to [22], the fully extended width of a cover should be at least 1.5 times larger than that of the main cod-end and the length of the cover is advised to be two times longer than the extended length of the main cod-end. The construction of the cover should ensure that the water flow in and around the main cod-end is affected as little as possible. The cover cod-end is usually attached to hoops or kites to avoid masking effects with the main cod-end [14].

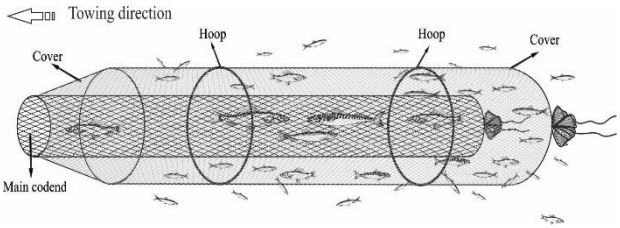

Fig. 3. Covered cod-end method

The main aim of using the covered cod-end method is to calculate selectivity parameters based on the proportion of fish that remain in the catchees compared to the ones those escapees [16]. In this method, caught fishes from both inside and outside main cod-end analyze separately. Length measurements of all individuals use for the estimation of the selectivity parameters [7].

Trousers trawl method

The trouser trawl was developed as an alternative product to the covered cod-end and alternative haul methods and came into widespread use in the mid-1980s [5]. In this method, a sorting grid fixes end of the tunnel before the trousers shaped cod-end s. In front of sorting grid, a guiding panel, made from netting should be stretched. This panel helps the fish directly to swim the sorting grid. When designing a sorting grid, it is important to develop a system that ensures that most fish come into contact with the grid and thereby have a chance to escape through it [12].

The sorting grid consists of two parts. Upper part of sorting grid is without any grid and the length of this part should be 40% of the total length. Other part of sorting grid consist 60% contain grids. The space between grids can be set according to height of targeted fish species body shape. Trousers shaped cod-end fixes behind the sorting grid (Figure 4). The form of sorting grid (using horizontal or vertical grids) is depending on targeted fish body form.

During haul, small fish that pass through the grid direct towards the escapees and larger fish (that couldn't pass through the grid) direct towards the catchees. The fish totally retained in catchees, and escapees use to estimate the selectivity parameters [15].

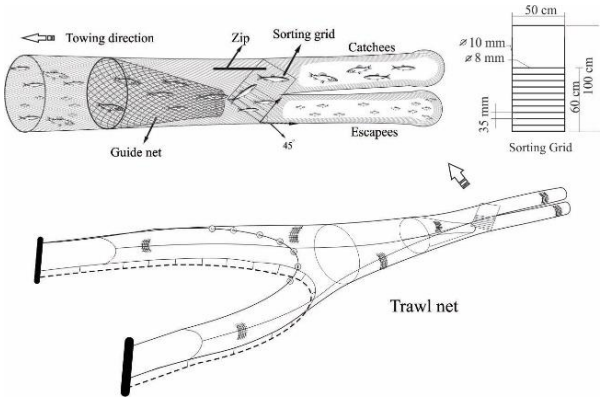

Fig. 4. Design of the sorting grid systems used in Turkey [15]

Square mesh cod-end

In this method, square mesh shaped cod-end fixed trawl net use instead of diamond mesh cod-end (Figure 5). The shape of square meshes keep continuously remain open unlikely diamond mesh during the haul. Because of this reason, square mesh cod-end is more selective than the diamond shaped mesh cod-end s, as it increases the 50% selection lengths of most target species and reduces discards [3].

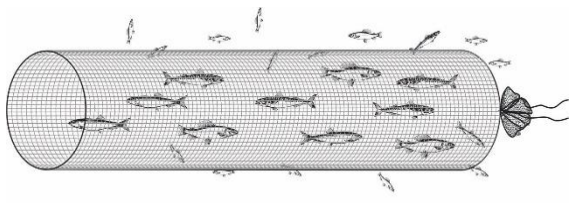

Fig. 5. Square mesh cod-end

RESULTS AND DISCUSSIONS

The fisheries in the Turkish Mediterranean coasts are very diverse, both in terms of the fishing methods, fishing gears used and the species caught. Demersal fishery in Turkey mainly constitutes 41 fish species [19]. Demersal fish production was 3% of the total fish production in 2015 [8]. The aim of ecosystem based fisheries management is to provide the maximum sustainable take of target organisms with the minimum impact on other ecosystem components.

Trawling and dredging are responsible approximately half of the total discarded fish worldwide. Bottom trawling causes seriously chronic and widespread problems on the demersal zone with the removal of growing epifauna, damaging and shifting the habitat and benthic community and demersal fish fauna [8]. According the [4], every 1 kg of targeted catch responded 1.5 kg of discarded species in the catch composition [8]. The main goal of selectivity studies is to improve minimizing the capture of juveniles by regulating the size at first capture, increasing the yield per recruit of targeted species, and reducing the discards and hence the impact of fishing on ecosystems [2].

Up to now, there are many studies established differences in selectivity of mesh size (diamond, square, and hexagonal meshes) different selectivity methods (covered cod-end, trousers cod-end method) and gears (grids, hoops etc.) to provide better reducing discard ratio [4, 9, 15]. After all of these experiments, very important results published by the researchers.

Although there are many selectivity studies carried out in the Mediterranean coast of Turkey, selectivity experiments results have not used into practice for management of fisheries yet.

CONCLUSIONS

The European Union and the General Fisheries Commission for the Mediterranean proposed 40 mm square mesh cod-end in all demersal trawl fisheries to improve the overall exploitation pattern in 2008. The

studies result showed that covered cod-end method, trousers cod-end method, using sorting grid or using square mesh cod-end instead of diamond mesh cod-end have many advantages and disadvantages. According to these results a single method will not to be suitable for all species to decrease or minimize the discard or to catch juveniles in the Turkey as in the world.

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FOOD INCUBATORS FOR SUSTAINABLE DEVELOPMENT OF REGIONS

Zuzana PALKOVÁ[1], Tibor PALKO[2]

[1]Slovak University of Agriculture, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, Phone:+421 905 206 963, Email: Zuzana.Palkova@uniag.sk
[2]New Edu. n.o., Kováčikova 12, 949 01 Nitra, Slovakia, Phone: +421 905 433 029, newedu@newedu.sk

Corresponding author: Zuzana.Palkova@uniag.sk

Abstract

Food and drink represents the largest manufacturing sector in the EU and encouragingly has sustained positive growth. Even during the economic downturn, levels of employment in the food and drink industry remained quite stable. While the sector has excellent potential for artisan and specialty producers to establish, the lack of access to food grade workspace is a serious and inhibiting barrier to entry. Moreover, artisan food producers struggle to support the capital requirements of setting up a production facility. On the other hand, there is an abundance of underutilized properties in public and private ownership which could be re-imagined as vibrant Food Incubators but the promoters of same lack the skills and practical strategies to develop them. From this point of view, food incubators have the unique potential to spur productive, inclusive and sustainable economic development. They provide a strong foundation for the creation and expansion of food businesses and jobs by helping communities, Vocational Education and Training (VET) bodies, development agencies to revitalise underutilised buildings into powerhouses of food sector learning, innovation and production. The paper presents the project FITR – Food Incubators Transforming Regions, which seeks to forge an effective and replicable model to provide the learning and strategic structure to develop food kitchens and incubators as enterprise, training and support drivers at regional level.

Key words**:** *food incubator, sustainable development, curriculum, innovative learning*

INTRODUCTION

Food and drink represents the largest manufacturing sector in the EU and encouragingly has sustained positive growth (EC, 2015). Even during the economic downturn, levels of employment in the food and beverage service activities remained quite stable. It is a fragmented industry with 1,519 thousands enterprises employing 7 806 thousands people (Eurostat, 2013). Based on the statistical data (Eurostat, 2013) more than half (55.3 %) of all the enterprises within the EU-27's food and beverage services sector were classified as belonging to the restaurants and mobile food services subsector [2]. Moreover, small and medium enterprises (SMEs) account for 99 % of companies operating in this industry and, often, are part of highly fragmented and complex food chains (Smith & Barling, 2014) [4].

From this point of view, food incubators have the unique potential to spur productive, inclusive & sustainable economic development. They provide a strong foundation for the creation and expansion of food businesses and jobs by helping communities, VET bodies, development agencies to revitalise underutilised buildings into powerhouses of food sector learning, innovation and production. At a time of rising social inequality, food incubators also offer the prospect of expanding employment in the growing food sector through educational opportunities for disadvantaged populations.
The project Food Incubators Transforming Regions (FITR, 2015), founded by European Commission through the programme Erasmus+, aims to forge an effective and replicable model to provide the learning and structure to develop food kitchens and incubators as enterprise (FITR, 2015) [2]. This in return will spur productive and

sustainable economic development through an increase in available resources to start small businesses and creation of jobs in this sector.
The project undertakes a process of revitalisation at a local community level through the development of food incubators in dilapidated buildings. These buildings are an economic drain in communities and through FITR they can be turned into a hub for economic prosperity, by establishing food incubators in communities who provide training and workspace for these emerging food entrepreneurs.

MATERIALS AND METHODS

The Food Incubators Transforming Regions (FITR) project brings together partners from Northern Ireland (Banbridge Distinct Council and Canice Consulting), Slovakia (Slovak University of Agriculture and New Edu, n.o.), Netherlands (Stitching Business Development Agency) and Irish partners Momentum Marketing and Roscommon LEADER Partnership.
A key aspect of FITR project is its ability to harness the knowledge triangle to capture and share a unique VET formula for the development of food incubators. By creating Regional Partnerships involving VET institutions (e.g. HEIs, business training organizations), local governments, food industry and economic development stakeholders, the project enables the sharing of knowledge and best practice between organizations from the fields of research and education and this will be converted into wider innovations in policy and practice at regional level. The result aims to create ongoing relationships between diverse institutions working in the food-entrepreneurship knowledge triangle. Through this collaborative aspect and shared ownership of the project, the establishment of Regional Alliances strengthens the technical assets of the regional food sector to facilitate regional growth and better knowledge triangle impact.
The FITR project directly enables the provision of new training content motivated by industry need. While there are many VET responses for food entrepreneurs and SMEs, there is no course for vocational education and training in the theme of best practice in developing regional infrastructure and support structures that may stimulate food economies. FITR plans to address this lag by providing a unique training curriculum and course materials to successfully establish and manage food incubator hubs to cater for the growing numbers of emerging food entrepreneurs who are in urgent need of a place to produce, learn and grow. It targets community drivers, development agencies and VET bodies. Developed by a compelling mix of academics & industry specialists, it epitomizes quality VET provision.
At policy level, the partners plan to develop a training blueprint to develop or enhance physical food incubation hubs in local communities in a training tool format. The objective is to better sensitize local, regional and national authorities of the potential of food industries as community based stimuli at regional and local development. The FITR Partnership after finishing its activities will engage with industry and policy decision makers to adopt and implement food sector investment which should stimulate confidence in communities, provide enterprise access and social cohesion.

RESULTS AND DISCUSSIONS

The FITR project started in September 2015 and over 24 months, FITR plans to achieve in four regions - in Ireland, UK, Slovakia and Netherlands, four key deliverables (FITR, 2015) [3]:
-Through a Triple Helix leadership network to establish four sustainable, sector focused **Regional Partnerships** to study and capture best practice in the development of Food incubators and.
-Create and publish a "**The Essential Guide to developing a Regional Food Incubator**" to focus on "how-to" strategies for food hub establishments and operations that are based on successful models operating in other regions and new concepts from the US (the market leaders in food incubators).
-Create and publish a **course curriculum**, guiding Vocational Education and Training

practitioners on the topics and skills most needed to establish and manage a Food incubator.

-Develop an intensive **blended learning "The Essential Toolkit to develop a successful Food Incubator" course** based on open education resources, targeting regional change makers in local government, development agencies, communities, businesses, not-for profits and others interested in establishing food hubs.

The FITR project engages with four clear target groups:

-**Communities** with physical space that can be easily converted to a food hub - often overlooked, we embeds this project in local communities. According to the European Cluster Observatory local culture and heritage provide opportunities for exploiting creative potential, by providing opportunities for scope and space for creative entrepreneurship to take place, e.g. integrated training and co-working spaces in community buildings.

-Existing and emerging **food entrepreneurs**.

-**Vocational Educational Training trainers and Higher Educational Institutions** tutors involved in creative industries disciplines and entrepreneurship for social inclusion.

-**Local authorities and public sector agencies** in influencing policy - Affordable space for creative activity and enterprise is an enduring issue that needs policy maker influence. Artists and other creative people are routinely priced out of areas that become popular due to the very creative activity that they helped generate. Given the precedence of underutilised and eyesore properties as a legacy of recession, public bodies can incentivise reuse.

Rather than solely focusing on the final target group, partnership harnesses the knowledge triangle of actors working in food, regional marketing, and wider economic development. This enables to ensure the relevance and provide greater strategic focus to the training course, but also to create a more enabling environment for food incubators to be adopted as a driver of food entrepreneurship in the EU. This will be achieved though the creation of 4 Regional Partnerships.

FITR Course Curriculum & Open Educational Materials

Food incubators are proven to be a changemakers in increasing the labour market relevance of VET as they strive to give empowerment by offering an array of sector specific training access, technical assistance and resources for current and aspiring food entrepreneurs by promoting equal access to economic opportunity as entry costs to the sector are negated to manageable levels.

While across whole European Union many communities and local government bodies see merit in developing food incubators, they lack the skills to realise same (Palkova, Olejar, Cviklovic, & Lukac, 2016). The FITR toolkit and online training course cover different formats of food incubators:

-regional value-added food processing centres,

-shared-use community kitchens,

-shared-use agricultural processing facilities, which are designed for use by farmers for collective grading, processing and packaging of farm produce or other commodities,

-mobile incubators that can go to primary producers.

FITR Course Curriculum & Open educational materials is available in 3 languages (English, Dutch and Slovak) and based on the following principles:

-comprehensive and relevant course curriculum and content;

-comprehensive and relevant set of open educational resources, which together comprise the course content, but which can also be used independently.

Course curriculum comprises 6 modules and covers following topics:

-**Creating possibilities for food incubation in the Region** - a series of modules to train participants how to review of the potential of the sector through learning how to conduct a robust and credible feasibility analysis, the research tools to establish need and methodologies to harness support, identify suitable premises, how to technically assess and SWOT each building and negotiation skills to acquire the building at preferential rates.

-**Different Models of food incubators** - training to allow participants to synthesize

best practices models and assess best fit for themselves; regional value-added food processing centres; shared-use community kitchens; shared-use agricultural processing facilities, which are designed for use by farmers for collective grading, processing and packaging of farm produce or other commodities; mobile incubators that can go to primary producers premises and act as in situ production units.

-**Food incubators business strategy** - the nuts and bolts of running a food incubator, licensing options for operators, kitchen management protocols, adding value to your incubator e.g. shared sales & distribution platforms.

-**Stimulating demand** - tools to develop a pipeline of new food entrepreneurs in your region through Pre-Incubation supports and mechanisms, creative marketing of the resource.

-**Accessing resources** - training in innovative access to public finance, crowd funding potential and attracting corporate sponsors.

Connecting to collaborations & communities - the potential of co-working, new methodologies for creative collaborations, parameters of same and success tools.

The course are taught in a blended learning format and duration of each module represents 25- 30 hours of self-guided online and classroom based learning with:

-Classroom training course designed for use by HEI - VET and Business Support providers. Learning will embedded through self-assessment exercises (leading to a course certificate), peer to peer communications and setting up an ideas portal for participants who may like to collaborate with other emerging food incubator developers.

-Mobile and online learning resources for individual private study.

-Training notes for HEI-VET and Community Business Support providers to integrate our course and open educational resources into their offerings.

CONCLUSIONS

The Food Incubators Transforming Regions (FITR) project is Erasmus + project supported by European Commission which has been started in September 2015[1].

The FITR project seeks to forge an effective and replicable model to provide the learning and strategic structure to develop food kitchens & incubators as enterprise, training and support drivers at regional level. The partnership involves 7 partners across 4 counties - UK, Ireland, Netherlands and Slovakia and will run for 24 months. It is based on the facts that even if there are many VET responses for food entrepreneurs and SMEs, there is no vocational education and training in the theme of training tools for developing regional infrastructure and support structures that will stimulate food economies. The FITR project comprises unique training curriculum and course materials to successfully establish and manage food incubator hubs to cater for the growing numbers of emerging food entrepreneurs who are in urgent need of a place to produce, learn and grow. The FITR project targets community drivers, development agencies and VET bodies. Developed by a compelling mix of academics & industry specialists, it epitomizes quality VET provision.

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GREEN ENERGIES FOR AGRICULTURE: COMPARATION STUDY FOR SLOVAKIA & THE NETHERLANDS

Zuzana PALKOVÁ[1], Michal PALKO[2]

[1]Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, Email: Zuzana.Palkova@uniag.sk
[2] Comenius University in Bratislava, Odbojárov 10, 820 05 Bratislava 25, Slovakia

Corresponding author: Zuzana.Palkova@uniag.sk

Abstract

The primary role of agriculture is to produce food. However is the agriculture sector able to provide other activities? Exploitation of biomass and production of biogas from the waste of agricultural production shows that the farmer can become producers of energy. Two of the most typical agricultural countries in European Union are Slovakia and the Netherlands. This article was based to answer the question: What are the differences of using green energy in Slovakia and the Netherlands in agricultural sector? Comparison of information such as spread of land, population density, gross domestic product data on agricultural production, energy production and consumption in the agricultural sector showed that renewable energies are widely used in agriculture sector although approach in both countries is different, as a result of differences in the climate and geographical condition of these countries.

Key words**:** *agriculture, Slovakia, the Netherlands, renewable energy sources, green energy*

INTRODUCTION

Since the Industrial Revolution in the late 19th century made an industrial big power out of Netherlands, furthermore accelerated the industrial development in the Austro-Hungarian Empire, which also included Slovakia. Due to this fact, all parts of the economy became depended from electricity. Agriculture with livestock, crop and food production is no exception. However new technologies used in the production process are being labour-saving, they increases the dependence of the sector from electricity and fuel.

This article focuses on the differences in the use of green energy in agriculture in the Netherlands and the Slovak Republic. In order to answer mentioned question, following specific questions need to be answered: "*What are the general Country Data like an area, population, GDP?*", "*What are the basic characteristic of agricultural sector in both countries?*", "*What are the basic characteristics of energy consumption in both countries?*", "*What is the actual installed capacity per technology and per sector?*", "*What is the policy of both countries on green energy in agricultural sector?*".

This topic can be very interesting in connections with the problem in agriculture infrastructure of the rural areas. Indeed, many of them have no built infrastructure or it is significantly outdated. The need for large investments and lack of financial resources leads to raised unemployment and depopulation of rural areas. In these consequences, diversification into non-agricultural activities supporting the development of new, respectively existing forms of business, provide alternative types of employment in agriculture. In other words, alternative forms of energy largely contribute to sustainable rural and regional development (Krištofičová, 2011) [16]. Growing energy plants, biomass combustion in order to generate heat or biogas production from the waste of animal and crop production represent opportunities that can reverse these negative trends and to facilitate the sustainable development of local entrepreneurship based on local natural resources of renewable energy.

Renewable energy can be seen as a way to improve the economic situation of farms, in addition can help develop other companies

that are in any way involved in energy production, construction and operation of agro-bio-energy plants.

MATERIALS AND METHODS

In order to answer questions and sub-questions mentioned above desk research was conducted. A wide variety of sources were used to retrieve information including books, scientific publications and web resources regarding renewable energy.

To obtain basic data about each country a databases of World Population by Country and International Monetary Fund were used. Both databases are available online and include basic economic information on almost 190 countries. In addition, data from European Union's Eurostat allow to answer questions about the installed capacity, production and consumption of electric energy as well as the characteristics of the agricultural sector.

Legal documents, laws and regulations relating to the use of renewable energy were taken from the website of the European Commission.

The aim of the desk research was to gather qualitative and quantitative data, which will enable a debate about what is the state of exploitation of renewable energy in both countries as well as what the development of the situation is. Tables and graphs contained in the document allow comparison between figures, presenting the view on this issue.

RESULTS AND DISCUSSIONS

According to the latest statistics, population of the Netherlands is 16,901,693 citizens, which makes it the 62nd most populated country in the world (WPR, 2015) [19]. Whereas the Slovakia has an estimated 2015 population of 5,461,108 (WPR, World population review, 2015) [19]. Economy of the Netherlands is focus on agriculture and food processing, chemicals, petroleum refining, and electrical machinery, in contrary of this, the Slovak economy is oriented on manufactured goods, machinery and transport equipment. Total nominal GDP of the Netherlands is 749,365 billion $, for Slovakia 87,528 billion $ (IMF, 2015) [14].

The Slovakia and the Netherlands are in terms of area similar countries but with very different geographical conditions. The average altitude in Slovakia is 392 metres and up to 40% of its area is formed by mountains or highlands. The highest point is Gerlach with a height of 2,655 meters above sea level, oppositely the lowest is Streda nad Bodrogom with altitude 94 metres above sea level. Slovakia is a landlocked country, still a major European river Danube flows through the area. (Zem na dlani, 2015) [20].

The Netherlands is a lowland country, meaning major part of country area consists from plane. Mountains are just in the middle of the country. The highest lying point is Vaalserberg Hill, which is located at an altitude of 322.7 meters (Britannica, 2015) [2]. About half of the surface area is less than 1 metre above sea level (Europedia, 2015) [6], moreover large part of the country consists of polders - areas that arose by barricading the coast and drying of the sea. Typical canals that connect the rivers and provide shipping.

The Netherlands and Slovakia are in the matter of size very similar countries. Dutch population, however, is more than three times bigger than the population of Slovak Republic. The demographic factor significantly affects the primary production of electric energy - Netherlands produced three times more (in 1990), respectively 3.5 times more (in 2013) of electricity than the Slovak Republic (EuroStat, 2015) [8].

Primary production of energy by sources varies in both countries - 92% of primary electricity production in the Netherlands is sourced from natural gas, on the other hand in Slovakia the share of natural gas covers only 2%.And what is more, up to 66% share is covered in form of nuclear energy. Share of renewable energy in total production of electricity is 6.2% in the Netherlands, in contrast with 22.6% in Slovakia (EuroStat, Primary production, 2015) [10,11].

Fig. 1 shows the power consumption in both countries, in particular economic sectors. The most significant difference shows the energy consumption in the agricultural sector - more

than 6% in the Netherlands in comparison with the little over 1% in Slovakia. This also points to the different position of agriculture in both countries (EuroStat, Final Energy consumption by sector, 2015) [9].

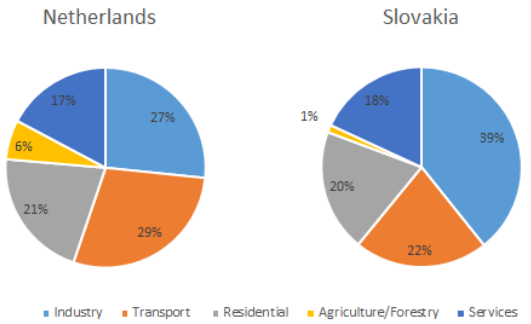

Fig. 1. Final energy consumption by sector (Mtoe)

Among the renewable energy sources we include wind energy, solar energy, hydro energy, geothermal energy, tidal energy, energy from biomass and biogas. Thus these energy sources currently represent an essential alternative to fossil fuels. In addition their exploitation helps to reduce greenhouse gas emissions from energy production and consumption, furthermore reduce dependence on imports of fossil fuels from often politically very unstable regions.

According to the website of the European Parliament (Kerebel, 2015) [15], the EU owns 40% of the world's patents relating to renewable energy. In these consequences, the European Union is consider as the leader in the development of technologies for renewable energy. Indeed, in 2012, almost half (44%) of world's electricity generation capacity from renewable sources (excluding hydropower) was produced in the European Union and this area of economy employs around 1,2 million people. (Kerebel, 2015) [15].

The basic document of the European Union for the use of renewable energy sources is Directive No. 2009/28/ES of the European Parliament and of the Council from 23 April 2009 on the support of energy from renewable sources and amending and subsequently repealing Directives 2001/77 / EC and 2003/30 / EC (EUR-Lex, 2015) [5]. Considering the fact that the primary energy sources and energy markets of the Member States of the European Union are different, national governments had to adapt to this fact and their energy policies and the fulfilment of obligations under the Directive No. 2009/28/EC.

In addition the basic guidelines for the use of renewable energy sources, there are other documents that deal with the problem of green energy. For instance, the document "Renewable Energy Road Map" , "Biomass Action Plan", "EU Strategy for Biofuels", "Motor vehicles: use of biofuels" or "Promotion of offshore wind energy". Finance investments in renewable energy development provide several programs - the "Intelligent Energy for Europe" program for the period 2003-2006, "The Global Energy Efficiency and Renewable Energy Fund" or "Support for electricity from renewable energy sources".

Under the Directive No. 2009/28/EC, the Netherlands and Slovakia have created National action plan that explains how they intend defined objectives achieved in 2020 (EC-Energy, 2015) [4]. This plan include information such as the share of renewables in the energy mix, which the state want to achieve, which technology it want to use, what policies want to achieve and how it will cooperate with local, regional and national authorities. Mandatory national target set in the Directive 2009/28/EC features for both countries 14 % share of RES in final consumption of energy. Share of renewable energy in gross final energy consumption in 2013 accounted for 4,5% in the Netherlands, in the case of Slovakia, 9,8%. (EuroStat, Share of renewable energy in gross final energy consumption, 2015) [12].

Current installed capacity by technology in 2013 is given in Table 1 (EuroStat, Primary production of renewable energy by type, 2015). [11].

Scientific work focused on the issue of renewable energy in the agricultural sector mainly focuses on the topics such as impact of policy on the use biofuels in agriculture (Banse, 2008) [1], (Demirbas & Balat, 2006) [3], the use incinerating waste in agricultural production (Werther & et al., 2000) [18] or the pros of anaerobic digestion (Holm-Nielsen, Oleskowicz-Popiel, & Al Seadi, 2009) [13].

Table 1. Renewable energy - Actual installed capacity per technology (kToe)

	Hydro power	Wind power	Solar thermal	Solar PV	Tide, wave and ocean	Solid biofuels	Biogas	Municipal waste	Biodiesels	Geothermal
Netherlands	9.8	483.8	26.0	44.4	0	1,113.5	311.7	798.8	1,215.1	23.7
Slovakia	416.9	0.5	5.6	50.6	0	768.6	54.9	15.5	94.8	6.5

In detailed report on impacts of renewable energy on European farmers (Pedroli & Langeveld, 2011) [17] is written that renewable energies can play a crucial role in the transformation of agriculture, as they provide a new source of income. Furthermore, the report examines the contribution of agriculture to renewable energy production and the impact of this new activity on the farms. Based on this analysis possible development paths for the future are defined.
Besides this, the statistical portal of the European Union (EuroStat, Agri-environmental indicator - energy use, 2015) [7] provides summary on the use of renewable energy in agriculture and forestry. The growing trend of energy from renewable sources in the agricultural sector highlights the significant contribution of agriculture and forestry to the objectives of the EU 2020.

Table 2. Production of renewable energy from agriculture and its share in total production of renewable energy (ktoe, %) in 2010

	Primary energy production of renewable energy from agriculture and forestry (ktoe)			Share of primary energy production of renewable energy from agriculture and forestry to total production (%)			Share of primary energy production of renewable energy from agriculture and forestry to total renewable production (%)			Share in total production of renewable energy (%)
	Agriculture	Forestry	Total	Agriculture	Forestry	Total	Agriculture	Forestry	Total	
Netherlands	582	1,033	1 615	0.8	1.5	2.3	19.8	35.1	54.8	19.8
Slovakia	143	740	883	2.4	12.4	14.8	10.2	52.7	62.9	10.2

With reference to this report, total primary energy production of renewable energy from agriculture and forestry, which was produced in year 2010 in the Netherlands (1,615 Ktoe) was twice as high as in Slovakia (883 ktoe). However, considering the fact that the Netherlands produces 3.5 times more electricity than Slovakia, the share of primary energy from renewable energy sources in agriculture and forestry in the total electricity production in Slovakia (14.8%) is about 7 times greater than in the Netherlands (2.3%). Moreover, the proportion of primary energy production of renewable energy from agriculture and forestry in the total production of renewable energy in Slovakia (63%) is larger than in the Netherlands (54.8%).
Due to geographical conditions of both countries, these findings may be considered. A large part of the Slovakia is covered by forests and usage of wood biomass for heating has long tradition in the country. On the other hand, despite the tradition of building waterways and the presence of coastline, using the hydropower in the Netherlands is unexpectedly low. The probable reason is that the Netherlands concentrate more at land drying and using hydropower claim higher speed of water flow as is required for waterways, the main concept of channels in the Netherlands.
The basic finding of the research is the fact that both countries consistently fulfil the objectives set by the European Union for using renewable energy sources. Accomplishing the set target in the usage of renewable energy in the overall energy mix has been set for both countries on the same level - 14%. However, actual situation is better in the Slovak Republic. Contribution of the total energy production from renewable energy sources in agriculture and forestry is in the Slovak republic 7 times higher than in the Netherlands.
It needs to be said that any relevant scientific data that study case mentioned above have not

been found during the research. As shown in Table 2, the significant amount of electricity production from renewable energy in Slovakia is covered by small hydropower plants, as well as a by biomass and biofuels. These types of alternative energy sources have the greatest exploitation in the agricultural production.

CONCLUSIONS

The goal of the research was to present the current state of development regarding the use of renewable energy sources in agro sector in two EU countries - the Netherlands and Slovakia. Both countries are similar to the size of its territory, but with wide variations in population, climatic and geographic conditions.

Both countries accepted the Directive No. 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of renewable energy - basic document of the European Union for the use of renewable energy sources. Both of them also have prepared national action plans, which consistently define national targets for the share of renewable energy in the total energy mix for 2020 at 14%.

Total primary energy production of renewable energy from agriculture and forestry in 2010 was two times higher in the Netherlands than in Slovakia. However, considering the production of primary energy from renewable sources, the share in the agriculture and forestry sector is in Slovakia seven times higher as in the Netherlands. Likewise, the proportion of primary energy production from renewable energy from agriculture and forestry in the total production of renewable energy is higher in Slovakia than in the Netherlands.

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ASSESSEMENT OF RESIDENTS' ATTITUDES TOWARDS TOURISM AND HIS IMPACT ON COMMUNITIES IN THE DANUBE DELTA

Anca PAVEL-NEDEA, Ion DONA

University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone/Fax: 00 40 744 6474 10; Email: ancanedea29@yahoo.com

Corresponding author: ion_dona@yahoo.com

Abstract

The Danube Delta was in 2016 the object of large debates regarding the future development of this area. The proposed strategic measures concentrate on the economic benefits of local communities and on the conservation of biodiversity, but in the same time sustainable tourism was considered (together with small industries and traditional crafts development) a very important source of revenue for the local communities. We consider that understanding residents' perceptions over the tourism activities from Danube Delta can improve the future decisions of stakeholders. In this context, the paper examines the attitudes of local people from Danube Delta towards the ongoing tourism and the impact of tourism on their communities. Questionnaire surveys were carried out in 2016 in 12 villages and were collected responses from 146 local residents. The main results of our survey revealed a positive attitude of residents towards tourism in general (especially amongst female, non-employees, high-income and directly involved in tourism respondents) and towards tourism in their community (especially amongst male, non-employees, low-income and directly involved in tourism respondents).

Key words**:** *sustainable tourism, resident attitudes, tourism management*

INTRODUCTION

Economic and social problems jeopardize the development of communities from areas with national parks or protected areas where the low incomes or the lack of jobs exacerbates the utilization of natural protected resources and creates conflicts with the authorities or the stakeholders responsible with the conservation of biodiversity. In remote areas, especially from protected areas like Danube Delta, the problems are bigger due to different factors like unauthorized tourism or high taxes imposed by local and central governments [1]. Here are needed a sustainable use of natural resources, an increase of human capital, a consolidation of local management (political intervention and sectors' integration [13] and the development of activities with added value to boost the local economy.

The development of touristic activities represents a viable solution for income' boosting in local communities but like highlighted [8] sometimes these benefits come with environmental and cultural costs. In Danube Delta, these aspects are very important in the present even if tourism has been an important part of the delta economy for several decades. Why now? Because there is an increasing demand for resources both from tourists and residents and also a rise of polluted areas and accommodation facilities. But the implementation of a sustainable tourism, which can balance the demand for natural resources, needs a better distribution of environmental, social and economic costs and benefits of tourism [12]. In the process of reducing the costs and increasing the benefits, the strategic measures need to take in account the alteration of environment and the local resource consume due to transportation and accommodation of tourists [3], the tendency for a high consume in holiday periods [2] and the desire of investors to obtain benefits immediately with any regard for natural resources [11].

Many authors consider that the tourism development alters the relationship between residents and the environment [10]. In this situation, residents' relationships with their environment can become decontextualized [5] and different factors, like the increase of noise or prices, can lower the community

satisfaction [9]. In addition, the development leads to an increase in the use of energy (transportation, accommodations and specific activities) [15], water [6] and land.

How cope with these problems the residents? The tendency is to emphasize the economic gains to justify the environmental and cultural cost [4] and to create a negative opinion towards the controlled measures implemented by authorities. If the benefits are lower than the costs, the tendency is to develop feelings of resentment and irritation towards tourists and tourism activities [7]. In general, the people with economic gains from tourism or implicated in tourism planning have a positive attitude towards tourism [14].

In all this context, the implementation of any strategic measures in Danube Delta needs to take in account the overall opinion of residents towards the development of tourism and the impacts of this activity on their communities.

MATERIALS AND METHODS

The objective of this research is to understand the residents' attitudes towards tourism and his impact on communities. Understanding resident attitudes is a complicated process because it depends on residents' perceptions of authority's efficiency and environmental, social and economic impacts of tourism. In this context, our questionnaire survey was constructed by taking in account the following sections:

-*Section 1* - the characteristics of respondents;

-*Section 2* - 11 positive affirmation towards tourism (a 5-point Likert scale):

-Item 1 - We have much to learn from tourists;

-Item 2 - Tourism encourages the preservation of nature and traditions;

-Item 3 - Tourism activity develops other local industries;

-Item 4 - Tourism activity diversify the local economy;

-Item 5 - Tourism activity creates new markets for local products;

-Item 6 - Tourism development attracts investors;

-Item 7 - Tourism development increases the prices of local products;

-Item 8 - Tourism development has made our community stronger;

-Item 9 - Tourism stimulates community members to work together;

-Item 10 - Tourists respect the values of local communities;

-Item 11 - Tourism development has brought more advantages than disadvantages in my community.

Section 3 - 7 negative affirmation towards tourism (a 5-point Likert scale):

-Item 12 - The environment is destroyed by tourists;

-Item 13 - Tourism development increases pollution;

-Item 14 - My community is much more crowded due to tourism development;

-Item 15 - Community tourism activities carried in my community bother me;

-Item 16 - The quality of community life has deteriorated due to tourism;

-Item 17 - Tourism development has created economic dependence on foreigners;

-Item 18 - Community resources are overused by tourists.

-*Section 4* – overall attitude – advantages and disadvantages of tourism development in the area (a 5-point Likert scale).

The statements from sections 2 and 3 are Likert-type items which fall into the ordinal measurement scale. In this case is recommended to use descriptive statistics tools like median (to measure the central tendency), frequencies (to measure variability) and the non-parametric test Mann–Whitney *U*. The median measure the central tendency (the 'likeliest' response), the IQR measure dispersion (clustered or scattered responses) and Mann–Whitney *U* estimate the differences between two independent groups.

We applied this descriptive and non-parametric methods with IBM SPSS Statistics. To assure the best results in the assessment of the attitude towards tourism, the similar items were merged into new variables based on the median value of all the items. The variables have the following meaning:

-*PAT* - Positive attitude towards tourism

(Items 1-11);
-*PATGEN* - Positive attitude towards tourism in general terms (Items 1-7);
-*PATCOM* - Positive attitude towards tourism in community (Items 8-11);
-*NAT* - Negative attitude towards tourism (Items 12-18);
-*NATGEN* - Negative attitude towards tourism in general terms (Items 12-13);
-*NATCOM* - Negative attitude towards tourism in community (Items 14-18);
-*OAGEN* - Overall attitude towards tourism in general terms (Items 1-7 and 12-13);
-*OACOM* - Overall attitude towards tourism in community (Items 8-11 and 14-18).

RESULTS AND DISCUSSIONS

The survey carried out in Danube Delta had 146 respondents, from which 50.7% male and 49.3% female (Table 1). The main characteristics of our respondents are: 67.1% are employees; 54.1% are indirect or indirect related with touristic field; 50.7% have under 2,000 RON per family member (around 450 euro).

Table 1. Frequency distribution of respondents

	Frequency	Percent	Cumulative Percent
Total	146	100.0	-
Gender			
Male	74	50.7	50.7
Female	72	49.3	100.0
Status			
Employee	98	67.1	67.1
Non-Employee	48	32.9	100.0
Income level (RON)*			
Under 2000	74	50.7	50.7
Over 2000	72	49.3	100.0
Implication in touristic field (direct or indirect)			
Yes	79	54.1	54.1
No	67	45.9	100.0

Source: Own calculation with SPSS
* (equivalence 1 Euro = 4.5 RON)

Positive attitude towards tourism

Our findings suggest consensus *(Mdn=4, IQR=0)* regarding the positive attitude towards tourism (Table 2). The analysis covers the statements which imply that touristic activities have a positive roll over environment, in local economy and inside the community.
Most respondents (76.0%) indicated agreement with all the statements and especially with those related with the general benefits of this kind of activity (knowledge transfer, preservation of environment and traditions, economic development, investment growth, added value to local products). 82.2% of respondents have agreed with the statements regarding the positive impact of tourism on community (increase of strength, cooperation and self-respect) even if we may observe a more scattered responses pattern (IQR =0.5).

Table 2. Frequency distribution of positive attitude towards tourism, median and IQR (PAT, PATGEN, PATCOM)

	Neutral %	*Reject %*	*Accept %*	Median[a]	Inter-Quartile Range (IQR)[b]
PAT	17.8	6.2	76.0	4.0	0
PATGEN	17.8	6.2	76.0	4.0	0
PATCOM	12.3	5.5	82.2	4.0	0.5

Source: Own calculation with SPSS

The verification of null hypothesis didn't show a gender significant difference (p>0.5), but the Mann-Whitney U and Wilcoxon W statistics revealed a difference in mean ranks between male and female respondents. The females have a more favourably opinion about tourism in general, while man have a stronger positive attitude toward the impact of tourism in community (Table 3).

Table 3. Mann-Whitney Test (PAT, PATGEN, PATCOM) by genre

	N	Mean Rank	Sum of ranks	Test Statistics
PAT				
Male	74	73.7	5454.0	Mann-Whitney U (2649.0) Wilcoxon W (5277.0) Z (-0.068) Asymp. Sig. (2-tailed) (0.946)
Female	72	73.29	5277.0	
PATGEN				
Male	74	72.14	5338.5	Mann-Whitney U (2563.5) Wilcoxon W (5338.5) Z (-0.467) Asymp. Sig. (2-tailed) (0.640)
Female	72	74.90	5392.5	
PATCOM				
Male	74	75.33	5574.5	Mann-Whitney U (2528.5) Wilcoxon W (5156.5) Z (-0.552) Asymp. Sig. (2-tailed) (0.581)
Female	72	71.62	5156.5	

Source: Own calculation with SPSS

The verification of null hypothesis by status didn't show significant difference (p>0.5), but the mean ranks showed a much stronger

difference. The non-employees (employer, students, etc.) have a more favourably opinion than employees about tourism in general and at community level (Table 4). In conclusion, the non-employees believe more in the benefits of tourism in their communities.

Table 4. Mann-Whitney Test (PAT, PATGEN, PATCOM) by status

	N	Mean Rank	Sum of ranks	Test Statistics
PAT				
Employee	98	71.61	7017.5	Mann-Whitney U (2166.5) Wilcoxon W (7017.5) Z (-0.897) Asymp. Sig. (2-tailed) (0.370)
Non-Employee	48	77.36	3713.5	
PATGEN				
Employee	98	72.53	7108.0	Mann-Whitney U (2257.0) Wilcoxon W (7108.0) Z (-0.470) Asymp. Sig. (2-tailed) (0.638)
Non-Employee	48	75.48	3623.0	
PATCOM				
Employee	98	69.2	6782.0	Mann-Whitney U (1931.0) Wilcoxon W (6782.0) Z (-1.826) Asymp. Sig. (2-tailed) (0.068)
Non-Employee	48	82.27	3949.0	

Source: Own calculation with SPSS

If we take in consideration the level of income, we may observe a difference between local residents with low and higher earnings. The positive impact of tourism, especially on their communities, are more appreciated by the low-income residents, the difference being almost significant in statistic terms (Table 5).

Table 5. Mann-Whitney Test (PAT, PATGEN, PATCOM) by income level

	N	Mean Rank	Sum of ranks	Test Statistics
PAT				
Under 2000	74	69.57	5148.0	Mann-Whitney U (2373.0) Wilcoxon W (5148.0) Z (-1.323) Asymp. Sig. (2-tailed) (0.186)
Over 2000	72	77.54	5583.0	
PATGEN				
Under 2000	74	71.28	5275.0	Mann-Whitney U (2500.0) Wilcoxon W (5275.0) Z (-0.762) Asymp. Sig. (2-tailed) (0.446)
Over 2000	72	75.78	5456.0	
PATCOM				
Under 2000	74	74.26	5495.0	Mann-Whitney U (2608.0) Wilcoxon W (5236.0) Z (-0.228) Asymp. Sig. (2-tailed) (0.819)
Over 2000	72	72.72	5236.0	

Source: Own calculation with SPSS

The following results confirm the research of Woo (2015). The residents implicated directly or indirectly in touristic activities have a more positive attitude towards tourism, especially regarding the ones carry out in their communities (Table 6).

Table 6. Mann-Whitney Test (PAT, PATGEN, PATCOM) by the level of implication in tourism

	N	Mean Rank	Sum of ranks	Test Statistics
PAT				
Yes	79	77.84	6149.5	Mann-Whitney U (2303.5) Wilcoxon W (4581.5) Z (-1.564) Asymp. Sig. (2-tailed) (0.118)
No	67	68.38	4581.5	
PATGEN				
Yes	79	77.42	6116.5	Mann-Whitney U (2336.5) Wilcoxon W (4614.5) Z (-1.446) Asymp. Sig. (2-tailed) (0.148)
No	67	68.87	4614.5	
PATCOM				
Yes	79	78.7	6217.5	Mann-Whitney U (2235.5) Wilcoxon W (4513.5) Z (-1.681) Asymp. Sig. (2-tailed) (0.093)
No	67	67.37	4513.5	

Source: Own calculation with SPSS

Negative attitude towards tourism

The negative statements imply that touristic activities affect the environment and the community life through an increase in the level of pollution, agglomeration, noise, usage of resources, etc. Our findings suggest that the residents' opinions are more scattered and the median is at neutral levels *(Mdn=3)* (Table 7). Actually, regarding their attitude toward negative impact of tourism, almost half of residents didn't express their opinion and the other half presented a clear division of opinion (IQR = 1-1.5).

So, regarding the tourism in general many respondents (45.2%) expressed disagreement with the idea of negative impact, but 38.4% indicated that they agreed (Mdn=3, IQR=1.5).

The reverse pattern - but much weaker - is observed for the impact of tourism on community: 20.5% of respondents believe that tourism has a negative impact, while 37.7% reject this idea.

There isn't a significant difference ($p>0.5$) between genders' opinion, but the mean ranks reveal that female agree more with the idea of negative impact of tourism in general, while man reject more the idea of negative impact over communities' life (Table 8).

Table 7. Frequency distribution of negative attitude towards tourism, median and IQR (NAT, NATGEN, NATCOM)

	Neutral %	*Reject %*	*Accept %*	Median[a]	Inter-Quartile Range (IQR)[b]
NAT	43.2	38.4	18.4	3.0	1.0
NATGEN	16.4	45.2	38.4	3.0	1.5
NATCOM	41.8	37.7	20.5	3.0	1.0

Source: Own calculation with SPSS

Table 8. Mann-Whitney Test (NAT, NATGEN, NATCOM) by genre

	N	Mean Rank	Sum of ranks	Test Statistics
NAT				
Male	74	71.75	5309.5	Mann-Whitney U (2534.5) Wilcoxon W (5309.5) Z (-0.541) Asymp. Sig. (2-tailed) (0.588)
Female	72	75.3	5421.5	
NATGEN				
Male	74	71.9	5320.5	Mann-Whitney U (2545.5) Wilcoxon W (5320.5) Z (-0.470) Asymp. Sig. (2-tailed) (0.638)
Female	72	75.15	5410.5	
NATCOM				
Male	74	76.76	5680.0	Mann-Whitney U (2423.0) Wilcoxon W (5051.0) Z (-0.977) Asymp. Sig. (2-tailed) (0.319)
Female	72	70.15	5051.0	

Source: Own calculation with SPSS

The situation is similar when we compare the employees with the non-employees (Table 9). The employees agree more with the idea of negative impact of tourism in general, while non-employees reject more the idea of negative impact over communities' life.

Table 9. Mann-Whitney Test (NAT, NATGEN, NATCOM) by status

	N	Mean Rank	Sum of ranks	Test Statistics
NAT				
Employee	98	71.55	7011.5	Mann-Whitney U (2160.5) Wilcoxon W (7011.5) Z (-0.852) Asymp. Sig. (2-tailed) (0.394)
Non-Employee	48	77.49	3719.5	
NATGEN				
Employee	98	74.92	7342.0	Mann-Whitney U (2213.0) Wilcoxon W (3389.0) Z (-0.587) Asymp. Sig. (2-tailed) (0.557)
Non-Employee	48	70.60	3389.0	
NATCOM				
Employee	98	71.86	7042.0	Mann-Whitney U (2191.0) Wilcoxon W (7042.0) Z (-0.709) Asymp. Sig. (2-tailed) (0.478)
Non-Employee	48	76.85	3689.0	

Source: Own calculation with SPSS

The residents with higher incomes, compared with the ones with low-income, agree more with the idea of negative impact of tourism in general, but they reject the idea of negative impact over communities' life (Table 8).

Table 10. Mann-Whitney Test (NAT, NATGEN, NATCOM) by income level

	N	Mean Rank	Sum of ranks	Test Statistics
NAT				
Under 2000	74	72.00	5328.0	Mann-Whitney U (2553.0) Wilcoxon W (5328.0) Z (-0.464) Asymp. Sig. (2-tailed) (0.643)
Over 2000	72	75.04	5403.0	
NATGEN				
Under 2000	74	72.54	5368.0	Mann-Whitney U (2593.0) Wilcoxon W (5368.0) Z (-0.282) Asymp. Sig. (2-tailed) (0.778)
Over 2000	72	74.49	5363.0	
NATCOM				
Under 2000	74	71.16	5266.0	Mann-Whitney U (2491.0) Wilcoxon W (5266.0) Z (-0.716) Asymp. Sig. (2-tailed) (0.474)
Over 2000	72	75.90	5465.0	

Source: Own calculation with SPSS

The residents implicated directly or indirectly in touristic activities reject more the idea of negative impact of tourism on their communities (Table 11), but have almost similar opinion with the non-involved residents regarding the general negative impact of tourism.

Table 11. Mann-Whitney Test (NAT, NATGEN, NATCOM) by the level of implication in tourism

	N	Mean Rank	Sum of ranks	Test Statistics
NAT				
Yes	79	71.08	5615.5	Mann-Whitney U (2455.5) Wilcoxon W (5615.5) Z (-0.801) Asymp. Sig. (2-tailed) (0.423)
No	67	76.35	5115.5	Effect Score (0.066)
NATGEN				
Yes	79	73.16	5779.5	Mann-Whitney U (2619.5) Wilcoxon W (5779.5) Z (-0.107) Asymp. Sig. (2-tailed) (0.914)
No	67	73.90	4951.5	Effect Score (0.009)
NATCOM				
Yes	79	69.88	5520.5	Mann-Whitney U (2360.5) Wilcoxon W (5520.5) Z (-1.187) Asymp. Sig. (2-tailed) (0.235)
No	67	77.77	5210.5	Effect Score (0.098)

Source: Own calculation with SPSS

CONCLUSIONS

In our research, we hypothesized that there are differences between residents of Danube Delta regarding their attitude towards tourism,

but our results partially confirmed our hypothesis. Even if there aren't statistically differences between respondents we extracted some important conclusions:

-gender differences – female agree more than men with the general statements regarding the positive and negative impact of the tourism (preconceived opinion);

-status differences – non-employees believe more than the employees in the benefits of tourism in general and in their communities;

-the low-income residents appreciate more the positive impact of tourism, especially on their communities;

-the residents implicated directly or indirectly in touristic activities have a more positive attitude towards tourism, especially regarding the ones carry out in their communities.

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TRENDS IN MILK MARKET AND MILK CRISIS IMPACT IN ROMANIA

Agatha POPESCU

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest Romania, Phone: +40213182564, Fax: +40213182888, Email: agatha_popescu@yahoo.com

Corresponding author: agatha_popescu@yahoo.com

Abstract

The paper aimed to analyze the main trends in milk market and the impact of milk crisis in Romania. The empirical data were provided by the National Institute of Statistics for the period 2007-2015, and have been statistically processed by common used methods to identify the main trends. While cattle livestock decreased, sheep and goat livestock increased, as consequence of the high price for farm inputs and the low milk price at farm gate for dairy farmers. The whole milk production declined by 15 %, cow milk production by 21.3 %, sheep and goat milk increased by 83.5 %. Due to the lack of raw milk, processors were obliged to buy raw milk from other countries. Romanian producers received a low milk price at farm gate, meaning losses and efforts to produce more milk to maintain income level, and to sell milk in Bulgaria. Traders did not react to the decline of produce's milk price. The whole EU was affected by milk and dairy products overproduction, and low milk price, which caused deep disappointments and damages to milk producers. The weak connection between producers-processors-traders and consumers along milk chain have allowed milk crisis to leave deep traces and claimed a change in milk market policy regarding more equitable measures and tools for milk producers, taking into account the expenses for production factors as well as consumer price, in order to avoid production concentration and to assure a balanced distribution of value added along milk chain. The strong competition among farms, oblige farmers to pay more attention to knowledge, training level, modern technologies, and farm management, factors which could keep production cost at a low level, assure a high milk quality, and economic efficiency.

Key words**:** *milk market, milk crisis, milking livestock, milk production, milk price, milk trade, Romania*

INTRODUCTION

Milk is a basic and vital food for people and most of animals. Milk production has been continuously developing in the world but at present is facing milk crisis in terms of: lack of raw milk which affects milk processing industry, an unbalanced offer/demand ratio and a decline of the trade with milk and dairy products in many countries.[3, 8].

About 90-96 % of milk production consumed in the world is produced by bovines. However, the offer/demand ratio is unbalanced as long as a cow could not cover the needs of 10-15 inhabitants as it would have be, but only of maximum 6-8 inhabitants [4].

In the EU-28, milk crisis is amplified by the liberalization of the milk market since April 2015 when milk quotas were over, and by the embargo imposed to Russia which led to an overproduction of milk and dairy products and the decline of their price.

In 2015, the EU-28 farm milk accounted for 155.3 billion liters, by 10.92 % more than in 2013 (140.1 billion liters). About 83 % of this milk production in the EU is achieved by the main producing countries: Germany, France, United Kingdom, Netherlands, Denmark. Germany and France together carried out 39 %, meaning 54.2 billion liters of the total EU milk production [15].

The EU bovine livestock accounted for 83.4 million heads, of which 47 % being grown in three member states: France (22 %), Germany (14 %) and United Kingdom (11 %), which are the main milk producers [6].

The EU milk deliveries registered a deep decline in 2015, reaching only 136,000 tones, by 12 % less than in 2014 when they accounted for 153,000 tons. This low level was very close to the 2004 level which accounted for 135,000 tons.

The overproduction of milk and dairy products led to a decline of milk price to Euro 31/100 kg in the year 2015, by Euro 5 (-14%)

less than in 2014, when it accounted for Euro 36/100 kg and being almost similar with Euro 31 recorded in 2004 [2].
In 2020, it is expected as 14 milk producing countries of the EU to increase milk production between 6.8 and 23.2 billion liters, representing between 6 5 and 20 5 growth over the milk production achieved in the year 2013 (114 billion liters) [15].
Milk crisis have had a deep impact on milk producers and processors, many of them registering losses or being in danger to close or fail in many EU countries.
The milk crisis affected Romania also, where milk market was facing a lack of raw milk and the need to assure consumption by import from the neighboring countries. About 25 % of the local milk processors are closed due to the lack of access to the market, while the large multinational companies which dominates milk and dairy products market have been able to find solutions to balance their income [13].
In this context, the present paper aimed to analyze the evolution of milking livestock, milk production, milk yield, milk trade in the period 2007-2015 in order to identify the main trends and evaluate the impact of milk crisis in the Romanian milk market.

MATERIALS AND METHODS

The analysis is based on the following system of indicators characterizing milk market: milking livestock: cattle, sheep and goats, agricultural holding raising these species, farm size, milk production, milk production/inhabitant, milk yield, milk production vale at farm gate, cow and sheep milk price, milk deliveries, milk consumption, milk export and import, and the ratio of the two aspects of milk trade.
The empirical data were provided by the National Institute of Statistics for the period 2007-2015. They were statistically processed by common used methods to identify the main trends.
For the main indicators have been determined the statistical parameters: mean, standard deviation and variation coefficient.
Also, comparison regarding average farm size, and milk yield, as important quantitative factors with a deep influence on milk production were made between Romania and other EU countries.
The impact of milk crisis in terms of losses was evaluated mainly in 2015, but also in 2016, regarding raw milk offer, and milk price, milk export and import.
The regression of milk price depending on milk production has been graphically represented both in case of cow milk price and sheep and goat milk price.
The results were graphically illustrated and correspondingly interpreted.

RESULTS AND DISCUSSIONS

The milking livestock. In Romania, milk is produced by three animal species: bovines, sheep and goat. While cattle livestock registered a continuous decline from 2,819 thousand heads in 2007 to 2,092 thousand heads in 2015 (-26%), sheep livestock increased from 8,469 thousand heads in 2007 to 9,809 thousand heads in 2015 (+15.8 %) and goat livestock also increased from 865 thousand heads in 2007 to 1,440 thousand heads in 2015 (+66.4 %). This situation was created by the high farm input price and high milk production cost and the low milk price at farm gate offered by processors for cow milk. This determined cattle breeders to diminish the number of cows.

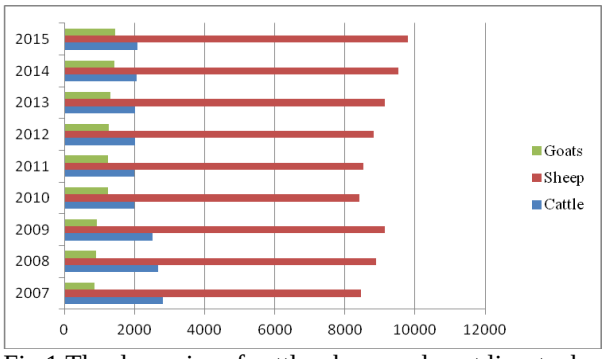

Fig.1.The dynamics of cattle, sheep and goat livestock, Romania, 2007-2015 (Thousands heads)
Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

Sheep and goat breeders are more advantaged because production cost is lower than in case of dairy farming and due to the increased demand for goat milk products (Fig.1).

In 2015, the female milking livestock was accounted for 1,311 thousand dairy cows and buffaloes, 8,329 ewes, and 1,133 goats (Fig.2).

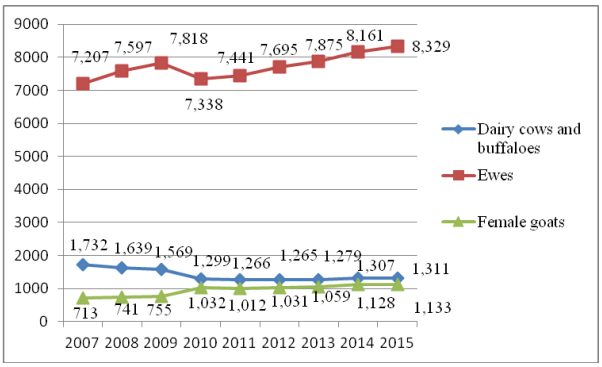

Fig.2.Milking livestock: Dairy cows and buffaloes, Ewes and Female goats, Romania, 2007-2015 (Thousands heads)
Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

Agricultural holdings raising cattle, and sheep and goats, and average farm size. In 2010, in Romania there were 728,020 holdings growing cattle, by 68.18 % less than in 2007, and 272, 275 holdings raising sheep and goats by 30.39 % less than in 2007. The reduction of the number of holdings was a positive factor, taking into account the dynamics of the livestock, as it contributed to the improvement of farm size.
In case of cattle holding, the average farm size increased from 2.64 heads/farm in 2007 to 2.74 heads/farm in 2010, and in case of sheep and goats the average farm size increased from 21.68 heads in 2007 to 30.91 heads/farm in 2010 (+42.57%).(Table 1).

Table 1. Average size and number of holdings raising cattle, sheep and goats, Romania

	No. of agricultural holdings			Average holding size (heads)		
	2007	2010	2010/2007 %	2007	2010	2010/2007 %
Cattle holdings	1,067,726	728,020	68.1	2.64	2.74	103.7
Sheep and goat holdings	390,562	272,275	69.7	21.68	30.91	142.5

Source: Own calculation based on NIS DataBase, 2017 [9]

About 90 % of dairy holdings raise 1-3 cows, reflecting the characteristics of subsistence farms.
In 2014, the number of dairy farms was 655,541, of which 84.4 % were small farms owning 1-2 cows. These farms are not able to make direct deliveries compared to a number of 2,042 larger farms where modern technologies are applied and milk quality fits quality standards, and which are able to supply raw milk for processors [4].
Farm size in Romania is the smallest compared to the other EU countries and characterizes a subsistence dairy farming, which means that traditional technologies are involved, milk quality does not always compile with the quality standards, direct milk deliveries are prohibited.
The reduction of cattle stock is not an isolated phenomenon in Romania, it also characterizes the whole EU. This aspect has had a good impact on the growth of farm size, 16.4 heads/farm in average at present, and which is expected to grow to 17.5 heads/farm in 2020. The highest average heard size is expected to be in the following countries: Denmark (301), Czech Republic (217), United Kingdom (191), Sweden (106), Netherlands (102), Belgium (102), Italy (85), Germany (76), France (72), Spain (74), Finland (45), Poland (36) and Austria (17) [15].
Milk production. Milk production recorded a variable trend in the period 2007-2015. In 2007, Romania achieved 57,736 thousand hl and in 2008, it reached 59,006 thousand hl, the maximum level in the analyzed period. Since 2009, milk production recorded a continuous decline, being determined by the reduction of cattle stock, also by the low performance per cow, and also due to the climate change, mainly the deep droughts in 2012 and 2013 which had a negative impact on forage production. However, in 2014, milk production reached 50,535 thousand hl, being

by 3.7 % higher than in 2013. But in 2015, due to the ending of quotas, milk production accounted for only 48,156 thousand hl, being by 2.73 % lower than in 2014. In 2015, Romania produced by 15 % less milk than in 2007 [7].

The bovine species gives the most important contribution to milk production. However, milk production from cattle declined from 54,199 thousand hl in 2007 to 42,663 thousand hl in 2015, when production was by 3.08 % lower than in 2014. As a result, the share of milk production from cattle in total milk production declined from 93.87 % in 2007 to 86.79 % in 2015, because of the increased milk production achieved from sheep and goat. Therefore, in 2015, milk production coming from cow and buffaloes represented 78.7 % of milk production produced by these species in 2007.

Milk production coming from sheep and goat increased by 83.5 % in the analyzed period from 3,537 thousand hl in 2007 to 6,493 thousand hl in 2015 (Fig.3).

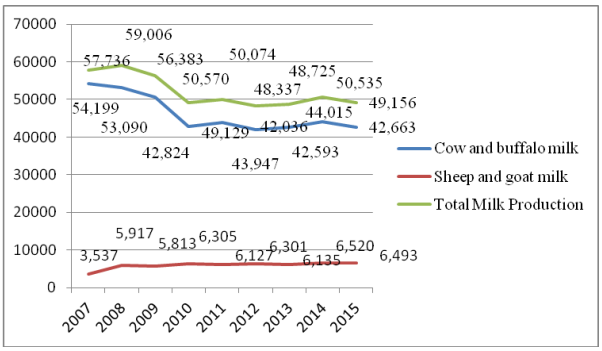

Fig.3. Milk production by species, Romania, 2007-2015 (Thousands hl)

Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

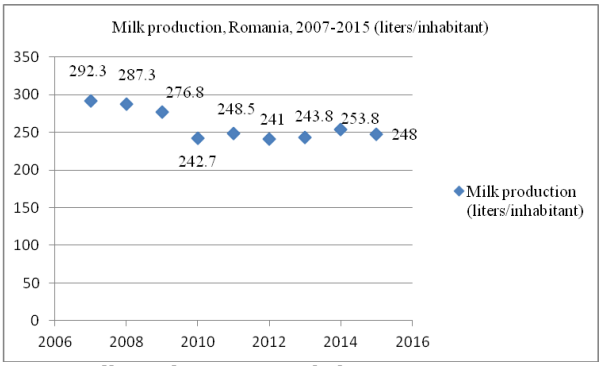

Fig.4. Milk production per inhabitant, Romania, 2007-2015 (liters/capita)

Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

As a consequence, milk production per inhabitant declined by 15,2 % from 292.3 liters/capita in 2007 to 248 liters per capita in 2015. In 2015, milk production per capita was by 2.3 % lower than in 2014, as an effect of milk crisis.(Fig.4.).

Milk yield. The reduction of milk production was caused also by the low milk performance per cow and its decreasing trend from 3,504 kg/cow in 2007 to 3,328.8 kg/cow in 2015 (-5%). The low yield is determined by the low production potential of the local Black and White Spotted, Yellow and White Spotted and Brown breeds and their crossbreds, by the scarce forage production in the last years caused by the extreme meteo phenomena (droughts and floods), by the reduced percentage of the use of frozen semen from high breeding value bulls (Fig.5.)

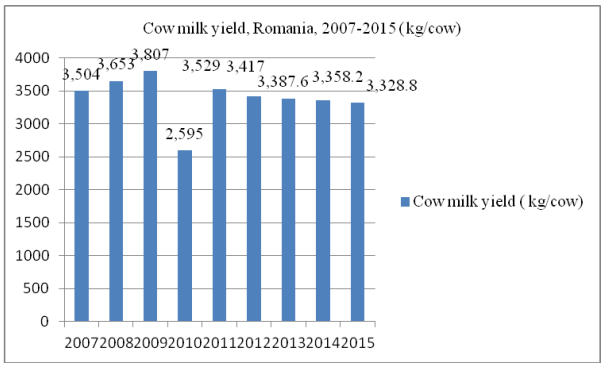

Fig.5. Cow milk yield, Romania, 2007-2015 (kg/cow/year)

Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

Milk yield in Romania is very low compared to milk performance per cow in other EU countries, for instance, over 7,000 kg/cow in Germany and France. The highest average milk yield is in Denmark (8,647 kg), Czech Republic (8,510 kg), Sweden 98,230 kg), Finland (8,158 kg), Spain (8,150 kg), Netherlands (7,900 kg), Hungary (7,251 kg), United Kingdom (6,742 kg), Italy (6,510 kg). The EU-28 average yield is 6,626 kg/cow, almost double compared to the one registered in Romania [12, 17].

More than this, in Romania milk quality does not fit in most of cases the EU quality standards. Only 26 % of about 4.5-5 million milk tons achieved annually have a high quality [13].

Milk consumption is one of the lowest in the EU-28 because of the high milk consumer price in supermarkets. Compared to 67.5 kg milk/capita/year, the average consumption of packed cow milk in the Western countries, in Romania it was registered jus 12.6 kg/capita [5].

Milk value at farm gate increased by 6.88 % in the analyzed period from 4,340.8 Million Lei in 2007 to 4,639.5 Million Lei in 2016, in terms of producer price. However, milk crisis affected milk price at farm gate and this led to a decline of milk value by -5.4 % in 2015 compared to 2014. Even thou producer's price was low, milk traders were not interested to diminish their prices in the supermarkets shelves.(Fig.6.)

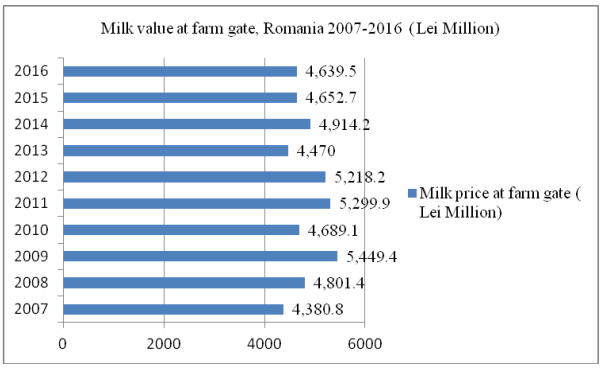

Fig.6. Milk value at farm gate, Romania, 2007-2016 (Lei Million)
Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

Cow and sheep milk price registered a general increasing trend in the analyzed period. Cow milk price increased by 40 % from 0.75 Lei/kg in 2007 to 1.05 lei/kg in 2015, while sheep milk price increased by 59 5 from 1.20 lei/kg in 2007 to 1.91 lei/kg in 2015. However in 2015, cow milk price declined by 16 5 and sheep milk price by 11 % compared to 2014 due to milk crisis.(Fig.7).

The decline of milk price at farm gate was imposed by milk processors, and the delay of payments from the EU funds for agriculture, milk producers were obliged to diminish milk production because of the low milk price, and many dairy farms registered losses [18].

Due to the lack of raw milk in the market, the Romanian milk processors bought milk at a lower price from the free market of the EU countries and then they were facing a deficit on spot market. Because of the low milk price offered by milk processors to milk producers, the last ones mainly from the South and South-Eastern Romania were obliged to sell their milk in Bulgaria, the milk export in this country increasing 2.5 times. Also, the decline in milk price in 2015 was caused by the reduction by 19.8 % of cattle livestock [10, 14].

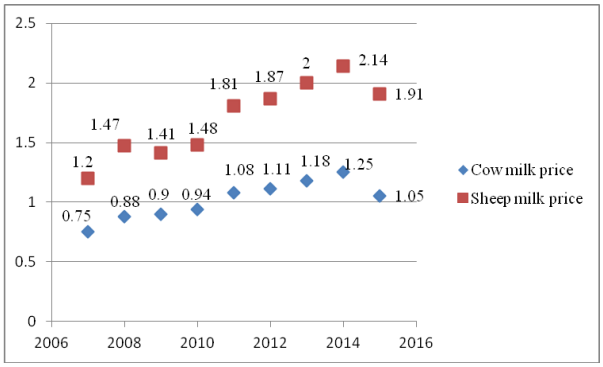

Fig.7. Cow and sheep milk price, Romania, 2007-2016 (Lei/kg)
Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

In fact, milk crisis in milk industry affected the whole EU. The overproduction of dairy products led to the deep reduction of milk price and price fluctuation, and in addition natural disasters have deeply affected milk producers [11].

The milk price of a bottled liter in the EU countries reached the lowest level of Euro 0.89, being by 33.6 % (-50 Eurocents) cheaper than one liter of bottled water [1, 11].

The low milk price at farm gate determined the European milk producers to produce more milk to keep their incomes at a constant level. But, more milk, means lower milk price, therefore, they were forced to produce in a "vicious circle" [4].

Mean, standard deviation and variation coefficients for the main studied indicators are presented in Table 2. The variability is higher than 10 5 in case of teh numbre of dairy cows and buffaloes, (13.12 %), goats (17.80 %), cow and buffalo milk (10.67 %), sheep and goat milk (15.56 %), cow milk price (14.85 %) and sheep milk price (18.34 %).

Table 2. Statistical parameters of mean, standard deviation and variation coefficient for the main studied indicators

Indicator	MU	Mean	Standard Deviation	Variation coefficient (%)
Dairy cows and buffaloes	Thousand heads	1,407.4	184.72	13.12
Ewes	Thousand heads	7,717	371.08	4.80
Goats	Thousand heads	956	170.19	17.80
Total milk production	Thousand hl	52,120.1	4,292.38	8.23
Cow and buffalo milk	Thousand hl	46,215.2	4,932.7	10.67
Sheep and goat milk production	Thousand hl	5,905.3	919.17	15.56
Milk production per inhabitant	Liters/capita	259.3	20.32	7.83
Cow milk yield	Kg/cow	3,307.7	337.7	9.93
Milk value at farm gate	Lei Million	4,851.5	361.69	7.45
Cow milk price	Lei/liter	1.01	0.15	14.85
Sheep milk price	Lei/liter	1.69	0.31	18.34

Source: Own calculation.

Milk delivery to milk processors. According to an USDA Report regarding milk market in Romania, cow milk production increased from 4,238 million liters in 2013 to 4,260 million liters in 2016, meaning just a slight increase of 0.5 %. At the same time, cow milk deliveries to milk processors also increased but by 6 % from 883.3 thousand Metric Tons in 2013 to 935 thousand Metric Tons in 2016 [17].

In 2015, the year when milk crisis started, cow milk yield was 4,240 million liters by 3 % less than in 2014, and cow milk deliveries to milk industry were by 7.8 % lower than in 2014.(Table 3).

Table 3. Cow milk production and deliveries to milk processors, Romania, 2013-2016

	MU	2013	2014	2015	2016	2016/2013 %
Cow milk production	000 000 liters	4,238.1	4,371.3	4,240.1	4,260	100.5
Cow milk deliveries	000 MT	882.3	996.6	919	935	106.0

Source: Own calculation based on the data provided by [17]

Milk export and import. Analyzing only the period 2013-2016, one may notice a general ascending trend both in case of milk export and milk import.

Romania's milk export was doubled in 2016, accounting for 46,000 MT, compared to 21,929 MT in 2013. Cow milk import increased by 36 5 from 136,105 MT in 2013 to 185,000 MT in 2016.

The effect of milk crisis is visible in the year 2015, when milk export was 31,723 MT by 11 % less than in 2014 (35,602 MT), and the cow milk import accounted for 146,522 MT in 2015 being by 26.73 % higher than in 2014 (115,612 MT).(Fig.8).

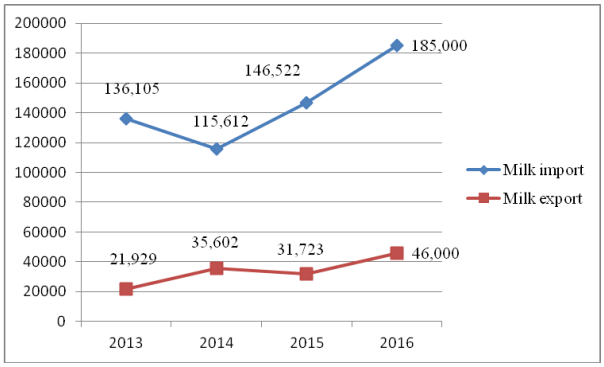

Fig.8. Milk export and import, Romania, 2013-2016 (Metric Tons)

Source: Own design based on the data provided by [17].

As a consequence the export/import ratio increased from 0.16 in 2013 to 0.24 in 2016,

the highest 0.30 being registered in 2014. But, milk crisis led to a decline of 30 % from 0.3 in 2014 to 0.21 in 2015, as imports were much higher than exports.

The raw milk suppliers for Romania are Hungary, Poland, Czech Republic, Germany, Greece, Slovakia and Bulgaria [17].

The losses registered in milk market in the year 2015 due to milk crisis are presented in Table 4.

Table 4. Losses in Romania's milk market due to milk crisis in 2015

	MU	Δ 2015-2014	±Δ %
Total milk production	Thousand hl	-1,379	-2.72
Cow and buffalo milk	Thousand hl	-1,352	-3.07
Sheep and goat milk production	Thousand hl	-27	-0.41
Milk production per inhabitant	Liters/capita	-5.8	-2.28
Cow milk yield	Kg/cow	-29.4	-0.87
Milk value at farm gate	Lei Million	-261.5	-5.32
Cow milk price	Lei/liter	-0.20	-0.16
Sheep milk price	Lei/liter	-0.23	-0.10
Milk export	Metric Tons	-4,229	-11.87
Milk Import	Metric Tons	+30,910	+26.73
Export/Import ratio	-	-0.09	-30.00

Source: Own calculation.

Regression of milk price depending on milk production are presented in Fig.9 for cow milk and Fig.10 for sheep milk.

The regression line shows that cow milk production has a deep impact on milk price, the coefficient of correlation between these two indicators being, r = 0.806, and that the R square reflects that about 65 % of cow milk price is determined by the variation in cow milk production (Fig.9.).

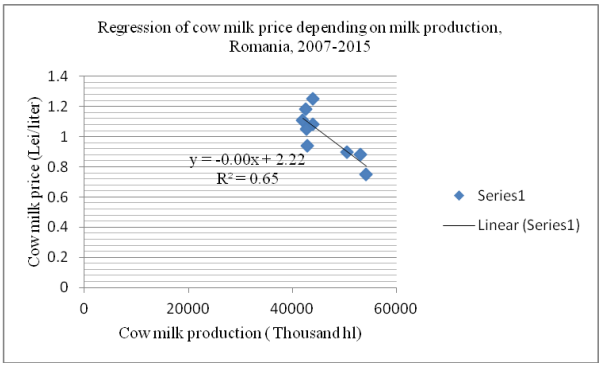

Fig.9. Regression of cow milk price depending on milk production , Romania, 2007-2015
Source: Own design.

Also, the regression line shows that sheep and goat milk production has a strong influence on milk price, the coefficient of correlation between these two indicators being, r = 0.718, and that the R square reflects that about 51.61 % of sheep and goat milk price is determined by the variation in sheep and goat milk production (Fig.10).

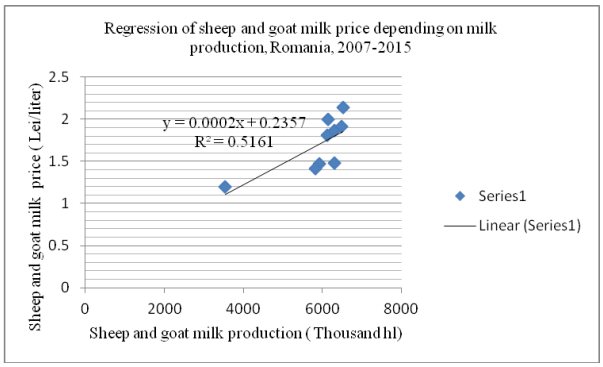

Fig.10. Regression of cow milk price depending on milk production , Romania, 2007-2015
Source: Own design.

CONCLUSIONS

While cattle livestock decreased, sheep and goat livestock increased, the main cause being the high price for farm inputs and the low milk price at farm gate for dairy farmers whose contribution to milk production is the most substantial one.

Milk production declined by 15 % in general, and while cow milk production declined by 21.3 %, sheep and goat milk production increased by 83.5 %.

All these affected milk supply to milk processors, which were obliged to buy raw

milk from other countries were milk price was lower.

Milk prices affected both Romanian producers and processors. Romanian producers were obliged to receive a low milk price at farm gate, to support losses and to produce more milk to keep their income level and pay their debts. A part of the producers who could not sell their milk at a low price on the local market, decided to sell their milk production in Bulgaria.

Due to the lack of raw milk on the local market, milk processing plants had the initiative to purchase raw milk at a lower price form the EU countries to balance their income.

Milk and milk products traders did not reduce consumer price in accordance with the farm gate price, and this caused the decline in milk consumption.

The overproduction of milk and dairy products in the EU, the low milk price at farm gate and price fluctuation, and natural disasters affected all the EU countries and caused deep disappointments to milk producers.

All these aspects proved the weak link and co-operation between producers-processors-traders and consumers along milk chain. Milk crisis has imposed the need of equity in setting up the corresponding measures and tools for milk producers, taking into account the expenses for production factors as well as consumer price, in order to avoid production concentration and to assure a balanced distribution of value added along milk chain.

Since 2017, the Romania Government decided to offer financial aids for milk producers, more exactly Euro 14 per each 100 cow milk liter of non marketed milk, under the condition that the reduction of production to be of minimum 1,500 liters [16].

Romania's milk producers have to pay attention to the increased competition among farms both at national and European level and to adapt to the market changes and price fluctuations. All these will oblige them to take into consideration that knowledge, training level, modern technical endowment and technologies, farm management are the key qualitative factors which could keep production cost at a low level, assure a high milk quality, economic efficiency and competitiveness.

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TRENDS IN AGRICULTURE ENDOWMENT WITH MACHINERY IN ROMANIA 2007-2015

Agatha POPESCU, Toma DINU, Elena STOIAN, Ionela Mituko VLAD

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 MarastiBlvd, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax: +40213182888, Emails: agatha_popescu@yahoo.com, tomadinu@yahoo.fr, stoian_ie@yahoo.com, bmitsouko@yahoo.fr

Corresponding author: agatha_popescu@yahoo.com

Abstract

The paper goal was to analyze the technical endowment in terms of machinery in Romania's agriculture in the period 2007-2015 and to identify the main trends and problems which affect performance and competitiveness. In the analyzed period, the park of tractors and machinery increased as follows: tractors by 14.5 %, ploughs by 13.9 %, cultivators by 11.3 %, seeders by 14.6 %, combines for cereals by 11.4 and for fodder by 17 %, machines for potatoes harvesting by 43.5 %, presses for hay and straw by 121.7 %, only windrowers and sprayers and dusters declined by 1.2 %, respectively, by 2.6 %. Despite this slight increase, the structure of agricultural machinery is still an uncorresponding one for keeping pace with new technologies. The utilized agricultural area (UAA) increased and as a result the UAA per tractor declined from 44.5 ha to 41.3, which is also a good aspect. Despite that agricultural production increase, its performance is not supported by mechanization mainly in the small sized holdings. The replacement of the existing old machinery with a high usage degree, whose repairs are costing, is obviously needed and requires substantial financial resources. the continuous growth of farm inputs price and the low price at farm gate for agricultural products do not assure farmers enough income to modernize mechanization. The Romanian Government should allocate a higher percentage from budget to agriculture for improving the park of tractors and agricultural machinery. Also, the financial aid per ha coming from the EU should be equitably divided among member states. Farmers need a better endowment in their farms to apply modern technologies and increase production, quality of agricultural products, economic efficiency and competitiveness.

Key words**:** *agriculture, endowment, machinery, Romania, trends*

INTRODUCTION

The assurance of production factors: land, labor and fixed and working capital is a condition of the achievement of high production, economic efficiency and competitiveness in agriculture.

Agricultural equipment and machinery is needed for farmers in planning, cultivating and harvesting of crops, in housing, feeding, watering, milking of animals, in collecting of manure, in transports goods.

The large scale agriculture requires modern technologies and corresponding modern machinery, and even for small scale farming some types of machinery and equipment are very useful. Taking into account the depreciation either determined by usage or technical progress, old machinery should be replaced with modern equipment to help farmers to increase productivity, save time and money. Therefore, farmers need to keep pace with new technologies and corresponding machinery for producing more agricultural products for covering consumers' and processing industry needs [13].

The variety of machinery and equipment used in agriculture is generated by the peculiarities of production and technologies applied in its production sub-branches: crop production, horticulture, and animal production.

In crop production, it is needed a system of specialized machinery for tilling, sowing, planting, applying fertilizers and pesticides, harvesting, transporting. For this reason, there is a large range of tractors and agricultural machinery such as: tractors, plows, planters, drills, sprayers, spreaders, combines, balers, grain trucks, computers and other types of machinery.

The horticulturalist need tractors, tillers, lawnmowers, sprayers, spreaders, irrigation

systems, wood chippers, lawn rollers, leaf blowers, and computers.

In animal production, farmers need also tractors, ploughs, seeders, harvesters, combines, hay and straw presses, windrowers, for producing forages, but also specific installations and machinery depending on farm profile: milking machines, feeding installations, watering systems, incubators, egg candlers, manure collecting systems, computers, and types of machinery and equipment to improve efficiency in the producing farm and assure a high quality of products [10,11].

In the EU, it is a large variety of endowment level, productivity and profitableness in agricultural holdings from its member states. In some countries, agriculture is well developed benefiting a high technologies and the best machinery and equipments, in other countries agriculture has not a modern endowment and less production performance.

The need to invest in new machinery depends on farmers' income, which in its turn is determined by marketed production and price of agricultural products at farm gate, and also by farm inputs variety, performance and price in terms of equipment, installations, machinery. It was noticed that when agricultural commodities are sold at good price in the market, farmers' income grow and their demand for improving the farm endowment as well. However, price increase is not the only factor influencing farmers' decision to improve farm machinery.

The EU agriculture is facing many aspects which could affect its future endowment, such as: the decline in agricultural land by 0.7 % in favor of forestry, the decline in agricultural workers due to the dynamic urbanization, the overproduction in cereals, milk, meat which impose restrains of production. A recent study proved that at present, just 3 new tractors are sold per 100 km^2, where there are 34 farms, instead of 7 tractors in 1950. Annually, in the EU are sold no more than 170,000 tractors, by 15 % less than only one type of car model, whose sale accounts for about 200,000 pieces [2].

More than this, the EU agriculture has a huge number of holdings, accounting for 19,667,460 in 2013, but their average size is 16.1 ha/holding, reflecting small or medium sized farms. About 86 % of the number of holdings own and work less than 20 ha, and only 14 % holdings are larger than this figure.

Also, the utilized agricultural area (UAA) is unequally distributed among holdings. Of the 174,613,820 ha representing the EU UAA, 82 % belongs to the holdings with over 20 ha and just 18 % of surface is owned by small farmers.

The maintenance of machinery is another aspect which could be taken into consideration, because it claims a corresponding service system and a good logistical chain able to supply the spare parts to farmers every moment they require and especially at tilling, plowing, spraying and harvesting.

The endowment level of a farm is also a consequence of farmer's experience, training level, age and of course income. In the EU agriculture the number of young farmers represents only 6 % of their total number. The number of young farmers under 35 years is in decline, due to the lack of substantial support for this category and attraction of the cities where the urban life is easier and jobs are better paid [2, 7].

The agriculture in Romania is characterized by a huge number of small holdings, about 3.5 million, a small farm size about 3 ha/farm, an uncorresponding farm structure which does not allow the implementation of modern technologies except the 1% commercial societies where they are successfully applied, a low productivity and competitiveness determined by the old endowment, population aging in the country side, the lack of financial resources and of a corresponding training level of the farmers [1, 4, 5].

In this context, the paper aimed to analyze the technical endowment in terms of machinery in Romania's agriculture in the period 2007-2015 and to identify the main trends and problems which affect performance and competitiveness.

MATERIALS AND METHODS

In order to characterize technical endowment of Romania's agriculture in terms of

machinery, the following indicators were studied: (i)the number of tractors and agricultural machines; ploughs, mechanical cultivars, seeders, self propelled combines for cereals and food harvesting, combines and machines for potatoes harvesting, straw and hay presses, fodder windrowers, mechanical sprayers and dusters; (ii) utilized agricultural area at the country level and its distribution in the territory by NUTS 2 development regions, (iii) utilized agricultural area per tractor at Romania's level and also in the territory by development region, (iv)agricultural production value at the country level and by region of development,.

For all these indicators there were determined the statistical parameters: mean, standard deviation and variation coefficient.

The empirical data were provided by the National Institute of Statistic, Tempo-online Data base for the period 2007-2015. The index with fixed basis was used to interpret the increase/decrease of the indicator in the analyzed period.

Also, other aspects have been approached regarding the context of agriculture development in Romania and its place in the EU agriculture, using the following system of indicators: surface, population, GDP (PPS), GDP (PPS)/inhabitant, utilized agricultural area, number of holdings and holding size in terms of utilized agricultural area/farm, arable land and its share in UAA, employment in agriculture, output in agriculture and share of agriculture in GDP.

Also, comparisons were made between Romania and other EU countries regarding average UAA per holding, share of arable land in UAA, standard output in agriculture.

The results were graphically represented and tabled, and correspondingly interpreted. Finally, the main conclusions were drawn.

RESULTS AND DISCUSSIONS

Characteristics of Romania's agriculture and its position in the EU. With 238,391 km^2 surface, Romania represents 5.51 % of the EU surface, and from a demographical point of view, 3.96 % of the EU inhabitants are in Romania. In 2013, Romania achieved Euro 289 Billion GDP, contributing by 2.13 % to the EU GDP (PPS). The GDP/inhabitant in Romania accounts for about Euro 7,500, representing about 26.86 of the EU average, Euro 26,918.

The utilized agricultural area, UAA, in Romania accounts for 8,244,351 ha, representing 4.67 % of the EU UAA (Table 1).

Table 1. Romania's position in the EU agriculture in 2013

	MU	EU	Romania	%
Surface	Km^2	4,322,385	238,391	5.51
Population	'000 capita	503,297	19,934	3.96
GDP (PPS)	Euro Billion	13, 548	289	2.13
GDP (PPS)/ inhabitant	Euro/capita	26,918	7,500	26.86
Utilized agricultural area	'000 ha	176,316	8,244	4.67
Number of agricultural holdings	'000	10,951	3,560	33.7
Utilized agricultural area/holding	Ha	16.1	2.31	14.34
Arable land	'000 ha	105,789 60 % of UAAA	5,193 63 % of UAA	4.90
Employment in agriculture	'000 persons	11,500	2,900	25.2
Output in agriculture	Euro Million	331,044	11,990	3.62
Share of agriculture in GDP	%	1.2	4.8	400.00

Source: Own calculation based on [8].

Romania has 3.56 million holdings, representing 33.7 % of the EU holdings, which in the year 2013 accounted for 10,951 thousands. From this point of view, Romania is on the top position in the EU, and together with Italy (106 million holdings), Poland (1.5 million), Spain (989.9 thousands), Greece (723 thousands), Hungary (576.8 thousands) and France (516.1 thousands), totalizes 6,9044 million holdings, representing 53.92 % of the EU holdings [3].

The average UAA per holding in Romania is very small, just 2.31 ha, specific to subsistence agriculture, being by 6.9 times smaller than the EU UAA average/holding 16.1 ha. Despite of the huge number of holdings, the small farm size reflects that in Romania small individual subsistence farms are dominant, and where traditional technologies are applied as technical endowment is scarce and production performance and labor productivity is very low. About 54 % of holdings own less than 1 ha UAA, and only 2.2 % holdings own over 10 ha UAA [3].

The average UAA per holding in different EU member states is presented in Table 2.

Table 2. Average UAA in the EU by member state, 2013 (ha/holding)

Country	UAA/holding (ha)	Country	UAA/holding (ha)	Country	UAA/holding (ha)
Czech Rep.	155	Ireland	38	Poland	14
United Kingdom	86	Belgium	36	Croatia	14
Slovakia	80	Netherlands	28	Hungary	13
Denmark	68	Spain	25	Greece	12
Luxembourg	62	Latvia	23	Slovenia	12
France	58	Austria	19	Romania	2.31
Germany	57	Bulgaria	17	Cyprus	2
Estonia	50	Lithuania	16	Malta	1.8
Sweden	45	Portugal	15	EU-AVERAGE	16.1
Finland	43	Italy	15		

Source: [9].

Romania has 5,193 thousands ha arable land, representing 63 % of its UAA, while the EU has 105.7 million ha arable land, meaning 60 % of its UAA. Therefore, the arable land of Romania represents 4.9 % of the EU arable land.

The share of arable land in various selected EU countries is presented in Table 3.

Table 3. Share of arable land in selected EU countries, 2013 (% of UAA)

Country	Share of arable land in UAA (%)	Country	Share of arable land in UAA (%)	Country	Share of arable land in UAA (%)
Finland	98	Poland	75	France	68
Denmark	92	Cyprus	73	Estonia	68
Sweden	85	Slovakia	72	Latvia	65
Hungary	82	Czech Rep.	72	Romania	63
Lithuania	80	Germany	71		
Malta	79	Bulgaria	71		

Source: [3].

In Romania's agriculture there are employed 2,900 thousand people, representing 25.2 % of the EU employment in agriculture. However, about 35 % of Romania's population is living in the rural areas where the main occupation is agriculture.

The standard output in Romania's agriculture was Euro 11,990 million in the year 2013, representing 3.62 % of the EU standard output. Romania comes of the 8th position based on its contribution to the EU output (Table 4).

The contribution of agriculture to Romania's GDP is 4.8 % compared to 1.2 % the EU average.

Table 4. Romania's position in the EU regarding standard output in agriculture, selected countries, 2007-2013 (Euro Million)

	2007	2010	2013	2013/2007 %
EU	285,597	308,062	331,062	115.91
France	45,978	50,733	56,914	123.78
Germany	44,202	41,494	46,252	104.63
Italy	40,543	49,450	43,767	107.95
Spain	33,363	34,173	35,979	107.84
United Kingdom	17,722	18,987	21,819	123.11
Poland	17,035	18,930	21,707	127.95
Netherlands	18,071	18,930	20,498	113.43
Romania	10,120	10,420	11,990	118.47

Source: Own calculation based on [9].

Technical endowment in terms of tractors and machinery.

The number of tractors increased by 14.52 % from 174,003 in 2007 to 199,284 pieces in 2015 (Fig.1.).

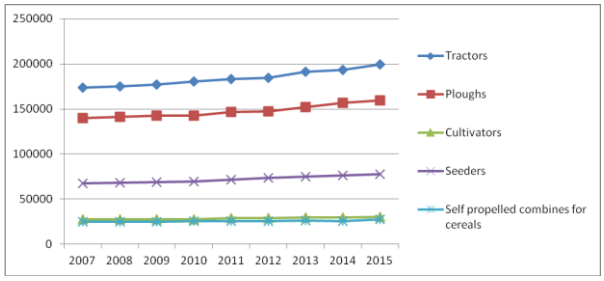

Fig.1. Dynamics of tractors, ploughs, cultivators, seeders and self-propelled combines for cereals harvesting, Romania, 2007-2015 (pieces)
Source: Own design based on the data provided by National Institute of Statistics, Tempo-online Data Base, 2017 [12].

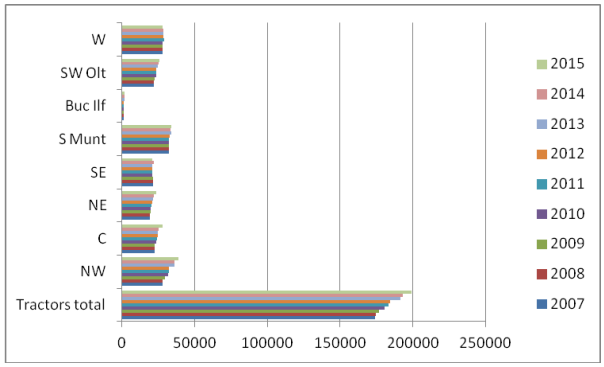

Fig. 2. Dynamics of tractors in Romania and by region of development, 2007-2015 (pieces)
Source: Own design based on the data provided by National Institute of Statistics, Tempo-online Data Base, 2017[12].

Their number increased in all the NUTS 2 micro-regions of development, except South East region where they declined by 0.87 %. The distribution of tractors in the territory, in the decreasing order, is the following one: North West region 19.3 %, South Muntenia 17.1 %, West region 14 %, Central region 13.8%, South West Oltenia 12.7 %, North East 11.7 %, South East region 10.3 %, Bucharest-Ilfov area 0.7 % (Fig.2.).

The number of ploughs increased by 13.98 % from 139,782 pieces in 2007 to 159,334 pieces in 2015 (Fig.1.)

The number of mechanical cultivators increased by 11.34 %, from 27,262 pieces in 2007 to 30,355 pieces in 2015 (Fig.1.).

The number of mechanical seeders increased by 14.6 % from 67,674 pieces in 2007 to 77,560 pieces in 2015 (Fig.1.).

The number of self-propelled combines for cereals harvesting increased by 11.49 % from 24,656 pieces in 2007 to 27,485 pieces in 2015 (Fig.1.).

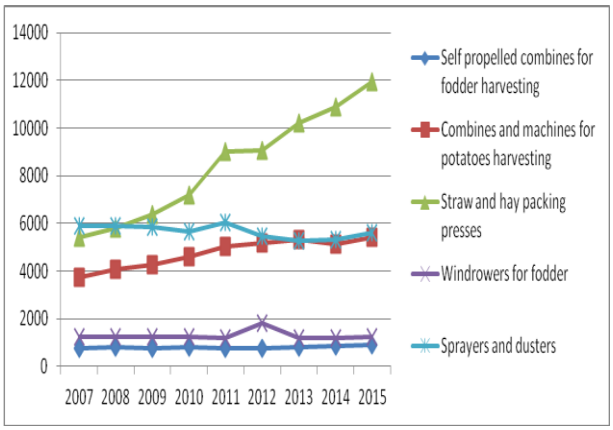

Fig. 3. Dynamics of self-propelled combines for fodder harvesting, combines and machines for potatoes harvesting, straw and hay packing presses, windrowers for fodder, and sprayers and dusters, Romania, 2007-2015 (pieces)
Source: Own design based on the data provided by National Institute of Statistics, Tempo-online Data Base, 2017 [12].

The number of self-propelled combines for fodder harvesting increased by 17.08 % from 761 pieces in 2007 to 891 pieces in 2015 (Fig.3.).

The number of combines and machines for potatoes harvesting increased by 43.50 % from 3,765 pieces in 2007 to 5,403 pieces in 2015 (Fig.3.).

The number of straw and hay packing presses increased by 121.63 % from 5,399 pieces in 2007 to 11,966 pieces in 2015 (Fig.3.).

The number of fodder windrowers declined by 1.2 % from 1,269 pieces in 2007 to 1, 254 pieces in 2015 (Fig.3.).

The number of mechanical sprayers and dusters declined by 2.66 % from 5,876 pieces in 2007 to 5,607 pieces in 2015 (Fig.3.).

Therefore, in general, the equipment in agriculture increased from a numerical point of view, except fodder windrowers and sprayers and dusters.

The change in agricultural machinery structure was determined by the new farm structure, and mainly the commercial companies were able to benefit of the EU funds for purchasing new tractors and equipments. [14].

However, in many agricultural holdings, equipment are old and with a high degree of usage. In the smallest holdings many of agricultural works are executed manually [3].

The utilized agricultural area (UAA) in Romania accounted for 8,244,351 ha in 2015, being by 6 % higher than in 2007 (7,777,174 ha). (Fig.4).

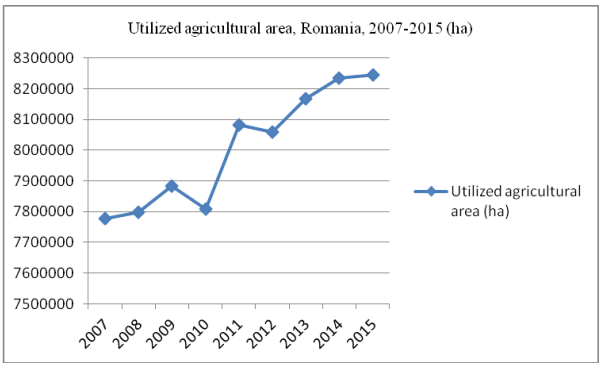

Fig. 4. Dynamics of utilized agricultural area in Romania, 2007-2015 (ha)

Source: Own design based on the data provided by National Institute of Statistics, Tempo-online Data Base, 2017 [12].

In general, the UAA increased in almost all NUTS 2 regions, except North West region where it declined by 7.5 % and Bucharest-Ilfov where it declined by 14.8 %.

The distribution of UAA in the territory of Romania, in the decreasing order, is the following one: South Muntenia 22.3 %, South East 22 %, North East 14.7 %, South West Oltenia 12.9 %, West 10.7 %, North West 9.4 %, Center 6.9 %, Bucharest Ilfov 0.8 % (Fig.5).

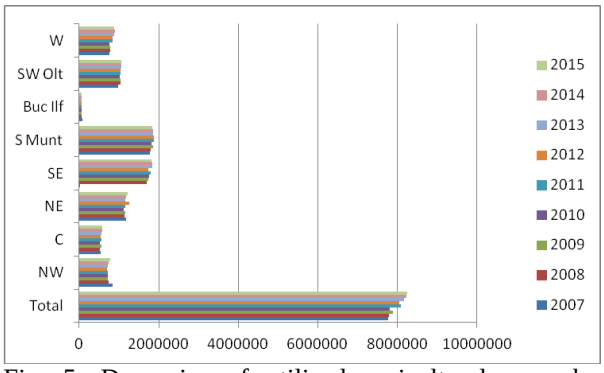

Fig. 5. Dynamics of utilized agricultural area, by regions of development and at country level, Romania, 2007-2015 (ha)

Source: Own design based on the data provided by National Institute of Statistics, Tempo-online Data Base, 2017 [12].

The utilized agricultural area per tractor was in average at country level 41.3 ha/tractor, a consequence of the evolution of the cultivated surface and the number of tractors in the analyzed period.

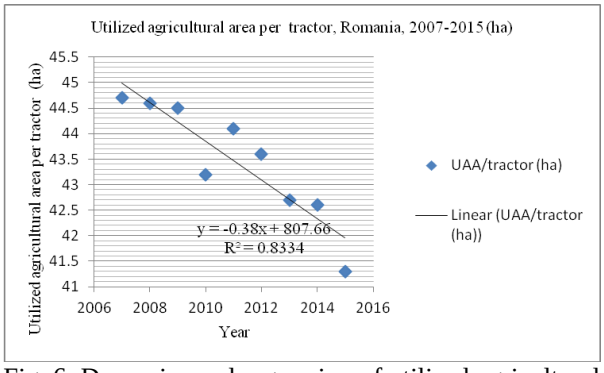

Fig. 6. Dynamics and regression of utilized agricultural area per tractor, Romania, 2007-2015 (ha/tractor)

Source: Own design based on the data provided by National Institute of Statistics, Tempo-online Data Base, 2017 [12].

In 2015, the UAA per tractor declined by 7.7 %, from 44.7 ha/tractor in 2007 to 41.3 ha in

2015, being a positive aspect. However, Romania has still a high charge of ha per tractor compared to the EU average or UAA/tractor in the EU member states with a high development of agricultural equipment (Fig.6.)

The UAA per tractor by development region NUTS 2 was the following one in the year 2015, in the decreasing order: South East 88.4 ha, South Muntenia 53.9 ha, North East 52.1 ha, Bucharest Ilfov 43.1 ha, South West Oltenia 41.9 ha, West 31.7 ha, Center 20.7 ha and North West 20.1 ha. A positive aspect is that UAA per tractor declined in almost all the regions of development, except South East area and West region where it increased (Fig.7).

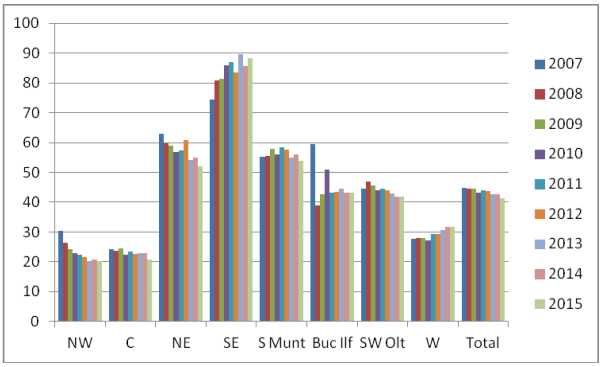

Fig. 7. Dynamics of utilized agricultural area per tractor, by regions of development and at country level, Romania, 2007-2015 (ha/tractor)

Source: Own design based on the data provided by National Institute of Statistics, Tempo-online Data Base, 2017 [12].

By NUTS 2 region of development, the situation is the following one: North West-30.3 ha/tractor in 2007 and 20.1 ha/tractor in 2015 (-33.7%), Central area 24.3 ha/tractor in 2007 and 20.7 ha/tractor in 2015 (-15 %), North East 62.9 ha/tractor in 2007 and 54.9 ha/tractor in 2015 (-17.2 %), South East 74.3 ha/tractor in 2007 and 88.4 ha/tractor in 2015 (+18.97%), South Muntenia 55.3 ha/tractpr in 2007 and 53.9 ha/tractor in 2015 (-2.6 %), Bucharest Ilfov 59.6 ha/tractor in 2007 and 43.1 ha /tractor in 2015 (-27.7 %), South West Oltenia 44.5 ha/tractor in 2007 and 41.9 ha/tractor in 2015 (-5.9 %) and West region 27.6 ha/tractor in 2007 and 31.7 ha in 2015 (+14.85 %).

Agricultural production value could be considered a consequence of the number and quality of equipment and machinery used in agriculture, besides other factors such as: obtained agricultural production, price at farm gate for agricultural products, climate conditions, soil conditions, technologies applied, other farm inputs (biological material, fertilizers, pesticides etc), farm management, farmers training level etc.

Agricultural production increased at country level by 44.21 % from 47.67 Lei Million in 2007 to 68,749 Lei Million in 2015 (Fig.8).

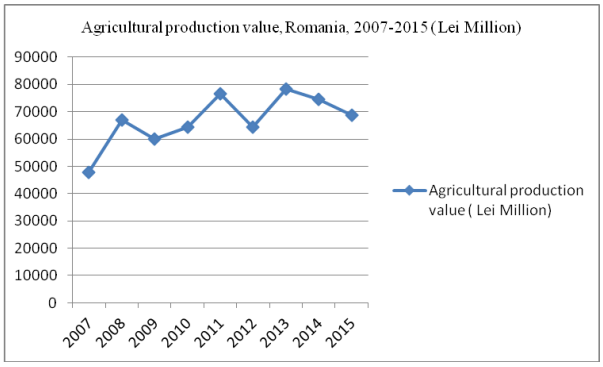

Fig. 8. Dynamics of agricultural production value in Romania, 2007-2015 (Lei Million)

Source: Own design based on the data provided by National Institute of Statistics, Tempo-online Data Base, 2017 [12].

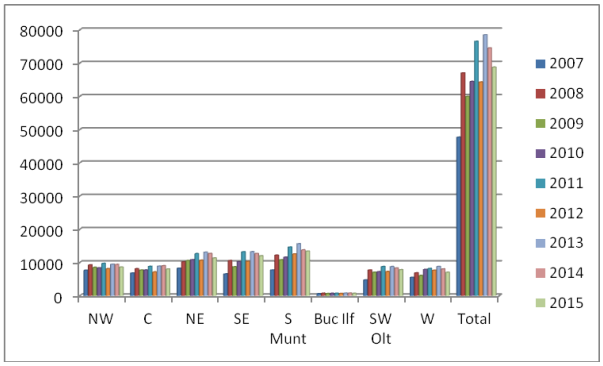

Fig. 9. Dynamics of agricultural production value, by region of development and at country level, Romania, 2007-2015 (Lei Million)

Source: Own design based on the data provided by National Institute of Statistics, Tempo-online Data Base, 2017[12].

An important growth of agricultural production was noticed in all the development regions as follows: North West + 12.55 %, Central area + 17.33 %, North East +37.22 %, South East +83.52 5, South Muntenia + 73.72 5, Bucharest Ilfov +12.79 %, South West Oltenia + 65.48 % and West +27.87 % (Fig.9).

The contribution of various regions to agricultural production value in Romania in the year 2015 was the following one: North West 12.50 %, Central region 11.63 %, North East 37.22 %, South East 17.41 %, South Muntenia 19.45 5, Bucharest Ilfov 0.98 %, South West Oltenia 11.31 %, and West 10.22 %. Therefore, the highest contribution is gicen bt North East, South Muntenia and North West regions.

Statistical parameters of the studied indicators is presented in Table 5.

Table 5. Statistical parameters: mean, standard deviation and variation coefficient for the studied indicators characterizing agricultural equipment and machinery in Romania, in the period 2007-2015

	MU	Mean	Standard Deviation	Variation coefficient %
Tractors	Pieces	184,142	8,801.35	4.77
Ploughs	Pieces	147,630	7,024.81	4.75
Cultivators	Pieces	28,648.3	1,107.15	3.86
Seeders	Pieces	71,997.11	3,686.70	5.12
Self propelled combines for cereals harvesting	Pieces	25,587.44	901.01	3.52
Self propelled combines for fodder harvesting	Pieces	805.11	47.66	5.91
Combines and machines for potatoes harvesting	Pieces	4,758.88	594.53	12.49
Straw and hay packing presses	Pieces	8,432.44	2,358.26	27.96
Windrowers for fodder	Pieces	1,300.77	194.86	14.98
Sprayers and dusters	Pieces	5,669.33	270.72	7.77
Utilized agricultural area	Ha	8,005,809.2	181,447.82	2.35
Utilized agricultural production value per tractor	Ha/tractor	43.47	1.13	2.59
Agricultural production value	Lei Million	66,938.88	9,479.82	14.18

Source: Own calculation

The main problems which are in agriculture of Romania related to technical endowment in terms of machinery and equipments are the following ones:

(i)the number of machinery and equipment for Romania's agriculture is still unsufficient to correspondingly cover the volume and quality of agricultural works, to assure the implementation of modern technologies, and increased production performance and competitiveness;(ii)the structure of the machinery system is unbalanced distributed in the territory, related to the actual structure of production and types of technologies applied;

(iii)the actual park of tractors and machinery is old in most of part, it is not able to assure a high quality of agricultural works, it requires important costing repairs, it has a high fuel consumption and low productivity and efficiency;

(iv) there is an imperious need to replace old machinery with modern equipment in the most of farms for increasing their production performance;

(v)the high UAA per tractor is still far away from the EU average and from the one of the EU countries with high developed agriculture; it perfectly reflects a low endowment level, one of the lowest in the EU;

(vi)the unsufficient use of the EU funding for purchasing modern equipment;

(vi)the substantial reduction of the budget allotments of expenditures for agriculture, compared to other EU countries; for instance,

(vi)the value of fixed assets in Romania's agriculture is still low compared to fixed capital in other EU countries. For instance, in Romania, the value of fixed assets is Euro 3,600/farm compared to Euro 290,000/farm in France [6];

(vii)the low financial aid allotted to Romania's agriculture compared to other EU countries; Despite that Romania contributes to the EU GVA by 4.48 %, coming of the 7th position in the EU from this point of view. In 2010, Romania received from EU, Euro 151.4 /ha financial aid, compared to other EU countries like: France, Italy, Spain, Germany, Poland, United Kingdom, Greece, Hungary, Austria and Belgium [6] (Table 6).

With such a low financial aid both from the Romanian Government and EU, the Romanian farmers can not face the higher and higher prices for farm input and the low price

at farm gate for agricultural products, which assure an income at the threshold of profitability and many times losses.

Table 6. Financial aid from Government and EU for Romania's agriculture compared to other EU countries, 2010 (Euro/ha)

Country	Government aid (Euro/ha)	EU aid (Euro/ha)	Total aid (Euro/ha)
EU-27	55.7	318.3	373.9
France	69.1	284.8	353.9
Italy	63.4	466.6	530.1
Spain	22.6	330.2	352.8
Germany	61.9	417.4	479.3
Poland	42.5	256.1	298.6
United Kingdom	24.6	234.3	258.9
Romania	**6.9**	**151.4**	**158.3**

Source: [6]

Under these conditions, it is obviously impossible to modernize farm machinery and equipment for obtaining a higher performance and competitiveness.

CONCLUSIONS

The study emphasized the slight increase in the number of tractors and agricultural machinery in Romania's agriculture, and the fact that technical endowment is still weak compared to agriculture needs for increasing production , economic efficiency and competitiveness.

In Romania's agriculture there are still old machinery and equipment with a high usage degree, whose repairs are not justified by the high cost. The lack of financial resources in most of farms do not allow farmers to improve the structure of the mechanization system, which is compulsory taking into account the modern technologies.

The Government should allocate a higher percentage from budget to agriculture for improving the park of tractors and agricultural machinery.

Also, the distribution of the EU financial aid per ha should be equitably divided by member states.

Farmers need a better endowment in their farms to apply modern technologies and increase production, quality of agricultural products, economic efficiency and competitiveness.

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AN EXPLORATORY RESEARCH ON RURAL AREAS ACCORDING TO NUTS CLASSIFICATION, IN TWO NEIGHBORING COUNTRIES: ROMANIA AND BULGARIA

Valentin-Cosmin SĂRĂCIN[1], Ilona-Elena-Cristina ȚÎRCĂ[2], Lucian CONSTANTIN[1]

[1]The Bucharest University of Economic Studies, 6 Romania Square, District 1, 010374, Bucharest, Romania, Email: saracin_valentin@yahoo.com, l1.ctin@gmail.com
[2]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, Email: t.elenailona@yahoo.com

Corresponding author: saracin_valentin@yahoo.com

Abstract

This exploratory research is based on statistical data about some indicators for the context of rural development, from different countries of EU, but also it is a comparative study of speciality literature regarding sustainable development and rural development, in two neighbouring countries: Bulgaria and Romania. The research is based on a methodology that involves the use of statistical data on leading indicators for the rural development context, from two neighbouring countries, Romania and Bulgaria. By analysing economic indicators we found that in some countries there are large discrepancies between urban zones and rural zones. This discrepancy between rural zones and urban zones is confirmed by environmental indicators, which still have positive influences on other fields, in which there was a positive evolution. Both Romania and Bulgaria, the two countries used in this study benefit from varied tourism resources, both natural and anthropogenic, insufficiently developed and exploited. Through these they can develop rural areas, opting for the development and support of rural tourism, the diversification of the rural population, in order to create new non-agricultural activities as a result of exploitation of the agricultural sector, with implications for increasing the number of jobs and increasing of the employment rate among the rural population.

Key words*: Romania, Bulgaria, sustainable development, rural zones development, NUTS 3*

INTRODUCTION

The sustainable development, according to different specialists, involves combining and using all resources, forms and development activities, both at the social and economic level and respecting the principle of balance between the aspects and social, economic levels and environmental protection. [2]
A certain report formulated by the World Commission on Environment and Development (WCED), mentions the fact that „sustainable development envisages the achievement and solving of current needs without hindering and restricting future generations to solve their own needs in the future".
Sustainable development aims to create a stable context in which relationship between man and environment is ensured, taking into account both environmental protection, and economic and social factors. Initially this development aimed at solving the problem caused by the increasing industrialization of resources, which was having negative implications on the environment. Throughout its evolution, the sustainable development expanded, aiming now the importance of the quality of life, protecting the environment, and in terms of social and economic factors, pursuing just relationships and between states and not only between current generations but between future generations as well.
The concept of rural zones development is a very important concept nowadays, being a subject of high importance because it is viewed throughout a whole, according to its territorial and sectorial sizing, and also in terms of reaching this concept in all phases and activities undertaken at the country level. This generic concept, includes one of the most important activities, namely rural development, which is considered the most important and basic development of this concept of rural development, through attention and importance are given to the

development of agriculture as a major player in admitting the importance of land in the socioeconomic context, for developing a standard of living higher than the existing one. [3]

The generic concept of rural development involves combining all economic, social and environmental factors in the territories, but also designing and supporting optimal governance across these territories.

The concept of rural development is a set of measures and actions integrated and dedicated, which aims to ensure and increase the quality of life of rural people, aimed at protecting the environment, in terms of natural and cultural resources, thus ensuring the sustainable development of rural zones, in accordance with their specific resources. The national program of rural development, has among its objectives, at the level of any country, depending on the specific needs of rural areas in each country, the agriculture development, infrastructure development, rural tourism development and agro tourism and also the supporting of entrepreneurial environment in rural zones, by the creation and establishment of new enterprises in order to create new jobs, all these being in accordance with the protection of the environment and education of people in this sense and the development within these sectors.

This research started on the report from 2013 that contains statistical and economic effects on rural zones development in the EU, drafted by the European Commission, which examined the objectives and the important criteria that were the basis for coordination, monitoring and evaluation of rural development policies for period 2007-2013, analyzing the situation in the rural zones, acording to social factors and economic factors.

The Common Agricultural Policy (CAP) includes two important pillars like rural development policy, which entails the use of integrated structural measures for rural zones development and the politic of common market organizations, which entails using integrated measures to regulate transactions and the proper functioning of the market in products farm. By rural development policy are indicated solutions to specific needs identified in the rural areas. [4]

As a result of these instructions have been adopted a series of 22 integrated measures, which take into account the specific needs identified in the European Union countries, measures that will be implemented in the new exercise 2014-2020.

The goal that is intended to be achieved in the period 2014-2020 was based on three objectives such as increasing competitiveness among agriculture and forestry, increasing environmental protection, improvement of rural areas and increasing the quality and duration of life of people from rural zones even encouraging and supporting them to diversify towards non-agricultural activities. After the end of the 2007-2013 periods, the European Commission has designed, developed and adopted a new regulation of a particular importance in order to sustain the rural environment and the sustainable development of rural areas in member states of the European Union).

MATERIALS AND METHODS

The European Commission indicates a classification at the level of the member states, for the territorial statistical units in order to collect the data necessary for the preparation and publication of a regional analysis at EU level. This nomenclature is called NUTS.

The indicators used in this paper were processed by the Canadian Council of Ministers of the Environment (CCME), and are considering measuring the importance of the social and economic level, analysis of the types of rural areas (NUTS 3), sustainable development in the economic context and also the analysis of the economic structure, and an analysis with the purpose of developing rural areas which have tourism potential.

RESULTS AND DISCUSSIONS

The analysis of the social and economic context from rural areas according to EU Rural Development Report 2013, prepared by

the European Commission, EU-27 is divided in terms of territory as follows: 51.6% of the territory is represented by rural areas, 38,4% of Europe's surface is represented by intermediate areas and only 9.9% of the surface is represented by urban areas.

An increase in terms of the surface and the importance of rural areas it can be seen, increasing from 49.8%, which represented the EU-15, at 51.6%, which represented the EU-27 in terms of total rural areas. Also, it can be seen an increase in population in rural areas from 18.1%, which represented the EU-15, at 22.6%, which represented the EU-27.

Analysis of social and economic context

(i)Analysis of social and economic context in the rural areas in Bulgaria

Bulgaria is a country in the Balkan Peninsula, bordering Romania in the north, with Greece and Turkey in the south and Serbia and Macedonia in the West.

Bulgaria has a population of over 7,153,784 inhabitants, of which 1,926,602 live in rural areas, according to data from the National Statistical Institute of Bulgaria on 31.12.2015.

Bulgaria has a zone of 53.6% made up of rural zones, an area made up 45.2% of the intermediate zone and an area of only 12% made up of urban zones. At the same time, Bulgaria has a population of 38.5% residing in rural areas, 45.0% of population residing in intermediate areas and a population of only 16.5% residingin urban zones, according to the Report of EU Rural Development 2013 prepared by the European Commission.

National Statistics Institute of Bulgaria indicates that in 2015 the unemployment rate nationwide was 9.1%, compared to 10.3%, as it was in 2010 and the unemployment rate in rural areas was 15.1 % in 2015 compared to 15.6% in 2011 (Table 1).

Table 1. Unemployment rate and the employment rate in Bulgaria

Unemployment rate (for 15 years old and over) nationwide					
2010	2011	2012	2013	2014	2015
10.3%	11.3%	12.3%	12.9%	11.4%	9.1%
Unemployment rate (for 15 years old and over) in rural areas					
-	15.6%	16.9%	18.4%	17.6%	15.1%
Employment (for 15 years old and over) nationwide					
2010	2011	2012	2013	2014	2015
47.9%	46.6%	46.6%	46.9%	48.0%	49.1%
Employment (for 15 years old and over) in rural area					
-	35.8%	35.7%	35.6%	35.8%	36.6%

Also, the employment rate nationwide was 49.1% recorded in 2015 compared to 47.9% in 2010, while in rural areas, the employment rate recorded was 36.6% in 2015 compared to 35.8% in 2011) (Table 1).

The gross value added from the rural zones in Bulgaria in are represented by the tertiary sector in proportion of 52.0%, the secondary sector in proportion of 36.7%. The primary sector in Bulgaria represents a proportion of 11.2%, according to EU Rural Development report in 2013.

According to Eurostat, the agricultural sector in Bulgaria have a gross added value of 1,514,04 million in 2016 compared to 1355,65 million in 2010 (Figure 1).

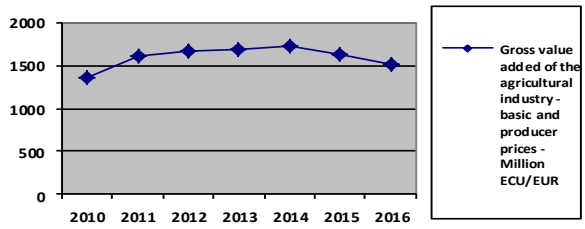

Fig. 1.The evolution of Gross value added of the agricultural industry in Bulgaria

In Bulgaria, among the most developed sectors are: tourism, agriculture, energy and heavy industry.

(ii)Analysis of social and economic rural zones in Romania

Romania has a population of over 21 million inhabitants. In terms of surface, Romania is the second EU country, first in terms of surface is Poland.

Romania has as advantages, compared to other EU countries, their natural resources (land and water), and human resources. However, these advantages has not lead to an optimal and superior development in terms of sustainable rural development and rural development. Even if it is not exploited enough, Romania registers a significant growth potential and a lot due to rural areas, which are important socially and economically. Romania has an area of 59.8% made up of rural areas, a total of 39.4% of the intermediate zone and an area of only 0.8% in urban areas.

At the same time, Romania has a population of 45.6% residing in rural areas, a population of 43.80% residing in intermediate areas and a population of only 10.5% residing in urban areas, according to EU Rural Development Report in 2013 developed by the European Commission.

The unemployment rate in 2015 nationwide, according NIS in Romania was 5%, compared to 7%, as it was in 2010, while in rural areas the unemployment rate was 6.6% in 2015, compared to 4.8% in 2010. Also, the employment rate nationwide was 66.8% in 2015 compared to 59.6% in 2010 and in rural areas, the employment rate was 50.7% in 2015 compared to 53.4% in 2010 (Table 2).

Table 2.Unemployment rate and the employment rate in Romania

Unemployment rate (for 15 years old and over) nationwide					
2010	2011	2012	2013	2014	2015
7%	5.2%	5.4%	5.7%	5.4%	5%
Unemployment rate (for 15 years old and over) in rural areas					
4.8%	5.5%	5%	5.2%	5.3%	6.6%
Employment (for 15 years old and over) nationwide					
2010	2011	2012	2013	2014	2015
59.6%	59.6%	61.1%	60.9%	66.9%	66.8%
Employment (for 15 years old and over) in rural area					
53.4%	51.1%	52.4%	52%	51.7%	50.7%

Rural areas in Romania, in termsof gross value added, are represented by the tertiary sector in proportion of 46.5%, the secondary sector in proportion of 42.5% and the primary sector in proportion of 11.0%, according to EU Rural Development report in 2013.

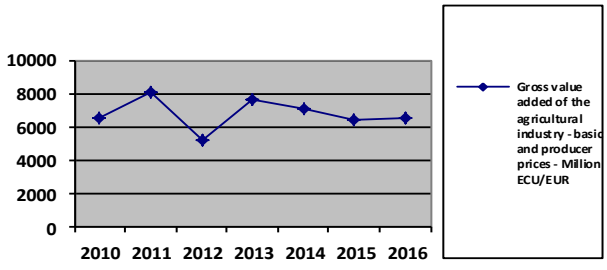

Fig. 2. The evolution of gross value added of the agricultural industry in Romania

According to Eurostat, in Romania the agricultural sector had a gross added value of 6,569.35 million in 2016 compared to 6,591.49 million in 2010 (Fig. 2).

Among the most important sectors in Romania we can mention the agro-food, energy and agriculture. Given the stage for development, Romania should point to a much higher productivity in agriculture and industrial sector, in close correlation with supporting the development of new jobs in non-agricultural sector to diversify agricultural activities.

Importance and typology of NUTS regions from the rural – urban zones.

NUTS aims subdivision of each Member State in three hierarchical levels, such as: NUTS 1, NUTS 2, NUTS 3. In 2015, NUTS was composed of 98 level 1 regions, 276 regions level 2 and 1342 regions level 3.

NUTS 3 classification is based on a methodology that uses the dispersion of the population reported to more than one square kilometer in the context of creating some networking groups in urban environments, where it meets a density of population of 300 places within a radius one kilometers square, totaling a population of 5,000 people. Over 50% of population lives in different zones witch are rural. Intermediate zone requires a population that lives in the area, between 20% and 50%. Predominantly urban areas are those networking groups in which a population lives less than 20% of its total (Table 3).

Table 3.Classification ofrural zones, intermediate zones and urban zones - NUTS 3

	%Territory			%Population			%GVA			%Employment		
Country	Rural	Intermediate	Urban	Rural	Intermediate	Urban	Rural	Intermediate	Urban	Rural	Intermediate	Urban
Bulgaria	53.6%	45.2%	1.2%	38.5%	45.0%	16.5%	24.5%	35.4%	40.2%	32.5%	42.0%	25.5%
Romania	59.8 %	39.4%	0.8%	45.6%	43.8%	10.5%	32.7%	42.1%	25.1%	41.8%	46.2%	12.0%
EU-27	51.6%	38.4%	9.9%	22.6%	35.1%	42.3%	15.6%	30.0%	54.4%	20.6%	33.9%	45.4%

Rural zones in Bulgaria occupie an area of 53.60% of the total territory. Predominantly rural zones in Romania occupie an area of 59.80% of the total territory and at the level of EU-27 rural zones occupie an area of 51.60% of the total territory. The share of population in rural zones, of both Romania and Bulgaria in this research is around the European average.

Also in Bulgaria a rate of 48.50% of the total population is located in rural zones. In Romania a proportion of 45.6% of the total population is located in rural zones, while in

the EU-27, a proportion of 22.60% of the total population is located in rural zones. Bulgaria and Romania registers a superior value compared with the average value from European level. The gross value added registered in Bulgaria in rural zones recorded a share of 24.50%, while in Romania it recorded a value of 32.7% and the EU-27 it records a value of only 15.60%.

As a result of this analysis, in both analyzed countries the percentage of gross value added in themost predominant rural areas, recorded a higher value than the average reported in Europe. We can see that Bulgaria meets a share of 32.5%, while in Romania it recorded a share of 41.80% and in the EU-27 recorded a share of 20.6%, in the context of the employed population located in the most predominant rural regions.In both countries studied, the percentage of people employed in the more rural areas, is high relative to the average European level.

The Economic development

Gross Domestic Product (GDP) registered in the EU-27 70% in rural zones, 87% in intermediate zones. Also a percentage of 123% in urban areas. By this it can be concluded that urban zones registered the highest lievel. On the second place we can find intermediate zones and on the third place we can find the rural zones. At the level of Bulgaria, GDP recorded 28% in predominantly rural regions, a 35% in intermediate regions and a percentage of 103% in urban areas. In Romania, GDP recorded 33% in predominantly rural regions, 45% in intermediate regions and a percentage of 113% in urban areas (Table 4).

Table 4. The economic development expressed by GDP - NUTS 3

Country	Rural	Intermediate	Urban
Bulgaria	28%	35%	103%
Romania	33%	45%	113%
EU-27	70%	87%	123%

Through this analysis we conclude that the GDP in Romania and Bulgaria, registered in regions predominantly rural, in intermediate areas and in urban areas is below average recorded levels in EU-27 (Fig. 3).

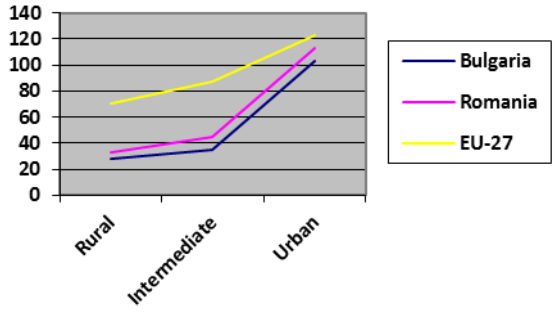

Fig. 3. Graphical representation of economic development expressed by GDP

The economic Structure

Regarding the predominantly rural areas, it can be seen that the tertiary sector is dominant, registering a share of 52.0% in Bulgaria, accounting a share of 46.5% in Romania and an average of 64.6% at the European level.

Table 5. Structure of the economy expressed by gross value added - NUTS 3

	Rural			Intermediate			Urban		
Country	Primary sector	Secondary sector	Tertiary sector	Primary sector	Secondary sector	Tertiary sector	Primary sector	Secondary sector	Tertiary sector
Bulgaria	11.2%	36.7%	52.0%	5.9%	37.0%	57.2%	0.2%	18.4%	81.4%
Romania	11.0%	42.5%	46.5%	6.5%	47.0%	46.5%	0.3%	33.3%	66.4%
EU-27	4.4%	30.09%	64.6%	2.2%	29.1%	68.7%	0.5%	20.8%	78.6%

Also, the secondary sector ranks second, recording a rate of 36.7% in Bulgaria and in Romania a percentage of 42.5%, exceeding the average percentage values from EU-27, which is only 30.09%. Also, the primary sector ranks last with a rate of 11.2% in Bulgaria and a percentage of 11.0% in Romania, higher values than the ones recorded at the European level, an average percentage of only 4.4% (Table 5).

Regarding the intermediate areas, it can be seen that the third sector is that which prevailed at European level with a share of 68.7%, accounting for 57.2% in Bulgaria, while in Romania the tertiary sector is in second place with a share of 46.50%.Regarding urban area the tertiary sector is dominant with a value of 81.4% recorded in Bulgaria and a value of 66.4% registered in Romania, while the European average was recorded at a value of 78.6 %.Also, in terms of economic structure, the

tertiary sector is followed by secondary and primary sector, both in the two countries in this study, as well as at the European level (Table 6).

Table 6. Evolution of economic structure expressed by gross value added, 2007-2010 - NUTS 3

	Rural			Intermediate			Urban		
Country	Primary sector	Secondary sector	Tertiary sector	Primary sector	Secondary sector	Tertiary sector	Primary sector	Secondary sector	Tertiary sector
Bulgaria	-0.3%	-2.8%	3.1%	-0.7%	-2.5%	3.2%	-0.1%	-1.9%	2.0%
Romania	-0.2%	4.7%	-4.5%	0.3%	5.4%	-5.7%	0.0%	2.8%	-2.8%
EU- 27	-0.2%	-1.3%	1.5%	-0.1%	-1.1%	1.2%	0.0%	-1.7%	1.7%

According to EU - 27 it can be concluded that the regions predominantly rural, have registered a significant increase in the tertiary sector compared with the secondary sector, evolving blamed on the economic crisis held. In Bulgaria, can be seen an increase in the tertiary sector by 3.1%, while in Romania can be seen a decline in the tertiary sector by 4.5%.

The services sector Evolution/Tertiary- NUTS 3

Table 7. The analysis of services sector

	Gross value added and share of total GVA in tertiary sector - MS		Share of gross value added in tertiary sector (% total GVA) - NUTS 3		
	2012		2010		
Country	EUR billion (current prices)	% of total	Rural	Intermediate	Urban
Bulgaria	21.5	63.2%	52.0%	57.2%	81.4%
Romania	59.5	51.6%	46.5%	46.5%	66.4%
EU- 27	8.467,1	73. %	64.6%	68.7%	78.6%

According to statistics, the tertiary sector had a 73.4% share of gross value added at European level, while Romania had a share of 51.6% and in Bulgaria had a share of 63.2%, which means that both countries compared recorded valuesbelow the European average. Regarding predominantly rural areas, the services sector had 64.6% share of total gross value added in EU - 27, while in Romania have a share of 46.5% and 52.0% in Bulgaria, which means that the both countries compared to the European recorded below average values (Table 7).

Table 8.Evolution of services sector - NUTS 3

Country	Average annual growth rate of GVA in tertiary sector (in % points) - NUTS 3		
	2007-2010		
	Rural	Intermediate	Urban
Bulgaria	5.5%	7.1%	10.3%
Romania	-4.0%	-4.5%	1.6%
EU- 27	0.8%	0.5%	0.2%

At Member State level it can be concluded that the regions predominantly rural, recorded a relatively small increase, with only 0.8%.In Bulgaria can be seen an increase in the services sector by 5.5%, while in Romania can be seen a decline in the tertiary sector by 4.0% (Table 8).

Table 9. Analysis of accommodations present in units with tourism accommodations function

	% of EU-27			%		
	2011					
Country	Rural	Intermediate	Urban	Rural	Intermediate	Urban
Bulgaria	0.6%	1.8%	0.2%	19.3%	76.1%	4.6%
Romania	1.0%	1.4%	0.3%	31.3%	61.1%	8%
EU- 27	100.0%	100.0%	100.0%	32.2%	42.5%	25.3%

As it can be seen the share of accommodation units with functions of tourist accommodation at European level is higher (32.2%) in predominantly rural areas compared to urban areas share (25.3%).In Bulgaria, the share of accommodation units with functions of tourist accommodation is higher (19.3%) in the more rural areas compared to urban areas share units (4.6%).The same report, predominantly rural areas in favour, recounted in Romania, with a value of 31.3%, compared to a value of 8% for the urban areas.

Also, the share of accommodation units with functions of tourist accommodation in connection with to the total number at European level, we see that in Bulgaria there is an amount of 0.6% in predominantly rural areas, compared to a value of 0.2% in urban areas, while in Romania registers a value of 1.0% in rural areas compared to a value of 0.3% in urban areas (Table 9).

Table 10.Evolution of units of accommodation with functions of tourist accommodation - NUTS 3

Country	Bed places in tourist accomodations
	2007-2012
Bulgaria	13.0%
Romania	0.6 %
EU- 27	4.9%

Analysing the evolution of accommodation units with functions of tourist accommodation, it can be seen that it grew by

4.9% at European level. From this point of view in Bulgaria there was an increase by 13.0%, while in Romania it grew by only 4.9% (Table 10).

CONCLUSIONS

Over time, rural areas were especially compared with agriculture, considering that as long as the agriculture develops, the rural area will develop. For some time, through various practical researches it was certified that rural development is influenced by the development of agriculture, but not in particular. Tertiary sector growth was achieved as a result of sustainable development, in close correlation with environmental protection.

Both Romania and Bulgaria, the two countries used in this study benefit from varied tourism resources, both natural and anthropogenic, insufficiently developed and exploited. [1]

Through these they can develop rural areas, opting for the development and support of rural tourism, the diversification of the rural population, in order to create new non-agricultural activities as a result of exploitation of the agricultural sector, with implications for increasing the number of jobs and increasing of the employment rate among the rural population. This way the living standards will rise.

Also, rural areas with potential agriculture development must be supported and exploited even by supporting employment among the primary sector.

Also, in areas with tourism potential, rich in natural resources, the development of this sector in the rural areas has to be produced in close correlation with the environment.

Organization and productivity growth in agriculture but also supporting the rural population to diversify their activities are clear and strategic objectives at European level, and in each growing country. Adoption of new measures and integrated actions to increase investments in accordance with protecting the environment, respecting and ensuring sustainable development in every step of these phases, facilitating and increasing products marketing to facilitate selling are necessary and proposed solutions by the programs and policies adopted at European level for rural development.

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ASSESSMENT OF HUMAN POTENTIAL INCREASE BY STIMULATING THE DEGREE OF EMPLOYEES' LABOUR SATISFACTION

Olga SÂRBU, Cornel COȘER

State Agrarian University of Moldova, Chisinau
42 Mircești Street, MD-4209, Chisinau, Republic of Moldova, Emails: osarbu@uasm.md

Corresponding author: osarbu@uasm.md

Abstract

This paper aims to evaluate the increase reserves of the human potential use efficiency by quantifying increase of employees job satisfaction. This study is based on the assumption that the performance achieved by the entity are directly related to labour satisfaction. In order to achieve this investigation it was carried out the questioning of employees, by comparing the data obtained during two years. Presentation of the causes leading to the decrease in work satisfaction of staff may be considered by the entity leadership for the efficient management of human potential and the improvement of its performance.

Key words**:** *factors of satisfaction, human potential, labour satisfaction*

INTRODUCTION

In the current competitive environment, both nationally and internationally, significant increases were recorded no specially for entities that managed to develop technologies, but those who were concerned about human capital. Human resources is one of the most valuable investment of the entity and those who understood it were able to cope more easily with economic crises and other challenges.

Assessment process of work satisfaction of the staff is very important to the entity and has a great influence on economic and social activity, with direct repercussions on increasing the efficiency and productivity of work and the results of the company.

Work satisfaction of the employee is resulting from personal opinion on working conditions, salary and other material benefits, career promotion, conditions to improve, the climate in the collective, organizational policy and it is important for the development of each individual, leading to the realization of ideals, enriching personality, diversification of interests, enhancing skills. Studies have shown a direct link between company performance and employee job satisfaction, at the same time, the dissatisfaction contribute to the increase of absence, symptoms of fatigue, tense psychological states (Zamfir, 1980) [5].

Motivating people is an aspect that deserves all the specialists in sociology attention, being a phenomenon of real importance for the society we live in and especially for the future of education (Horoiaș, 2015) [2].

Job satisfaction is an indicator of motivation, of how effective or ineffective implementation it is. At the same time, motivation and satisfaction appear in a dual capacity as cause and effect. Motivation is the cause and the satisfaction is a final state. Both motivation and satisfaction are reported on business performance that they can influence either positively or negatively. This study aims to identify directions for increasing the efficiency of human potential use by stimulating employees degree of satisfaction.

Setting of targets is also a good enough technique, however participation systems in taking decisions and re-design of position have proved to be the least efficient as regards improvement of productivity (Condei, 2012) [1].

The success of organizations in activities largely depends on its human resources. One of the strengths of motivational policy adopted by managers is knowing the real reasons of the employees (Ilciuc, 2016) [3].

MATERIALS AND METHODS

To achieve the objective set, there was used method of questioning. The study was conducted in several stages: determining the size and structure of the sample, the questionnaire, collecting and analyzing responses. The questionnaire aims to bring to the fore the factors and conditions that contribute to increased employee satisfaction. Investigation was carried out in the faculty "Economics" within SAUM. 95 people attended the investigation from all faculty structures, but mainly teachers were involved. Applied questionnaire was used in the research conducted in the academic year 2015-2016. Review questions were referred to the following conditions: cooperation, labor, social, training, remuneration. Responses were coded on an ordinal scale with three steps: satisfied, partly satisfied, dissatisfied. In assessing responses to questions, it should tick the "*Satisfied*" option indicating the highest degree of satisfaction and appreciation of the work. Respondents also had the opportunity to mention what improvements are needed for the work under optimal conditions, comments and suggestions for the university and for other comments. To study the change of the degree of employee satisfaction the obtained results were compared with ones of the previous year.

RESULTS AND DISCUSSIONS

Job satisfaction can be analyzed in several dimensions: *economic*, *related to work*, *psychosocial* (Rotaru, 2007) [4]. The first two dimensions of satisfaction have individual effects, and psychosocial dimension is extending to the entire community, indicating the need to pay particular attention. Conditions that can contribute to increasing job satisfaction are: choice of profession and employment by skills and inclinations, improving the physical and aesthetics conditions of the workplace, awareness of social utility of work, professionalism, participation in solving problems of the work group, organization, improve of interpersonal relationships, work climate by developing positive relationships, collegiality and friendship among the working group members. Factors leading to obtain satisfaction at work are: work viewed as a set of activities, the opportunity to learn and possess well an activity, remuneration of all its forms, promotions or professional development opportunities, recognition of good results, social benefits, working conditions, management style, reputation and importance of the firm
(Table 1).
Data analysis shows that out of 95 respondents surveyed 69.5% were female, respectively, 30.5% were men. Most interviewees aged 36-50 years (61.1%). All departments are represented in the sample, given a positive correlation between the size of the department in terms of staff and their presentation in the sample.

Table 1. Characteristics according to age and gender of the contingent subject to investigation

Indicators	Gender		Age categories				
	female	male	18-25	26-35	36-50	51-60	over 60
number of persons	66	29	1	17	58	13	6
share, %	69.5	30.5	1,0	17.9	61.1	13.7	6.3

Through questioning it was pursued assessing conditions of cooperation, labor, social, training, remuneration existing within the faculty,but also satisfaction of those conditions. However, it has documented the wishes, what improvements are necessary to carry out properly.
Problem relating to the terms of cooperation concerns relations between employees, between bosses and subordinates, receptivity of the management team to the proposals of employees, communication within the organization .
For cooperation conditions are satisfied 51.8%, 37.6% are partially satisfied and 10.6% are dissatisfied. The best cooperation conditions are *boss-subordinates* and *between employees* where the share of *satisfied* exceeds 60%.
Receptivity of the management to the

proposals of employees is appreciated by employees as *satisfied* and *partially satisfied* by more than 86% of respondents.

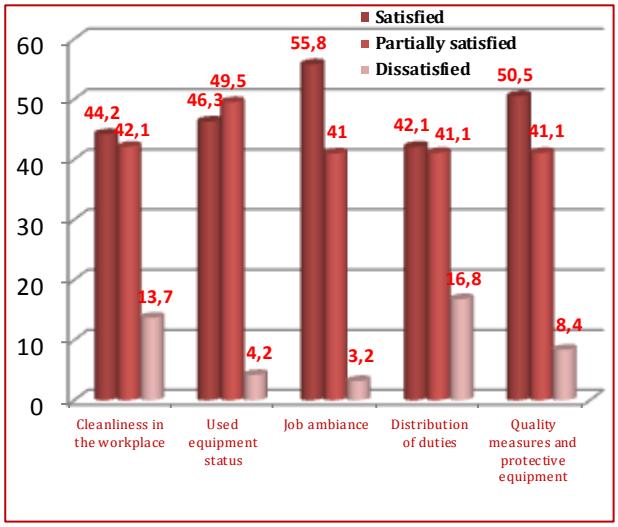

Fig. 1. The results of investigation on working conditions in the institution,%, 2015-2016 academic year

According to the results of the communication framework within institution there are *satisfied* and *partially satisfied* respectively 46.3% and 44.2%. So on the cooperation conditions within the faculty are satisfied 89.4%, which also highlights a positive organizational climate and a very good collaborative work.

Aspects of the assessment of working conditions (Figure 1) were related to cleanliness in the workplace, used equipment condition, job ambiance, distributing and sharing duties, quality measures and protective equipment against the risks to which employees are exposed. According to data 47.8% of respondents are *satisfied* with working conditions and 42.9% - *partially satisfied*, while the share of *dissatisfied* is 9.3%. In particular, workplace environment is positive characterized by the 55.8% of respondents that are *satisfied* and 41% - *partially satisfied*. From the respondents' answers it is shown that of the state of used equipment, cleanliness at work employees are satisfied. These results show that the organization is able to provide satisfactory working conditions so as not to discomfort the employees and it complies with legislative standards on working conditions.

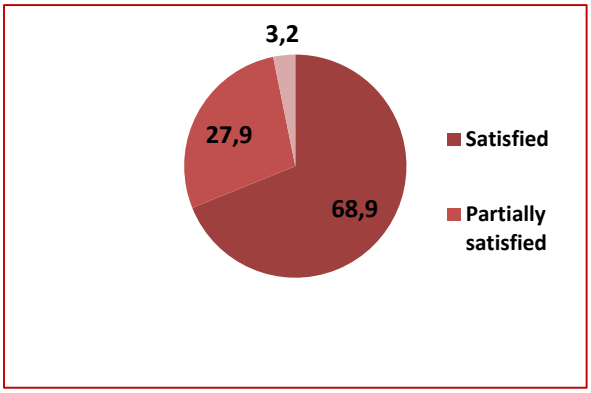

Fig. 2. The results of investigation on social conditions in the institution,%, 2015-2016 academic year

Social conditions (Figure 2) were less highlighted in questioned, resuming to the appreciation of the work program and the granting holidays. In this context practically all staff is satisfied with the agreed work program and only 5% are *dissatisfied* with the timing and manner of granting the holidays.

Assessing conditions training (Figure 3) reflects whether the institution creates the opportunity to advance and create a career as expected of employees.

The questionnaire included aspects of frequency of participation in training/staff development courses, information manner on staff development, quality and usefulness of trainings and courses of professional development, opportunities for internal development and promotion. As our results show 43.2% of respondents are *partially satisfied* with their training offered by the institution and 40% - *satisfied*. However, compared to the issues discussed above, at this chapter it increases the number of the *dissatisfied* up to 15.8%.

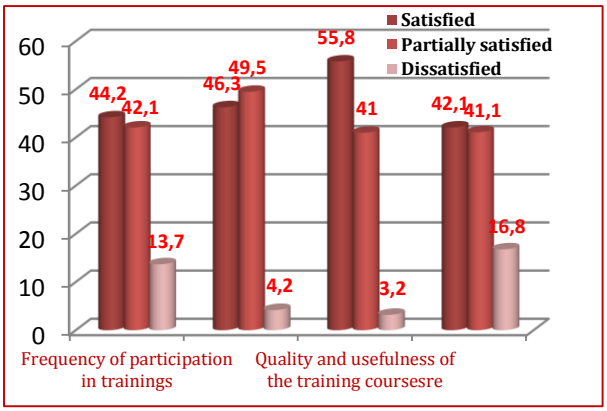

Fig. 3. The results of investigation on training conditions in institution, %, 2015-2016 academic year

In particular, respondents are *dissatisfied* with the way of information on staff development, where their share increased to 20%. Quality and usefulness of trainings and professional development courses also created dissatisfaction to 14.7% of respondents. 11.6% of respondents are not satisfied with frequency of participation in training/staff development courses.

Generalizing the results - training conditions are not paid the required attention in the institution. The institution should be more actively involved in the conclusion of contracts of collaboration with similar institutions abroad, invite experts from prestigious institutions to create greater opportunities for training and career growth of employees.

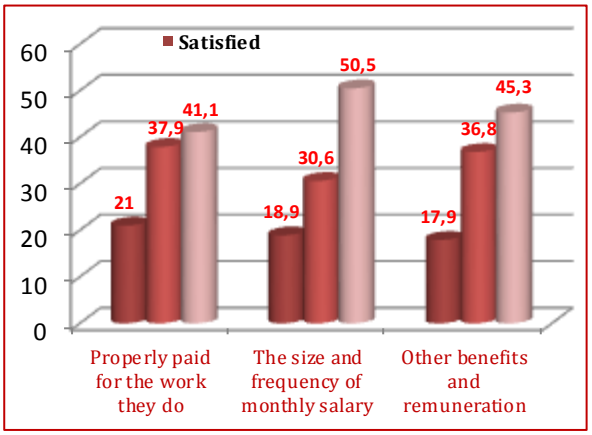

Fig. 4. The results of investigation on remuneration conditions in institution, %, 2015-2016 academic year

An important aspect that reflects job satisfaction is linked to conditions of remuneration (Figure 4). In this section 45.6% of respondents are *dissatisfied*, 48.4% - *partially satisfied* and only 19.3% - *satisfied*. In particular employees are dissatisfied (50.5%) with the size and frequency of monthly salary, that are not paid properly for the work they do (41.1%) and that basically there are no other benefits and payments in addition to salary (45.3%). From the results it is seen that there is no a wage satisfaction to the subjects investigated, there is no fairly rewards between employees remuneration and their aspirations, which may create tensions and lack of interest in the work done. Total lack of incentives and other payments made to employees to just come to work but its quality is not interesting to them. At the end of the survey respondents were able to express their opinion with regard to some aspects that would contribute to increase satisfaction at work. In the case of exposure of opinions regarding the improvement of conditions for normal activity of the employee, the proposals relate to the following: less bureaucracy; organizing training courses; salary increase; opportunities to do internships in production; increasing the quality of infrastructure; heating, lighting, repair and normal equipment of medical points, windows; increasing insurance of departments with projectors, notebooks, scanners; equipping with modern equipment: interactive whiteboards, ways to conduct conferences, online lessons; creating conditions for free internet access in all classrooms; providing monthly office supplies; ensuring qualitative conditions for making lunch in the faculty; timely payment of wages (up to 5th of the following month).

As for suggestions for university management, the respondents reported: reducing norm of auditory hours; increasing competitiveness of managerial staff; creation of a pleasant working ambiance; responsiveness from management.

CONCLUSIONS

The survey with included similar items was conducted in the previous year too. To identify the institution's effort to increase the level of employee satisfaction, the results were compared and the following general conclusions were made: considering the overall results, we can mention easily maintained and emphasized positive appreciation by the employees on the work conducted in the faculty; the results were slightly higher than those recorded in the survey for the academic year 2013/2014. The number of areas with *satisfied* increased, with *partially satisfied* reduced, with *dissatisfied* remained at the same level; for most areas studied (the only exception is remuneration conditions) the first two categories (*satisfied, partially satisfied*) account for about 90%. The most popular fields as a source of

satisfaction for SAUM employees are social conditions, 96.8% of responses in first two categories, work conditions, 90.7% of responses in first two categories; cooperation - 89.4% of responses in first two categories. In the case of training conditions 84.2% of responses were in first two categories, and in the case of wages only 54.4%; *totally dissatisfied* are about 10% of respondents, in majority of cases the most important exception being remuneration conditions, with a percentage of 45.6%, which is 0.9 percentage point lower compared to the previous year.

From the above we can highlight some proposals: creating a motivational policy with long-term goals for employees and institution; rigorous analysis of the needs of employees and their correlation with the remuneration system; creating conditions for professional training in order to foster innovation and creativity in the workplace; establishing clear rules to career advancement opportunities. So in order to ensure an effective management of the institution it is necessary to find a balance between employee satisfaction and company performance.

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EFFICIENCY OF PEASANT FARMS IN THE REPUBLIC OF MOLDOVA: PERSPECTIVES OF DEVELOPMENT

Elena SEMIONOVA, Dragoș CIMPOIEȘ, Anatol RACUL

State Agrarian University of Moldova, 44 Mircești str., MD 2049, Chișinău, Republic of Moldova, Phone: 00 373 22 432382, Fax: 00 373 22 312276, E-mail: e.semionova@uasm.md, d.cimpoies@uasm.md, anatol.racul@gmail.com

Corresponding author: e.semionova@uasm.md

Abstract

The paper presents the evaluation method for the efficiency level of peasant farms in the Republic of Moldova. The proposed assessment method is defined by the Stochastic Frontier Analysis of half-normal Gaussian distribution. The economic-social characteristics of the households and the statistical performance of farms are presented. The functional relationship between the efficiency level of peasant farms and income from various categories of activities has been revealed.

Key words**:** *peasant farms, stochastic frontier analysis, regression analysis, efficiency*

INTRODUCTION

The Republic of Moldova is one of the countries with a transition agriculture. About 60% of the country's population are employed in the agricultural sector. The agrarian orientation of the country's economy is determined by chernozems soils, which occupy 75% of the territory, as well as favourable climate conditions (Cimpoieș, 2008) [1].

The agrarian sector of the Republic of Moldova suffered considerable changes in 1990's. The country's Parliament at that time, adopted the "Transition concept to the market economy" and a year later the implementation started. It stated that "we suppose to overcome a very difficult transition period as soon as possible, approximately in 1.5 - 2 years". It was adopted an impressive set of market laws in Moldova: on estate, the Land Code, on peasant (farmer) economy, on Land Tax, on state land management, land cadastre and monitoring of land, etc. In 1992 it was launched the reorganization of large collective farms; peasants started leaving collective and state owned smaller farms; they were provided with their own land and property; the first farms were registered. Finally, in 1997 the first signs of an agricultural reform appeared: there were reorganized 70 % collective farms; about 70 thousand farmers received their land titles. Then, in 1998, along with considerable debts, almost extinct production facilities and a broken system of labour relations, the realization of the National Program "Land" began without much publicity and almost without any participation of the Ministry of Agriculture; it was carried out under the influence and significant financial support from external donors. Having gained economic independence, the majority of agricultural enterprises engaged in business and started changing their status and form of operations.

Table 1. The number of economic agents involved in the agrarian sector of the Republic of Moldova, 2011

Economic agents	The agents number	Area, thousand ha	Average area, ha
Agricultural cooperatives	204	141	712.8
Join stock companies	158	46	455.38
Limited liability companies	1,986	654	388.01
State enterprises	89	14	192.34
Peasant farms	898,768	749	0.89

Source: National Bureau of Statistics

The core of the agricultural business was formed quite quickly, within 3-4 years.

Statistically, the results of the land reform are quite impressive and may be find in the Table 1.

Peasant farms (PF) area operate more than 46% of the total farmland. This legal form of organization cover 749 thousand ha, which is by 95 thousand ha more than the area of the limited liability companies. Agricultural cooperatives, on one side, own the area of 141 thousand ha, which represents respectively 8.8% from total area. Joint-stock companies cover more than 3.1% of farmland. The share of public enterprises in the farmland is the smallest part and represents less than 1%, with only 14 thousand ha.

In 2011 there were 898,768 PF in agriculture, which represents more than 99% of the total number. The structure of individual enterprises changed as follows:

- 89 state-owned enterprises;
- 158 joint stock companies;
- 204 agricultural cooperatives;
- 1,986 limited liability companies.

There is a significant increase in the number of PF, mainly related to the issue of certificates, which legally confirmed the right to own land and registered farms in accordance with the law. It should also be noted that land has been assigned to PF much earlier and the above mentioned registration has been funded by means of the World Bank project (Lerman, 2004) [17.

The average size of agricultural cooperatives exceeds the average size of a joint stock company by 257 ha and amounts to 455 ha. The size of a limited liability company is on average 388 ha, which is by 324 ha less than the size of leading joint stock companies. The average size of public enterprises is 192 ha and the average size of individual farms is the smallest among all enterprises and amounts to 0.89 ha.

MATERIALS AND METHODS

In our sample there are 723 economic agents in homogeneous farming settlements from nine districts and three areas of the Republic of Moldova were surveyed to assess the efficiency of individual farms (Figure 1). The household questionnaire has been designed in such a way that the answers reflect the three components of the efficiency of rural areas: economic, social, environmental, with the data format according to the Likert-type scale for ordinal data. The survey provides an opportunity to examine the status and structure of the households from certain regions of the country.

Fig. 1. The distribution of settlements by the areas of the Republic of Moldova, where the survey has been conducted

The following variables have been taken into account: the size of a household, land use, types of the crops grown, the number and species of animals, agricultural machinery and equipment that are used, as well as the labour force engaged in agricultural activities on the farm. This information is crucial for determining the efficiency of PF and household plots.

As it has been mentioned above, the collection of various types of data contributes to the use of resources with the maximum benefit. However, this kind of survey has a number of drawbacks and it is important not to overlook them. A national representative survey would promote statistical significance and provide more conclusive evidence, which could serve as the basis for a strategy. However, such a survey would be larger and

more expensive. The extract used in this survey is representative and though it may point to some broader trends, it does not show any precise results for these or those groups of our society. The same concept is applied to both quantitative and qualitative aspects of the study. The disadvantages are particularly strongly noticed in the quantitative examination, since the quantitative analysis generally refers to objective information and cannot connect some peculiarities with the context as it is provided by the qualitative analysis. The quantitative survey results should be essentially seen as an aid to the main plot, which is based on the qualitative survey. The review of materials, qualitative and quantitative studies in this report assume to encourage more deployed debates about the impact of PF on the farmer's family welfare (Lerman, 2005) [8].

Another disadvantage of the sociological research is that a part of the information reported in questionnaires and interviews is distorted, either intentionally or unintentionally by respondents, and these distortions are often systematic. Respondents do not know or acknowledge much of the information that a sociologist needs. Therefore, questionnaire results should be cross-checked and supplemented by sociological observation and a performance study (Toma, 2015) [9].

We have chosen the parametric method Stochastic Frontier Analysis (SFA) to assess the efficiency of PF in this paper. Being technically a rating approach in identification of economic efficiency indices, SFA critically reflects the efficiency of PF on the basis of data inputs and outputs in agricultural activities. The boundary methods for determining the ranking of economic agents, which are characteristic to SFA, make it possible to determine the economic performance of agricultural activities. The purpose of this paper is to provide a critical and thorough review of the two main boundary practices. Parametric methods of assessment, which are used as a half-normal Gaussian distribution regarding Cobb Douglas production function, are a reliable tool to determine economic efficiency (Farrell, 1957) [5].

SFA model is often used to compare relative effectiveness of economic entities, because it is possible to monitor the dynamics of these indices. SFA assesses the "true" production boundary, rather than the average figure of all firms, since it takes full advantage of all the properties of the production function. The following may be distinguished as the advantages of this method: taking into account the influence of statistical noise on the resulting function, as well as the factors that are not included in the model for any reason. However, the method is complicated and requires a large extract of data, so that the analysis results may be considered statistically correct (Gorton, 2001) [6].

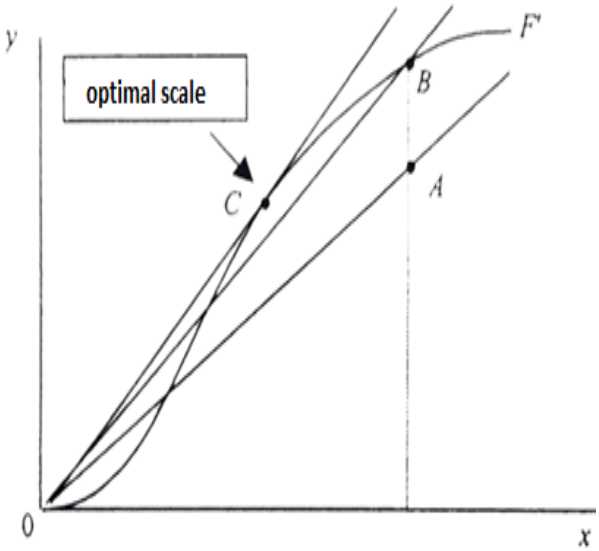

Fig. 2. Cobb Douglas production function used to assess the rating of PF

The standard function to determine the efficiency of PF can be presented in the following way:

$$Yi=X_i\beta+V_i+U_i, \text{ for } i= 1, ..., N, \quad (1)$$

where Y_i is the PF average income;

X_i – vectors of productive resources, which are used at PF to generate income;

β – a vector of unknown parameters;

V_i – a random variable, an error, it is assumed to be iid $N(0, \sigma_v^2)$;

U_i – a non-negative random variable, which characterizes the efficiency of a household iid $N(0, \sigma_u^2)$.

The key element in determining the PF efficiency is the evaluation of the non-observed value U_i. Therefore, we need to get the expectation U_i, conditional on the observed value ($V_i + U_i$). The expressions that are necessary to assess technical efficiency are defined by Coelli (Coelli et al., 2005) [3].

RESULTS AND DISCUSSIONS

The Republic of Moldova has significant natural, production and human resources to manufacture agricultural products. Hilly landscapes of the Republic, as well as favourable climatic conditions make it possible to develop agriculture and animal husbandry.

Table 2. The structure of expenses and costs needed to purchase goods and services for the production of agricultural products in the studied farms, %

	HF		PF	
	2014	2015	2014	2015
Total costs and expenses for purchased goods and service as well as taxes of which:	100	100	100	100
wages for employees	3.7	4.5	9.7	13.5
seeds, seedlings and planting material	6.6	7.7	7.0	5.2
forage	24.6	32.2	9.5	8.8
agricultural works (tillage, sowing, harvesting, etc.)	15.7	13.5	29.7	24.1
young livestock and poultry	27.1	26.7	16.8	12.0
diesel and gasoline	3.8	0.4	4.0	5.0
transportation services	3.4	2.2	4.7	4.0
inorganic fertilizers and crop protection agents	2.2	1.5	5.0	11.8
land and other taxes, social insurance	2.5	1.5	3.0	2.8
other costs and expenses	10.4	9.8	10.6	12.8

Source: National Bureau of Statistics

PF's grow mainly industrial crops (40%), vegetables (20%), etc. The average size of farm plots, cultivated by individual farms, is 0.89 ha, which is by 1.26 ha less than the value presented in our sample that equals 2,15 ha. Our sample data show that the total area that is cultivated is 1,327 ha, 228 ha of which belong to household personal subsidiary plots. This means that 83% of the land is owned by PF and 17% - by household farms (HF) respectively.

In 2015 the average size of land owned by HF in the Republic of Moldova amounted to 0.40 ha per farm, while the figure equals 0.33 ha in our sample. There is a number of expenses for obtaining of goods and services needed to produce agricultural products in both PF and HF.

Table 2 presents the structure of costs that is observed in the country's households.

We have selected the following indicators as variables of the Cobb- Douglas production function:

- Y - PF's income, thousand lei;
- X_1 – the area of cultivated land that is owned by a PF (including household plots);
- X_2 – expenses of a PF's to manufacture products.

Table 3. The PF efficiency depending on the farms area and its costs

No	Income, thousand lei	Area, ha	Consumption, thousand lei	TE
1	67,000	3.05	24,300	0.5733
2	25,000	2.41	10,300	0.3760
3	15,000	2.9	200	0.5423
4	40,000	2.48	36,500	0.4040
5	5,000	2.24	4,450	0.1364
6	18,000	1.99	3,950	0.3596
7	77,300	2.19	2,950	0.7261
8	83,000	0.38	1,200	0.7607
9	9,200	2.56	900	0.3050
10	53000	2.8	3,890	0.6413
11	68,000	2.23	7,758	0.6501
12	24,000	1.97	14,100	0.3417
13	56,000	1.41	6,550	0.6107
14	3,500	1.65	3,400	0.1088
15	28,700	4.63	8,000	0.4379

The production function in the form of translog can be presented in the following way:

$$\ln(Y_i)=\beta_0+\beta_1\ln(X_{1i})+\beta_2\ln(X_{2i})+V_i+U_i \quad (2)$$

The software used to calculate the technical efficiency is FRONTIER Version 4.1, developed at New England University, Australia (Coelli, 1996) [4].

We assessed the PF efficiency based on the assumption that U_i is distributed iid $N(0, \sigma_u^2)$.

We processed 723 PF in 2015 and obtained the following results:

(i)elasticity values for the factors that are included in the model are presented in Table 3.

(ii)values of PF technical efficiency for the considered factors are presented in Table 4.

Table 4. Program listing of the results for data processed with FRONTIER 4.1

```
Output from the program FRONTIER (Version 4.1c)
instruction file = a1.ins
data file =        a1.dta
 Error Components Frontier (see B&C 1992)
 The model is a production function
 The dependent variable is logged
the ols estimates are :
              coefficient     standard-error    t-ratio
  beta 0        0.83300257E+01  0.22169232E+00  0.37574714E+02
  beta 1       -0.40088151E-01  0.30587295E-01 -0.13106145E+01
  beta 2        0.29058829E+00  0.26598503E-01  0.10924987E+02
  sigma-squared  0.62695563E+00
log likelihood function =  -0.85561248E+03
the estimates after the grid search were :
  beta 0        0.90853413E+01
  beta 1       -0.40088151E-01
  beta 2        0.29058829E+00
  sigma-squared  0.11948558E+01
  gamma         0.75000000E+00
   mu is restricted to be zero
   eta is restricted to be zero
 iteration =     0  func evals =     20  llf = -0.84318895E+03
    0.90853413E+01-0.40088151E-01 0.29058829E+00 0.11948558E+01 0.75000000E+00
 gradient step
 iteration =     5  func evals =     41  llf = -0.84300023E+03
    0.91846804E+01-0.52968496E-01 0.28581368E+00 0.11939930E+01 0.75640680E+00
 iteration =     7  func evals =     64  llf = -0.84300022E+03
    0.91847589E+01-0.52927444E-01 0.28579559E+00 0.11941489E+01 0.75638573E+00
the final mle estimates are :
              coefficient     standard-error    t-ratio
  beta 0        0.91847589E+01  0.21966737E+00  0.41812122E+02
  beta 1       -0.52927444E-01  0.28424891E-01 -0.18620104E+01
  beta 2        0.28579559E+00  0.24610115E-01  0.11612932E+02
  sigma-squared  0.11941489E+01  0.11370922E+00  0.10501777E+02
  gamma         0.75638573E+00  0.53935089E-01  0.14024001E+02
   mu is restricted to be zero
   eta is restricted to be zero
log likelihood function =  -0.84300022E+03
LR test of the one-sided error =   0.25224523E+02
with number of restrictions = 1
 [note that this statistic has a mixed chi-square distribution]
number of iterations =      7
(maximum number of iterations set at :   100)
number of cross-sections =    723
number of time periods =      1
total number of observations =    723
thus there are:      0  obsns not in the panel
covariance matrix :
  0.48253753E-01 -0.24965445E-02 -0.38993311E-02  0.80678564E-02  0.42382898E-02
 -0.24965445E-02  0.80797444E-03 -0.19770534E-03 -0.22130500E-03 -0.13625490E-03
 -0.38993311E-02 -0.19770534E-03  0.60565774E-03 -0.11488226E-03 -0.71486441E-04
  0.80678564E-02 -0.22130500E-03 -0.11488226E-03  0.12929786E-01  0.50832781E-02
  0.42382898E-02 -0.13625490E-03 -0.71486441E-04  0.50832781E-02  0.29089938E-02
```

Constant beta 0 from the formula 2 takes value 0.918. While beta 1, which is responsible for the area, is set to -0.052. This suggests that the PF area negatively affects the level of efficiency. For example, if we raise the cultivated area of a household by

1%, its revenues are reduced by 0,052%. This statement is consistent with the data from previous studies (Cimpoies, 2013) [2].

As for constant beta 2, which is responsible for the costs of the household, the positive value of 0.285 suggests that the use of additional resources increases the efficiency of PF. For example, if we increase costs by 1%, the revenues of PF are increased by 0.285.

The average value of technical efficiency for this sample is 0.538, which corresponds to the expected performance of farms. For example, the farm 499 has an efficiency of 0.8745, which is the maximum value for this sample, and the ratio of the cultivated land of 0,65 ha and the amount of costs (23.2 thousand lei) are most favourable. The farm 390, which has 0.91 ha and costs amount to 2.4 thousand lei with a minimum efficiency in the sample (0.044), shows the worst ratio of the area and amount of expenses.

The stochastic component of the Cobb-Douglas production function TE (technical efficiency) was chosen as a characteristic feature that describes the efficiency of PF and HF. Both production inputs and market competition are considered in his index.

$$TE = e^{(-0,762 + 0,056\sqrt{X_1})} \quad (3)$$

As a result of processing, according to exponential model, the functional relationship between the efficiency of PF and the area of an individual quota is shown in Figure 3.

The analysis shows that the factor elasticity is equal to 0.76. If we increase the household area by 1%, the volume of agricultural production increases by 0.76%. This indicates an increase in the cultivated area of an PF and, consequently, an increase in yields and agricultural production, which leads to greater profits.

Usually HF is not oriented to participate in business relationships, as the main purpose of its activity is to provide themselves and their families with products, and only the surplus can be put up for sale. Consequently, the efficiency, according to the presented data, slightly depends on the exogenous factors. The elasticity coefficient is not high, but there are some farmers with a decent amount of land, who are able to compete with large households.

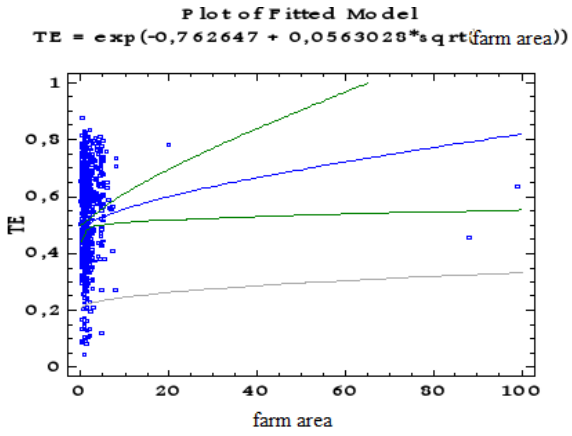

Fig. 3. Functional relationship of the PF area and TE

The model, which reflects the dependence of the efficiency of PF on the HF area, is as follows:

$$TE = \sqrt{0,304 + 0,019 * X_1} \quad (4)$$

In accordance with the studied sample, the total area of HF is 228 ha, which is 17% less than the area of PF that is equal to 1,327 ha.

Based on the data, presented in Figure 5, the factor elasticity is 0.0107. The elasticity ratio shows that the efficiency of HF increases by 0.0107%, if the plot area increases by 1%. Thus, the expanding of the production scale has a positive effect. Therefore, we may conclude about increased levels of the family income.

Traditional branches of the livestock industry are developed in the country too: cattle, pig and poultry breeding. Sheep, fur and fish farming, horse breeding, as well as bee-keeping have an insignificant share in the agricultural production. In years 2000-2015 the rural development is described by a steady productivity increase of agricultural animals and production volumes (Toma, 2014) [10].

The share of animal husbandry in the corporate sector is insignificant due to the emergence of a number of serious problems: lack of initial capital; they have no access to credits and loans due to the lack of collateral property. They also need significant expenses

to design farm buildings and to connect them to utility networks, paying out initial instalments for lease payments, etc.

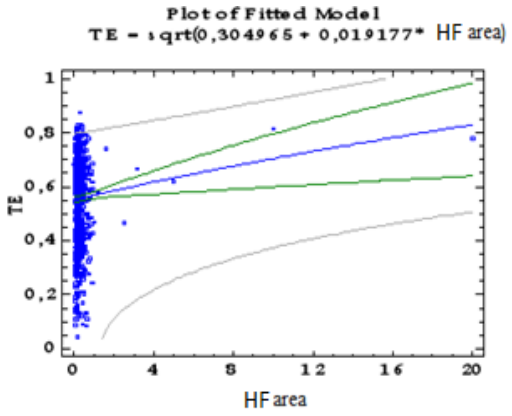

Fig. 4. Functional relationship of the HF area and TE

Based on the information mentioned above, we can conclude that crop production is dominant in agricultural production as compared to animal breeding. Overall agricultural production has fluctuated dramatically over the years at peasant farms.

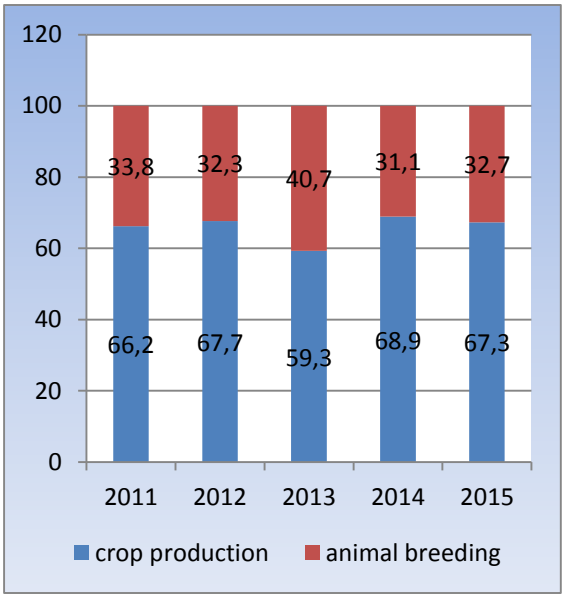

Fig. 5. The structure of agricultural production per branch at a PF, 2011-2015
Source: National Bureau of Statistics

As for individual farm products, the production of some of them tend to increase (grain, cattle and poultry for slaughter, milk), others tend to change slightly (vegetables, eggs).

CONCLUSIONS

We have analysed the efficiency of PF in the Republic of Moldova using the stochastic frontier method and we can conclude the following provisions: the average TE value for the sample is 0,538, which corresponds to the efficiency of PF that is most often found in the sample.

The contribution of various factors that influence the development of PF, is the following:

-the increase of the volume of mechanized operations by 1 lei leads to an increase in the efficiency of PF by 0.10655 TE units. This indicates a high factor elasticity of mechanized operations;

-the factor elasticity of land rent is low and amounts to 0.019 TE units with an increase in the cost of rent by 1 lei. The correlation coefficient between the cost of rent and the efficiency of PF is 0.17, which indicates a connection of low intensity between the factors;

-the factor elasticity of animals purchase is low and amounts to 0.0395 TE units with an increase in costs for the purchase of animals by 1 lei. The correlation coefficient between the expenses needed to purchase animals and the efficiency of PF is 0.053, indicating a low intensity connection between the factors;

-expenses on transportation services amount to 573 thousand lei, which is 13% of the total costs. The factor elasticity of transportation services is low and equals to 0.0498 TE units.

This method of determining the efficiency of PF may be useful to research competitiveness optimization in the rural areas.

ACKNOWLEDGEMENTS

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WHAT IS THE SMALLEST SIZE OF A FAMILY FARM THAT IS STILL ECONOMICALLY VIABLE. A STUDY IN THE ORCHARD INDUSTRY IN ISRAEL

Tal SHAHOR[1], Liron AMDUR[1], Moshe BEN SHAHAR[2]

[1]The Academic College of Emek Yezreel, Israel, Email: tals@yvc.ac.il
[2]Valley Farmers Centre, Israel

Corresponding author: tals@yvc.ac.il

Abstract

In Israel, like in most other countries, there are primarily two types of farms: small family farms and large cooperatives. In recent years, with the development of technology which reduces the need for labor and increases the need for capital, the question arises, "in today's world, is there still a place for small family farms?" In order to answer this question, we designed a comprehensive study to test this subject from a number of perspectives (socially, culturally, etc.). This article looks at the economic aspect of this larger study and it deals with the question of the smallest possible size of a farm, that is still economically viable. The study was done for the citrus industry, one of the main agricultural industries in Israel. For the study, we estimated the partial elasticity of production for an orchard with respect to its size and found the point at which average production reached a maximum. According to accepted economic theory, this point shows the minimal size of an economically viable, independent agricultural unit. The results of the study show that in this industry, the minimum size for an economically viable farm is about 30 dunams (1 dunam = 1,000 m^2). In Israel, the size of about half of all family farms is larger than 30 dunams. The immediate conclusion is that there is no reason to assume that an orchard run by a small family operation must be economically unviable. If small family farms adopt the correct organizational structure, not only at the stage of growing the fruit but also at the stage of marketing, it might be possible for at least some of them to be profitable and economically justified. Owners of the smallest farms can partner with their neighbors in order to reach the desired farm size.

Key words**:** *family farm, the smallest farm size, economic viability, orchard industry, Israel*

INTRODUCTION

This study seeks to determine whether there is economic viability for family farms in Israel. The study is part of a larger project whose purpose is to determine the current and future state of the Israeli family farm. One feature that characterizes the Israeli agricultural industry is that most family farms are (considerably) smaller than non-family farms. According to the Ministry of Agriculture and Rural Development (2013) [6], 48% of family farms are no larger than 60 dunams, yet they only work 8% of the land which is called "family owned." On the other hand, 3% of family farms work land in excess of 1,000 dunams, which constitutes about 43% of land called "family owned."

In other parts of the world the situation is similar. The small family farm is the most common form of agricultural organization, the world over. According to Lowder, Skoet & Singh (2014) [5], among the 570 million farms in the world, about 475 million of them are farms no larger than 20 dunams. In many countries in the world, small farms are the primary producers of agricultural produce, on relatively small plots of land. For example, according to Lerman, Kislev, Kriss, & Biton (2002) [4], in Russia, family farms produce 55% of the agricultural produce on 11% of the land. In recent years, due to technological development which reduces the need for labor and increases the need for capital, the question arises, "in today's world, is there still a place for small family farms?"

In the literature, there is an age long discussion regarding the size of the optimal farm and whether economies of scale in agriculture exist. According to Deininger (2003) [2], it is customary to distinguish between two types of farms—the large farm (individually or collectively owned) and the small or medium sized family farm. The

advantages of the large farm include the ability to maintain machinery, access to capital or credit, and marketing advantages. Despite these advantages, family farms are usually more intensive and make better use of land and labor resources. According to Lerman, Kislev, Kriss, & Biton (2002) [4], the family sector specializes in produce which has greater value, whereas the larger farms produce a wide variety of produce. For farms managed by families, there is an advantage due to savings in professional management and overseeing the workers. Therefore, there is the claim that small family farms which are supported by organizations which help in mechanization, finance, marketing and instruction are more efficient than large farms (Darwish 1975) [1]. In addition there are a variety of unique goods and services in the family farm which don't necessarily have an advantage due to size, but rather an advantage due to uniqueness and reputation, such as tomatoes grown in greenhouses.

The purpose of this study is to determine the minimal size for a farm in Israel, that can exist as an independent agricultural unit and still be economically viable. The industry chosen for this study is the citrus fruit industry of northern Israel.

The orchard was, for many years, the symbol of Israeli agriculture. Citrus fruits have been grown in Israel since the end of the 18th century, growing in size and economic importance since the beginning of the 20th century. The Jaffa Orange, a leading brand name, is famous in many countries all over the world. Pictures of Zionist pioneers ("Halutzim") packing oranges for export were the symbol of the resurrection of Jews in the land of the Bible. A number of the towns and villages that were established by the Zionist movement include reference to orchards in their names, for example Pardes Hanna (literally: Hanna's Orchard; named in honor of Hanna Rothschild), or Pardesia (literally: the orchard of God). In a recent project of the Israeli Nature and Parks Authority, the orchards of the area north of Tel Aviv ("HaSharon") were identified as cultural landscapes of national importance. Old packaging houses of oranges and grapefruits, which are scattered in citrus groves all over Israel, were recently designated for preservation.

Notwithstanding their cultural value, orchards are also (or mainly) an economic industry, that supports the livelihood of the farming family. In the second half of the 20th century, orchards were a leading agricultural branch in Israel, spreading out over 40,000 hectares (about 10% of the farmland in Israel). During the 1990s, the industry experienced a severe crisis and by the early 2000's was reduced to about 15,000 hectares only. Around that time, an original variety of tangerine was developed by Israeli experts and named "Ohr" (Hebrew for light). This variety is especially successful due to a number of factors: early ripening (around February-April), being seedless, especially sweet, and easy to peel. Soon enough, the abandoned citrus groves of Israel were re-planted with "Ohr" trees. Today there are around 20,000 hectares of citrus groves all over Israel.

Eighty one percent of the citrus farms in Israel are family farms while the rest belong to Kibbutzim (cooperative villages) or corporate farms. This means that the future of citrus in Israel, both as a cultural landscape and an economic branch, depends on the competitiveness of the small family farm. In industries where there are economies of scale, family farms will have difficulty competing, since larger farms have an obvious advantage. Therefore, the question of whether or not there are economies of scale in the citrus industry is vital.

MATERIALS AND METHODS

The database includes data received from two packaging facilities for the citrus industry in northern Israel. The data includes different citrus fruits: various types of oranges, tangerines, grapefruit, pomelo, and others. For each farm, there is data for the total area of the orchard for each kind of citrus grown, as well as the yield that was sent to the packaging facility. Similarly, there is data regarding the quality of the fruit: the percentage of fruit segregated as "type A," which is suitable to be sent to market.

The data for one packaging center are for the years 2013, 2014 and 2015. The data for the other packaging facility are for the years 2012 and 2013. For some of the farms there is only partial data. Similarly, in a few cases, a certain farm in a certain year for a certain type of fruit contains only data about the size of the orchard; there is no data pertaining to the yield. In these cases, the observation was removed from the database for the specific farm for that year. If for a different year the farm had complete data it remained in the data base. Note that the lack of uniformity of the data requires that we assume that there is no difference from year to year regarding the growth (weather, crop damage, etc.). The final number of farms in the sample is 70.

Preparing the data

In the region included in the sample, six types of citrus are grown. The proper way to approach the study is not to check each type of fruit separately using a separate regression, but rather to aggregate all types of fruit into one regression. The reason for this is that, in our opinion, the factor which determines the efficiency of the farm is the size of the whole growing area and not the size of the orchard for each particular fruit. In order to understand this decision, we will look at the following example.

Let's assume that there is a certain farmer with 95 dunams of a certain type of orange and 5 dunams of grapefruit. In this case, the farmer tends to both kinds of fruit tree together. That is, the amount of workers, machinery, and other inputs are suitable to tend to 100 dunams of fruit trees. Therefore, the yield of grapefruits is not the same as if the farmer only had 5 dunams of grapefruits and nothing else. Aggregation of the data for the various types of fruit was done in the following stages:

(i)We summed up the yield of all of the farmers for all the types of fruit, in order to get the total yield of all the orchards for the entire area. We then did the same for land area, which gave us the total land area of all these orchards in the area. Dividing the "yield of all farmers" by "total land area of all farms" gives the average total yield (of all the farmers for all the types of fruit) per dunam.

(ii)We then calculated the average yield per dunam for each type of fruit for all the farmers. To do so we calculated the total yield and the total area of each type of fruit for all the farmers. Then we divided one by the other.

(iii)We then calculated the coefficient for each type of fruit with respect to the average total yield that we calculated in step 1. For example, the average total yield per dunam (calculated in step 1 above) is 3,640 kg. Similarly, the average yield for one dunam of "Ohr" (a popular type of citrus in the industry) is 2,109 kg. Dividing 3,640 by 2,109 gives us the coefficient of 1.725. Afterwards, we multiplied the yield of "Ohr" of each farmer by this coefficient, which gives us the weighted average yield of "Ohr" for each farmer. This process was repeated for each type of fruit.

(iv)Then, for each farm, we summed up the weighted average yield of all the types of fruit and got the weighted average yield for each farmer.

(v)For the last step in preparing the data, we calculated the weighted average yield for all the years for which there is data for a particular farmer, for each farmer. For most farmers there are three years of data, but for a portion there is data for only one or two years. The result of this step is the dependent variable in the regression.

Note: We tried to run the regression whereby the data was handled differently. For example, we ran the regression for the data for "Sunrise" or "Ohr" alone (these are the types of fruit with the most farmers growing them). Similarly, we tried to run the regression without creating an annual average for each farm. The results of the regression were fairly similar. At the end of the day, we chose to work with the weighted average yield (the end result of the process of preparing the data) for two reasons: it seems the most theoretically correct way to operate and because the adjusted R-squared was significantly higher than the rest of the possibilities.

In the following table a number of figures for the size of the area and the yield per dunam appear.

Table 1. Critical data for the orchard size and yield per dunam according to type of farm

		Family	Non-family
Size of orchard (in dunams)	Average	33	240
	Minimum	6	37
	Maximum	140	558
Yield per dunam (in kg)	Average	3,945	3,676
	Minimum	969	965
	Maximum	7,123	6,882
Number of farms		50	2-

We can see that the output per dunam for family farms is higher than that of the larger farms. This finding suggests the hypothesis that there is a size whereby family farms can be efficient producers, and therefore it is important to determine the minimum size for efficient citrus production.

Determining the optimal size for a unit of production

In the literature there are different methodologies for determining the efficiency of farms. For example, Reznik (2013) [7] checked the economic efficiency, allocation efficiency, and the efficiency to size of milk farms in Israel using data envelopment analysis (DEA) and stochastic frontier analysis (SFA) approaches.

It is our intent to suggest an alternative methodology to measure economic efficiency – which in our opinion is more fitting for the proposed research – and that is to determine whether there is a minimum size a farm needs to be in order for it to be efficient. It has been suggested that the analysis should be done by estimating the production function of the citrus industry, which describes the relationship between output and orchard size. A characteristic production function is built such that for average output there are two regions. In the first region, where the amount of input (in our case, farm area) is low, the average output (AP) is increasing. In the second region, whereby the amount of input is larger, the average output begins to decline.

A producer in a competitive market does not choose to produce in the region where average output is rising, rather, only where average output is falling.[1] Therefore, we can say that the smallest possible farm size that is economically viable is found at the point where average output reaches a maximum. The maximum point of AP (which is the minimum size input) can be found with the help of the partial elasticity of production with respect to the input (which is farm area). In the region where AP is rising, the partial elasticity of production is greater than 1 and gets smaller as long as AP is increasing. At the point where AP is at a maximum, the partial elasticity is equal to 1. In the region where AP is declining, the partial elasticity of production is less than 1. Therefore, at the maximum AP point (the minimal size for an orchard that is economically viable), the elasticity will be equal to one. We will estimate the partial elasticity of production with the help of the production function:

$$(1) \quad Y = e^{\alpha} * X^{\beta} * X^{\beta} * e^{\beta_f D_f} e^{\beta_e D_e}$$

whereby:

Y is the output

X is the size of an agricultural unit

D_f is a dummy variable that takes the value of 1 for family orchards and 0 for non-family orchards.

D_e is a dummy variable that takes the value of 1 for orchards found in the geographic region of the eastern Galil and 0 for other regions.

For this production function, β is the partial elasticity of production with respect to the size of the orchard. We can estimate β with the help of a logarithmic transformation which appears in the following equation:

$$(2) \quad \ln(Y) = \alpha + \beta \ln(X) + \beta_f D_f + \beta_e D_e$$

As we saw earlier, in order to find the minimal size of an orchard that is still

[1] This can be seen with the help of the night regions

economically viable, we need to find the point at which $\beta = 1$. When the orchard area is small, β (the estimate of elasticity) is supposed to be greater than 1, and decreases as the area increases, until finally it equals 1. In order to find the desired point we initially ran a regression which included observations of farms whose areas were less than 20 dunams, and afterwards we increased the upper boundary (25 dunams, 30 dunams, etc.) and for each region we reran the regression. The expectation was that at the initial stage when the area is small, β would be greater than 1, but would decrease as the area increased, such that at some point we would get to a certain point where β =1, and afterwards β <1. As we said, the orchard size where β =1 is the minimal size for an orchard to be economically viable.

RESULTS AND DISCUSSIONS

The results of the regression appear in the Table 2.

Table 2. Partial elasticity of production for total output of the orchards with respect to orchard size[1]

Orchard size (In dunams)	Number of orchards	Partial elasticity of production - β	Adjusted R Squared
20	19	1.66	0.72
25	27	1.418	0.72
30	32	1.171	0.56
32	33	1.14	0.56
33	36	0.997	0.496
35	37	0.0987	0.5
37	39	1.046	0.55
45	40	1.045	0.57
47	41	1.045	0.589
48	42	1.027	0.595
50	43	0.992	0.59
52.5	44	1.005	0.61
62	46	1.017	0.65
65	47	1.004	0.66
77	49	1.02	0.7
87	50	1.01	0.715
106	53	0.937	0.7
123	56	0.86	0.67
Entire Sample	70	0.94	0.84

[1]The coefficients of the dummy variable for family farms and orchards in the eastern Galil were not statistically significant and hence removed from the regression.

As we can see, when the orchard size is smaller than 33 dunams, the partial elasticity with respect to area is greater than 1. In the region between 33 dunams and 87 dunams the partial elasticity is close to 1, and above that it begins to decline. These results show that the smallest possible size for an economically viable citrus orchard, in the region where the study was done, is 33 dunams. Another interesting result is the fact that the coefficient for the dummy variable for "family owned" is not statistically significant. This implies that in the region of production, family farms are differentiated from non-family farms in size only. In the following graph, data for the average output per dunam with respect to orchard size appears.

As we can see, here too when the area is small, the average output (AP) increases as orchard size increases. However, at a certain point the growth stops and afterwards average output begins to decline. Notice that the study focuses on the part of the production function and doesn't deal at all with production and marketing expenses.

It is entirely possible that regarding purchasing inputs or marketing, smaller farms will face operating difficulties in an independent and efficient capacity.

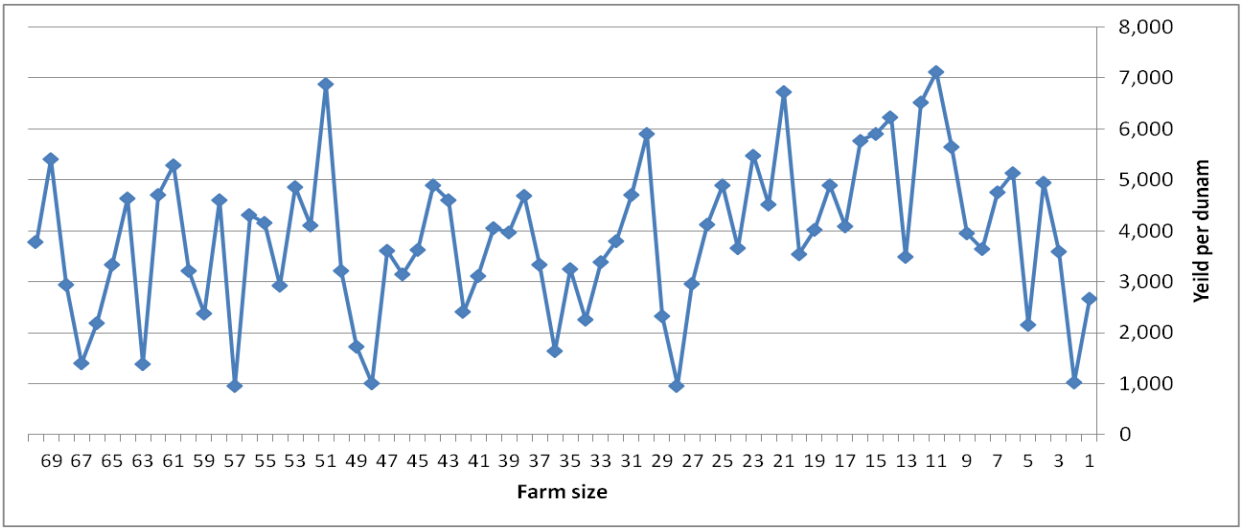

Fig. 1. Average yield per dunam

Therefore, it seems there is a need for outside intervention to help them organize and operate together. Organizations such as these exist in many places throughout the world. According to Helkis, Ginzburg & Kachel (2014) [3], in many different places in the world, agricultural organizations operate specifically in advertising, branding, production quality, R&D, market studies and environmental protection. In the United States, there are 30 such organizations for growers and in the European Union some 1,500 such organizations. The European Union encourages the establishment of growers' organizations and finances 50% of the cooperative agricultural ventures. It appears that there is room for similar actions such as these in Israel as well.

Fruit Quality

Like many other agricultural industries, the quality of the produce in the orchard industry has a large influence on the price the growers receive for their produce.

Table 3. Partial elasticity of production for the yield of type A fruit, with respect to orchard size[1]

Orchard size (In dunams)	Number of orchards	Partial elasticity of production - β	Adjusted R Squared
20	19	1.9	0.753
25	27	1.435	0.7
30	31	1.262	0.66
32	32	1.22	0.66
33	35	1.05	0.57
35	36	1.013	0.56
37	38	1.06	0.6
45	39	1.045	0.612
47	40	1.05	0.63
48	41	1.006	0.618
50	42	0.97	0.61
52.5	43	0.984	0.62
62	45	0.994	0.671
65	46	0.97	0.672
77	48	0.993	0.711
87	49	0.998	0.73
106	52	0.869	0.63
123	55	0.816	0.619
Entire Sample	69	0.868	0.814

[1]Here too the coefficients of the dummy variables for family farm and orchards in the eastern Galil were not significant and removed from the regression.

Therefore it is important to check the influence that farm size and type of farm (family or not) have on the quality of the fruit. Quality is determined at the packaging facility, where the fruit is sorted into two categories: type A (the higher quality, destined for packaging and export) and type B (the lower quality, usually sold to the juice industry or other industries). In this section we will check how the size and type of farm affects the yield of type A fruit.

Like in the section dealing with yield, here too we look at the weighted average yield. We calculated the weighted average yield of type A fruit according to the same stages described in the previous section. The natural logarithm of the weighted average yield of type A fruit is the dependent variable in the regression. The independent variables are the same as in regression (2) (the regression for yield size) and they are the natural logarithm of farm size, a dummy variable for family farm, and a dummy variable for farms found in the eastern Galil region. The results of the regression appear in Table 3.

As we can see, the partial elasticity of production with respect to farm size equals 1 when the size of the farm reaches about 48 dunams. This finding shows that regarding fruit quality, the minimal farm size required for an efficient farm is larger, and therefore a larger portion of the family farms (the smaller ones) are considered inefficient. This claim gets stronger if we compare the averages of family and non-family farms for two data types: quantity (which we saw in Table 2) and quality (Table 3). The results of the comparison appear in Table 4.

Table 4. Comparing family and non-family farms

Data type	Family farms	Non-family farms	Sig. (P-value)
Yield	3,944	3,676	0.25
Yield rate by type	0.58	0.63	0.01

As we can see, when looking at the amount of the yield, there is not a significant difference between family and non-family farms. When looking at the quality of the yield, the yield rate for type A fruit is significantly larger in non-family farms than family farms.

CONCLUSIONS

The purpose of the study was to determine whether there is economic justification for small family farms in Israel. To perform this study, we looked at 70 farms, 50 of which were small family farms and 20 cooperative farms, which are larger. The study was done with the help of the partial elasticity of production with respect to farm size. A typical production function is built such that for average output there are two regions. In the first region, where the input amount (in our case, farm size) is small, the partial production elasticity is greater than 1. In the second region, where the input size is larger, the partial elasticity of production is less than A producer operating in a competitive market will not produce in the region where the elasticity of production is greater than 1, but rather, only in the region where it is less than 1. Therefore, we can say that the smallest possible size for a farm to still be economically viable is found in the region where the partial elasticity of production is equal to 1 (or at least, very close to 1). The results of the study show that the minimal size for an orchard to be economically viable is about 33 dunams. Out of the 50 family farms in our sample, 18 of them have farms larger than 33 dunams and for 7 others, the size of the farm is very close to this size. Therefore, we conclude that close to half of the family farms are located in the efficient frontier. What we conclude from this is that we should not assume that small family farms are not economically viable. With the correct organizational structure, at the growing stages as well as marketing stages, family farms should be able to operate in a way that is economically viable and profitable.

It is important to point out that the study only looked at the production function and not

whether or not family farms are efficient, when also taking into account their expenses. Among those working in the industry, there is suspicion that, given the current circumstances, small farms that operate alone will face difficulty operating efficiently, both in purchasing inputs as well as marketing. Therefore, we see that there is a need for outside intervention which can help the smaller independent farms to operate together. Organizations like these exist in many places in the world. Another conclusion that comes out of this study is the fact that fruit quality from the family farms is lower than that of non-family farms. A growers organization which will allow them to purchase new technology and expertise can bring improvements in this area as well.

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SPECIFIC OF THE DEVELOPMENT OF LEASING ACTIVITY IN THE REPUBLIC OF MOLDOVA

Angela SHESTACOVSCAIA

Moldova State University, 60 Mateevici str., Chisinau, Republic of Moldova, Email: ashestakovskaya@bk.ru

Corresponding author: ashestakovskaya@bk.ru, cojocaruusm@gmail.com

Abstract

This article examines the development of leasing in the Republic of Moldova in the last nine years. According to statistic data, the author has examined the evolution of the value of fixed assets transmitted in lease for three consecutive periods, each including 3 years. There was analyzed the value and structure of fixed assets transmitted in leasing in terms of categories of fixed assets, the period of payment and benefits. There are presented the most powerful leasing companies, which are in the top of carried out leasing activities. Following the analysis performed, there can be made the conclusion that in the last decade, the value of leased fixed assets is increasing if we have a look at the development of this indicator, expressed in national value. At the same time, the same indicator expressed in US dollars shows that there is no real growth. Transport means have a large share (about 90%) in the structure of leased fixed assets. The share of machinery and equipment, and special buildings and structures is approximately equal, being around 3.5 to 5.7%. Examination of the value and structure of leased fixed assets in terms of the payment deadline demonstrates that in the practice of leasing there are preferred businesses with payment term up to three years. This situation comes as a reaction to economic instability, which is very pronounced in the last 3 years. The study of beneficiaries of leased fixed assets shows that a large share belongs to individuals (about 56% in recent years), followed by the category of companies and organizations (about 33%). These indicators confirm that in the Republic of Moldova, leasing has a consumption character and finance through leasing of the economic entities has economic development capabilities.

Key words**:** *leasing activity, finance, fixed assets, beneficiaries*

INTRODUCTION

The leasing activity is a method of indirect financing applied for the purchase and getting into operation of fixed assets. This financing method can be applied to economic entities, which are not able at some point to make a big investment in machinery, equipment, construction, buildings or transport units.
Leasing activity in the Republic of Moldova has begun its development after 1995. To this end, the Law on Leasing was adopted, which until now has been amended in relation to the national economic development. At present stage, this law regulates the activity of leasing companies, which provide their services to different categories of beneficiaries, economic entities, financial institutions and individuals.

MATERIALS AND METHODS

To analyze the development of leasing activity, data on the evolution of the value of leased fixed assets have been collected from the National Bureau of Statistics) [1].
These data were examined over a period of years from 2007 to 2015. The following methods have been applied in this study: monographic, trends analysis, applying of average values, analysis and synthesis.

RESULTS AND DISCUSSIONS

Leasing is a method of indirect financing of the investment activity.
Under the current legislation, leasing represents all relationships that arise within the scope and performance of a contract where a party (the lessor) takes the obligation at the request of other party (the lessee) to assure the possession and temporary use of a good against a periodical payment, acquired or manufactured by the lessor, with the condition that when the contract expires, there should be respected the optional right of lessee to purchase the asset, extend the rental

contract or stop the contractual relationships. (RM Law, 2005) [5].

According to its economic essence, leasing is on one hand a special form of long-term lending, and on the other hand some form of rent of a good in a long-term.

Leasing and lending have some common characteristics, namely:

-There is taking place the capital investment held by the lessor in important items that are necessary, but expensive, for the economic development, for other economic agents (lessees). These are usually part of fixed assets.

-There is taking place a gradual refund of the invested capital in these objects by the periodic receive of the lease payment set for the lessee. In determining this payment, the annuity method is applied and this payment also includes the reimbursement of invested value and interest.

-The income of the lessor, as well as of the creditor is made up of the interest rate, the leasing rate.

-A determined period is set in the implementation of a leasing business.

-The beneficiary of a lease does not make measures to ensure the contracted values.

Thus, as we can see, the leasing procedure respects all principles of lending (repayment, interest, the temporary nature of the business). At the same time, leasing differs from lending.

First, when finishing the leasing operation, the leasing object may: a) be passed in the possession of the lessee; b) remains in the possession of the lessor. While in the case of credit and commercial credit, the creditor passes immediately the object in the possession of debtor.

Secondly, the sale-purchase transaction stays at the basis of the commercial lending contract. In the case of the lease, there is not obvious such a close connection with the sale-purchase business.

Thirdly, commercial credit is contracted on short-term, where leasing operations provide for long-term lending, being considered in such a way a source of long-term investment financing.

Leasing has some common characteristics with the rent, also:

-The leasing object is put into the use of a beneficiary by the holder of this object;

-The object is put into use for a specified period;

-The object is put into use for a set payment.

-The specific of leasing versus renting is that at the end of leasing period, the ownership right passes from the original owner of the object to the beneficiary of this object.

-The leased object in the Republic of Moldova can be any movable and immovable property except:

-Goods removed from the civil circuit or whose circulation is restricted by law;

-Agricultural lands;

-Consumable goods;

-Intellectual property objects that cannot be transferred. (RM Law, 2004) [5].

-Several forms of leasing are known.

-Depending on the conditions, there is financial and operational leasing.

In the case of financial leasing there is provided:

-Transmission of risks and benefits specific for the ownership right on the leasing object to the lessee at the time of agreement on leasing contract;

-The value of leasing rates approaches the value of the leasing object. According to the legislative provisions it is at least 90%;

-The leasing contract provides for the transfer of ownership to the lessee at the end of the contract;

-The leasing period has to be bigger than 3/4 of the operating period of the leased object.

Operational leasing means operations that are not characterized neither by a provision mentioned above [7].

Depending on the form of paying the leasing rates, there are distinguished: ordinary leasing (original, currency) and material leasing.

In the case of the ordinary leasing (original, monetary, cash), lease rates are paid in cash.

In the case of material leasing, the law provides for two forms:

a) *barter leasing* - when the lessee pays the leasing rates through goods that belong to him.
b) *compensational leasing* - which involves paying the leasing rates through goods

produced with leasing objects - machinery and other fixed assets.

Depending on the initial appearance of the leasing object is known:

-*Direct leasing*, which means that the lessor is also the supplier of the leased object;

-*Lease-back* - is characterized by a situation when a subject of the business transmits to another subject the right of ownership on the object after it is leased.

Depending on the destination of the leasing object is known:

-*Leasing of production* - lease items will be used by the lessee for the production of goods and / or services.

-*Consumer leasing* - provides that the lessee is the consumer of the leased object.

Depending on the sourcing of subjects of leasing is known:

-*Domestic leasing* - leasing operation subjects are residents of the Republic of Moldova.

-*International leasing* - provides that the lessor or the tents is from abroad.

According to its economic meaning, leasing can be compared with the rent. Here we will focus on the specific of the leasing.

First, these two types of commercial businesses are distinguished by the object. The leasing object is formed of fixed assets like equipment, transport units, etc., that are acquired in most cases at the lessee's requirement.

Secondly, the specific of leasing operation refers to the period of use of fixed assets. This period is determined taking into account the depreciation period of the leased fixed asset.

Taking into account these two points, some economists, experts, define leasing as lease of fixed assets to develop production, in a term almost equal to the full depreciation of this fixed asset (Makeeva V., 2003) [6].

Leasing as an economic operation requires the participation of certain persons appointed as subjects. Legislation of the Republic of Moldova establishes the following three categories of subjects: the lessor, lessee and seller (supplier).

The lessor is the individual or legal person who carries out a business activity, transmitting the lessee (the beneficiary), at its request, the right to posses and use an asset, which it owns, for a certain period of time. At the end of the contract, the leased asset / object may be transmitted either to beneficiary of remain in the possession of the lessor.

The lessee is the individual or legal entity receiving on the basis of the leasing contract the ownership and use the asset specified in the contract for a certain period of time in exchange for payment of the leasing rates.

The seller (supplier) is the individual or legal entity, which sells the lessor under the contract of sale-purchase, concluded with the lessor and the lessee, the good requested by the lessee. (Law, 2005) [5]

As it was mentioned before, leasing is a method of indirect financing of the investment activity of beneficiaries (lessees). Beneficiary, by applying this method of financing has a series of advantages (Bugaian L. 2009) [3].

There is the possibility of investment in necessary fixed assets even if there is a liquidity shortage. Lessee put the asset into use, resulting in increased labor productivity, improving quality and lowering production costs. All these contribute to the increase of competitiveness of the economic entity.

The economic entity will increase the value of current assets primarily to enable fixed assets acquired through leasing;

The lessee has the option to be always in step with the scientific and technical progress by implementing new tools, machinery and equipment;

The lessee uses tax incentives, as payments for the lease goods are deductible expenses.

Leasing is done in the following two ways: financial and operational (Bruma I. 2004) [2].

Financial leasing means that the asset - the object of leasing is accounted by the lessee (the financing beneficiary). The lessee calculates the wear related to the asset, which is already included in the lessee's heritage value. According to the tax law in force, the calculated wear is a deductible expense for tax purposes. The monthly lease payment includes a share of the value of the object of leasing and leasing interest. Leasing interest is also a deductible expense.

In the case of operational leasing, the leasing

object is accounted by the lessor. The lessor receives monthly a value which includes the wear rate, calculated in accordance with the law regulations. The lessee (the financing beneficiary) records these expenses that are also deductible for tax purpose.

Leasing has begun to develop in the Republic of Moldova in the late -90s, XX century.

National Bureau of Statistics presents information about the activity of the companies working in the sphere of leasing and rent.

Table 1. Indicators of the economic activity of entities in the sphere of leasing and rental

Indicators	2014	2015
Number of enterprises	270	288
Average number of employees	629	771
Income from sales, mln. lei	148.1	173.3
Financial result before taxation, mln. lei	(11.5)	(3.6)
The number of business entities that have received profit	100	100
The financial result of the economic entities that have received profit, mln. lei	12.4	23.6

Source: www.statbank.statictica.md (accessed on 10.01.2017)

The number of economic entities, working in the sphere of financial leasing and rent, shows a small increase the last two years. But their share in the total number of registered enterprises is not quite significant - about 0.5%. The amount of revenue per an employee is reduced: from 253 lei in 2014 to 224 lei in 2015. We note that effective activity is registered at less than half the companies. Overall the sector records losses, but these losses decrease in 2015 towards 2014 with 3.2 times. So, the number of economic entities from the sphere of leasing and rental does not change, and the registered profit by these one hundred of economic entities increased approximately by 2 times.

Based on the data presented in Table 2, there are observed the following trends: the value of leased fixed assets during the years 2007-2015, expressed in national currency has increased lately by 24.5% compared to the first period.

At the same time, the average value of transport units in the years 2013-2015 increased related to the average period of 2007-2009 by 19.1 mln. lei or by 24.2%; the value of leased machinery and equipment in the third period has increased by 13.4% (7.7 mln. lei). This category of assets recorded a maximum peak to the average of 2007-2009 by 24.3%.

The value of leased special construction and buildings experience a steady growth over the nine years examined from an interval to another.

Table 2. Value and structure of leased fixed assets

Categories of fixed assets	Average on years		
	2007-2009	2010-2012	2013-2015
Total leased fixed assets, mln. lei	880.4	729.5	1,099.0
mln. $	77.7	60.6	75.2
of which: Transport units: mln. lei	789.3	607.6	980.3
mln. $	69.6	50.4	66.9
in % towards the total value	86.7	83.3	89.2
Machinery and equipment: mln. lei	55.1	68.5	62.5
mln $	5.0	5.7	4.4
in % towards the total value	6.3	9.4	5.7
Buildings and special constructions: mln. lei	31.2	39.3	45.0
mln $	2.7	3.2	3.2
in % towards the total value	3.5	5.4	4.1
Other fixed assets: mln. lei	4.8	13.9	11.2
mln $	0.4	1.1	2.0
in % towards the total value	0.5	1.9	1.0

Source: developed by the author on the basis of data from Statistical Yearbook

The average value of leased buildings and special constructions during 2013-2015 is higher than the average of 2007-2009 by 44.2% (13.8 mln. lei).

Other leased fixed assets reflect a significant increase of the value. Thus, the 2009-2013 average is higher than the average of the years 2007-2009 about 3 times; so in the years 2013-2015 the value of other fixed assets falls related to 2010-2012 with 79.4% (2.7 mln. lei), being still 2.3 times higher than in the first period.

On the other hand, the analysis of these data, expressed in US dollars, allow us to conclude that there is no a real growth in this area of economic activity. The average annual value of leased fixed assets through the years 2013-2015 is lower by 3.2% (2.5 mln. USD) related

to 2007-2009. In the same proportion, the value of transportation decreased (2.7 mln. USD). The value of buildings and special structures increased in the examined period as well as in estimating in the national currency, but in smaller proportions: with 18.5% in 2013-2015 compared to 2007-2009 (0.5 mln. USD).

Other leased fixed assets increased 5 times (with 1.6 mln. USD).

Examining the structure of leased fixed assets we mention that in all years, the transports occupied the biggest share, which decreased in 2010-2012 by 6.4 p.p. compared to 2007-2009, however, maintaining the level of 89.2 in the last period. There has been reduced the share of machinery and equipment, which was a small one in the first period. The share of buildings and special constructions amounted to 0.6 p.p. in the structure of leased fixed assets but like machinery and equipment remains quite low.

Table 3. Value and structure of leased fixed assets in terms of payment period

Payment period	Average on years		
	I-st period 2007-2009	II-nd period 2010-2012	III-rd period 2013-2015
Total leased fixed assets, mln. lei	880.4	729.5	1099.0
mln. USD	77.4	60.6	75.2
of which: with payment period up to 3 years, mln.lei	467.8	561.4	645.9
mln. USD	41.5	46.6	44.0
from 3 to 5 years, mln. lei	331.8	126.4	424.2
mln. USD	32.8	10.5	29.2
more than 3 years, mln. lei	80.6	41.7	28.9
mln. USD	7.0	3.5	2.0

Source: developed by the author on the basis of data from Statistical Yearbook

Analyzing the data from Table 3. we can mention that in the structure of leased fixed assets. leased fixed assets with the payment period up to 3 years are prevailing. Their share in the total value of leased fixed assets during the years 2007-2009 was 53.1%. increasing in the second period up to 77%. and lately being at a level of about 59%. So. there was an increase in recent years in regard to the first period with 5.7 percentage points. The second place is occupied by fixed assets with the payment period from 3 to 5 years. This indicator in the period of 2013-2015 reached 38.6%. which grew insignificantly (0.9 percentage points) compared to 2007-2009. In the second period their share declined to the level of 17.3%.

Leased fixed assets with payment term more than 5 years are in a continuous decline. occupying 9.2% in the structure in 2007-2009. 5.7% in 2010-2012 and 2.6% in 2013 2015. In the structure of leasing business. there prevail businesses with a shorter period. which is connected with the unstable situation in the national economy of the Republic of Moldova and the numerous risks associated with the situation of instability and uncertainty.

Another important aspect in the analysis of leasing activity is the beneficiary of this business. Republic of Moldova records the following three categories of beneficiaries: enterprises and organizations. financial institutions. individuals.

Table 4. Value and structure of leased fixed assets in terms of beneficiaries

Categories of beneficiaries	Average on years		
	Ist period 2007-2009	IInd period 2010-2012	IIIrd period 2013-2015
Enterprises and organizations. mln. lei	476.0	387.1	619.5
mln. USD	41.8	28.8	42.5
Financial institutions. mln. lei MD	4.2	1.2	1.3
mln. USD	0.4	0.1	0.1
Individuals. mln. lei	400	341.1	478.7
mln. USD	35.5	28.3	32.7
Total leased fixed assets. mln. lei	880.4	729.5	1099.0
mln. USD	77.7	60.6	75.2

Source: developed by the author on the basis of data from Statistical Yearbook

Data presented in Table 4 show that slightly more than half of beneficiaries (54.1% in the first period. 53.1% in the second period and 56.4% in the third period) are economic entities in the sphere of production and provision of services. This category is

followed by the category of individuals with respective shares by periods - 35.5%. 28.3% and 32.7%. There is a downward trend in the share of individuals as recipients of funding through leasing. So. there is decreasing the share of consumer leasing. which is used by individuals by buying vehicles through leasing.

In 2015. the value of leased fixed assets amounted for 1,089.2 mln. lei or 60.1 USD. In the last three years leasing companies were facing more difficulties. but still the most important have finished the management year with profit.

According to the opinions of leasing market participants. companies have adjusted their activity to the situation of significantly decrease in the demand for leasing services by issuing pricing policy. Leasing companies have lowered interest rates. If 3-4 years ago the interest rate was set at 13-14%. in the last period of study it decreased to 7-11%. This step was made by leasing companies. which are credited from the foreign market. Besides this. leasing companies began to provide other services - such as microfinance. This diversification has allowed companies to offset the decreasing demand for leasing services (Covalenco I.. 2017) [4].

At the present stage. five largest leasing operators are working on the leasing market: "Total Leasing" – that holds 21.4% of the total volume of this market; "BT Leasing MD" - 16%. "Capital Leasing" - 11%. "Finance Leasing Company" - 11% and "MAIB Leasing" - 11%. These five companies occupy 72.2% of the total value of leased fixed assets.

Overall on financial market. companies that have access to cheaper sources of external financing survive more easily. But the crisis situation in the banking system in the country does not allow foreign creditors to lower interest rates on borrowed capital by leasing domestic companies. as country risk is high.

In order to overcome the crisis situation. leasing companies hope for collaboration between participants of the leasing market. The major operators consider the need for a joint management of this market. In this context. an associative form of leasing companies occurs that will promote the interests of leasing companies. Currently. four companies have entered into this association - MAIB Leasing. Total Leasing. Raiffeisen Leasing and Ezpress Leasing. At present time. lease is less agreed compared to bank credit because it depends on percent calculated from the value added tax. Reserve capital formed by leasing companies to ensure risks is a deductible value for tax purposes and is established at a rate of 5%. while in crisis situations. formation of reserves should correspond to actual risks. (Covalenco I.. 2017) [4].

CONCLUSIONS

In the last three years (2013-2015) there is recorded a slight increase in the value of leased fixed assets.

Consumer leasing prevails, which ensures the beneficiaries – individuals, the possibility to buy easier the means of transport.

Leasing companies strive to reduce the interest rate as much as possible, and most successful are companies that have access to cheap financial resources from the external market.

Given the great needs in performant fixed assets by the domestic producers, we believe that leasing activity has prospects of development in the Republic of Moldova.

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CROSS BORDER COOPERATION: ROMANIA - BULGARIA

Cristiana SIRBU

University of Agricultural Sciences and Veterinary Medicine, 59 Mărăşti, Sector 1, 011464, Bucharest, Romania, phone: +40 740 055 221, fax: + 40 251 411 300/ +40 31 107 27 64, Email: cris_sirbu@yahoo.com

Corresponding author: cris_sirbu@yahoo.com

Abstract

The paper aimed to present the European territorial cooperation with an important role in removing obstacles and stimulating cross-border cooperation. More than a third of EU citizens live and work in border regions of Europe. Borders have an impact both directly and indirectly on their lives. Euro-regions consist of sub-regional cooperation which contributes to the development of economic and social cohesion of the geographical border areas including administrative units in neighbouring states and non-EU states. Cooperation in this framework is to create permanent direct links between regions and communities on either side of the border state under the powers of local authorities and in accordance with national legislation.

Key words**:** *cross-border, cooperation, opportunity, communities*

INTRODUCTION

More than a third of EU citizens live and work in border regions of Europe.
Borders have an impact both directly and indirectly on their lives.
European territorial cooperation has an important role in removing obstacles and stimulating cross-border cooperation.
Although relatively few have a budget, Interreg projects have been countless concrete achievements for citizens in various areas, including border security, transportation, education, energy, health, training or job creation.
In the 2014-2020 period, over € 10 billion will be invested in the cooperation between regions, of which approximately EUR 6.6 billion will be directed to border regions.
This should ensure maximum impact and use the more effective investment.
However, a significant economic potential remains fruitless in border areas because of a lack of confidence or even the existence of negative attitudes among neighbouring countries.

MATERIALS AND METHODS

Promoting cross-border cooperation through Euro-regions is based on:

-increasing trust and tolerance, understanding and good neighbourly relations, especially in border regions where minorities exist;
-improve the efficiency and service delivery to citizens through the association of public and private facilities and services on both sides of the border;
-managing issues involving accountability, coordination and joint actions environmental protection, reducing vulnerability to natural disasters or man, etc;
-co-ordination of mutual interest, such as those in the field of regional planning, urban and rural development, flood protection;
-CBC setting bodies to ensure that cross-border relations are sustained and improved.
Program fosters the creation of sustainable and competitive communities by using a resource effectiveness, promoting profitable initiatives and opportunities offered by the development and horizontal cross flows in the corridor Danube / Black Sea.
The specific objectives of the programme are:
-improving the process of planning, development and coordination of cross-border transport systems in order to ensure better connections to the transport network TEN-T;
-increase safety on inland waterways and maritime transport;

Fig.1. Area of the Border Cooperation Programme between Romania and Bulgaria

-improving the sustainable use of natural resources and heritage;
-improving the sustainable management of ecosystems in the border area;
-improving risk management in the common border area;
-encouraging the cross-border integration in terms of employment and labor mobility;
-Cooperation increased capacity and efficiency of public institutions in the context of cross-border cooperation.
-Border Cooperation Programme between Romania and Bulgaria for the period 2014-2020 includes seven counties in eight districts in Bulgaria and Romania which are composed largely of municipalities.
The overall strategy of this program was formulated in direct response to the EU 2020 strategy for smart, sustainable and inclusive growth. In the EU 2020 strategy, the EU has set ambitious targets to be achieved by 2020 in five main areas:
-employment: 75% of people aged 20-64 to be employed;
-Research and development: 3% of EU GDP to be invested in research and development;
-climate change and sustainable energy: emissions of greenhouse to be 20% (or 30% if the conditions are right) lower than in 1990; 20% of energy to come from renewable energy sources, increasing energy efficiency by 20%;
-Education: reducing early school leaving rates below 10% and at least 40% of young people aged 30-34 years to complete their third level studies;
-Combating Poverty and Social Exclusion to be at least 20 million fewer people in or at risk of poverty and social exclusion.
-In addition, the program fosters the creation of sustainable and competitive communities by using a resource effectiveness, promoting profitable initiatives and opportunities offered by the development and horizontal cross flows in the corridor Danube / Black Sea.

RESULTS AND DISCUSSIONS

The transport system of the Romania - Bulgaria Cross Border Cooperation Programme region (CBC), which entails four modes of transportation- road, water, rail and air, suffers serious challenges.
First, there is almost no connectivity at a cross-border level and its connectivity with the TEN-T corridors is very low. There is no optimized system of connections between the different modes of transportation. Thus, the accessibility of the region to businesses and people is seriously limited.
Second, the road infrastructure is heavily used for transit and internal transportation, creating bottlenecks and reducing the efficiency of the freight and passenger transportation in the CBC region. The costs for the business as well as the transportation time are higher. This further poses traffic safety issues. Indeed, the number of traffic accident, including with fatalities is very high. The underutilized green transport results in higher carbon emissions in the target area. A new, flexible and with improved infrastructure and intermodal connections transport system is needed in the CBC area.
"The Ecological Initiative and Sustainable Development Group" is a partner in the project of cross border cooperation between Romania and Bulgaria, on the Priority Area 1 : A well connected region, "Investigation of opportunities for reducing the TEN-T network use within the cross-border region Romania-Bulgaria through optimization of the freight and passenger transport and the development of a joint mechanism for support of the intermodal connections".
The total budget of the project is 1,428,765.75 euro, from which ERDF 1,214,450.87 euro, contribution from the state budget (Romania and Bulgaria) 185,739.54 euro and 28,575.32

euro beneficiary's own contribution.
The project addresses the accessibility, efficiency, ecology and safety problems of the CBC transport system, improving the planning, development and coordination of cross-border transport systems for better connections with TEN-T network. This is done through investment in a common study, planning and adoption of strategic documents on the optimizing of the transport system through enhanced intermodal interconnections in the CBC area.
The main project objective is to significantly improve the planning, development and coordination of CBC transport systems for better connections with TEN-T network in CBC area.
The results of the Project: 1 preliminary study on intermodal nodes' current state and their capability to enhance the TEN-T network within the CBC area, 1 common strategy on TEN-T network enhancement through improving intermodal nodes' capacity.
The documents, produced in the scope of the project will be presented and handed to all the stakeholders- public authorities in change of transport planning and policy, transport professionals, businesses, non-governmental sector; to multiply the results of the project. The key stakeholders are involved in the development of the study and strategy in the scope of the project and, thus, they "own" the Project's results and are committed to adjustment of their transport planning and strategic documents to accommodate better solutions, related to the use of the intermodal node's capacity in the CBC region. Further, they can use the produced study and strategy, and invest in intermodal infrastructure and facilities. Stakeholders, national and local authorities, can use the elaborated common study and strategy to seek financial support from public, European or other, or private sources.
The project will contribute to the overall economic and social development of the cross-border area. Uninterrupted transport connectivity and communications are prerequisites for the socio-economic development of the CBC region. Smarter, faster, more secure and green transport infrastructure and communications are key preconditions for economic development. The project results: a common and better planning of the transport infrastructure, including strategic planning, and a joint mechanism for improvement of the use of the TEN-T infrastructure and networks through improved use of the intermodal nodes' capacity directly contributes to the development of the CBC region in the long term.

CONCLUSIONS

The main goal of the project is to significantly improve the planning, development and coordination of cross-border transport systems for better connections with TEN-T network. This is done through investment in the study, planning and adoption of strategic documents on optimizing of the transport system through enhanced intermodal transport connections in the CBC area.
The project will significantly contribute to socio-economic development in the target region, enhancing the region connectivity for businesses, communities and people, and of the green and smart transport systems. The project results affect positively the economy and trade in the cross-border region and create a better environment for local businesses and foreign investment. This will lead to a rise in business productivity and to economic growth.
The result will be smart and sustainable use of all modes of transportation and the intermodal nodes. The project will contribute to capacity building and cooperation of authorities and stakeholders.
The project will lead to a significantly enhanced use of the TEN-T system and the intermodal nodes in the target region. Thus, it will contribute to the sustainable development of the region in the form of long-term increase the productivity, revenues, and European development of the CBC region.

ACKNOWLEDGEMENTS

After the successful implementation and reporting of this project, the beneficiaries will use the accumulated experience and

competences to apply for financing under the same scheme or other Programmes financed by the EU or other donors, thus aiming to build on, complement and multiply the results achieved by the implementation of the current project. The focus will be on projects, related to the transport connectivity within the CBC region as well as with the TEN-T infrastructure.

An immediate effect will be the continued cross-border cooperation and exchange of good practices between the all the involved groups e.g. public authorities, scientific communities, spatial developers and others.

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TOMATO MARKET TRENDS IN ROMANIA

Elena SOARE[1], Irina-Adriana CHIURCIU[1], Livia DAVID[1], Iuliana DOBRE[2]

[1] University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax: +40213182888, Emails: economiegen2009@yahoo.com, irina.chiurciu@yahoo.ro, livia_david@hotmail.com
[2]Academy of Economic Studies, Bucharest, 5-7 Mihail Moxa Street, District 1, 010961, Bucharest, Romania, Phone: +40213119790/112, Email: iulya_dobre@yahoo.com

Corresponding author: economiegen2009@yahoo.com

Abstract

The paper presents the main trends on the tomato market in Romania during 2008-2015. Tomatoes have a particular importance for the human consumption because they can be eaten fresh and on the other hand they are processed in a variety of canned foods. In order to clearly highlight the trends on the tomato market, the analysis was carried out at both national and macro regional level. A number of indicators specific to the tomato market have been analyzed, such as: tomato-cultivated are, tomato production, average yield per hectare of tomatoes, average purchase prices for field tomatoes, consumption of tomatoes. The amount of tomatoes purchased by a household; Imports and exports of tomatoes. The tendencies on the national tomato market were revealed by the quantitative analysis, which is focused mainly on the recorded fluctuations from one year to another. The data used in the paper was taken from the National Institute of Statistics and from other specialized sites.

Key words**:** *tomato, production, consumption, market, Romania*

INTRODUCTION

Tomatoes have a high prevalence in the world, coming from Peru, Central America and South America and Ecuador. In Europe, tomatoes have been grown since the 16th century. In Romania, tomatoes have been grown since the 19th century on small surfaces. The increase of tomato-cultivated areas in Romania was due to the growth in demographics and the growth of the urban population.

Tomatoes have a particular importance in human nutrition because they provide a variety of mineral salts, vitamins and vital water to function in normal human body parameters. According to the World Organization for Agriculture and Food (F.A.O), it is recommended to eat different vegetables depending by the age group. For consumers over 12 years old, 350g/day of vegetables are recommended. This consumption leads to an average annual consumption of 120 kg of vegetables.

Tomatoes are used for: fresh domestic consumption; Industrial processing in order to obtain the required products on the market and export. As far as the export is concerned, it was found that mainly the greenhouse tomatoes, the early ones, but also the industrialized products are desired for consumption [4, 5, 9, 11].

The vegetable market has a number of peculiarities, of which: the seasonality of production; Atomizing supply and demand; the seasonality of vegetable production; Poor marketing, etc [14]. The internal and external demand for vegetables has a permanent character, thus contributing to the growing interest of farmers in cultivating vegetables in protected areas.

MATERIALS AND METHODS

In order to accomplish this paperwork, statistical data were taken from the National Statistics and FAOSTAT. Several studies, magazines and specialized newspapers have been consulted for a more realistic analysis of the tomato market in Romania. The analysis of tomato market at national and Macro-Regional level was based on several specific indicators, such as: tomato-cultivated area; Total tomato production; Average yield per

hectare of tomatoes; Human consumption of tomatoes by social categories and by residence; Average purchase prices for tomatoes; The amount of tomatoes bought by a household; Monthly average spend per person for buying tomatoes by social and average residence categories; Imports and exports.

RESULTS AND DISCUSSIONS

The area cultivated with tomatoes is a key element that influences the production made by farmers on a national level. The area cultivated with tomatoes in the period 2008-2015, both at national level and also at Macro-Regional level, varied from one year to another (Fig.1). From the statistical data presented it is noted that the largest surface cultivated with tomatoes has been registered at national level in 2011 - 51,754 ha.

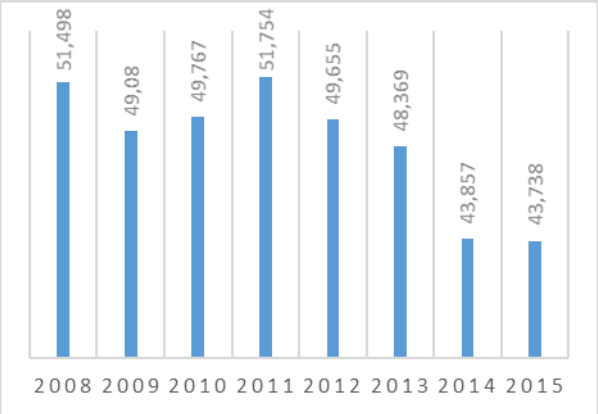

Fig.1. Dynamics of tomato areas at national level and macroregional level, 2008-2015 (ha)
Source: http://statistici.insse.ro/shop, 2017, [13]

On the opposite side, we find that the smallest area cultivated was of 43,738 ha (2015). In 2015, in Romania, a decrease in the tomatoes area (-15.1%) is observed compared to 2008. It can easily be noticed that, in Romania, the tomato teas are beginning to decrease, starting in 2012. This decrease in tomato areas was mainly due to the elimination of transitional payments. In this situation, farmers have reduced the areas cultivated with tomatoes. Cultivation of tomatoes involves high production costs, in a market economy where competition puts pressure, in order to decrease the selling price.

In Romania, in order to stimulate the growth of surfaces with tomatoes grown both in the field, but also in protected areas, financial support is granted [16]. In 2017, the financial support for tomatoes is a substantial one, of 3,000 euro/beneficiary/year, with a first condition, namely: the farmer has a tomato area in protected areas of at least 1,000 square meters [11]. At Macroregions level it is shown a variation of tomato areas from one year to the next.

Macroregion Two is on the first place at the macro-regional level, with regard to the area cultivated with tomatoes in the analyzed period. The largest area of tomatoes was in 2011- 17,951 ha. In 2015, the Macroregion Two accounted for 32.5% of the surface with autumn-grown national crops. On the opposite pole, we find Macroregion One, with the smallest areas cultivated with tomatoes. In 2015, this macro-region held a share of 15.8% of the area cultivated with tomatoes at national level. In 2015, all macroregions recorded a decrease in the areas under tomatoes, compared to 2010. The largest percentage drop occurred in Macroregion four (-24.1%).

Tomatoes production at national and Macro-Regional level, between 2008 and 2015, recorded variations from one year to the next (Fig. 2).

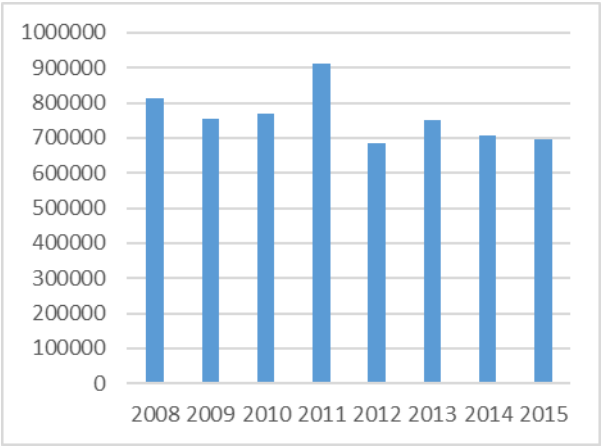

Fig.2. Dynamics of tomato production nationwide (tons)
Source: http://statistici.insse.ro/shop, 2017, [12]

In 2015, tomato production dropped by 14.7% compared to 2008. The largest national tomato production was in 2011 (910,978

tons), and the smallest vegetable production was recorded in 2012 (683,282 tons). Reducing tomatoes production has directly contributed to the increase in tomatoes [10] .
At the level of macro-regions it can be noticed that the tomato production registered the same tendency of decrease in 2015 as compared to 2008. The decrease of the tomato production was due to the less favorable climatic conditions and the decrease of the areas cultivated with tomatoes [5, 6].
The most significant tomato production is obtained in Macroregion Two. In this macro-region, in 2015, a production of 250,773 tons was obtained. Production in 2015 decreased by 7.4% compared to 2008. The largest production in this macro-region was 333,839 tons (2011). On the opposite side, the smallest production was 230,572 tons (2012). In 2015, Macroregion Two made 36.07% of the total national vegetable production. Macroregion Four is the second-largest producer of tomatoes. In 2015, in this macroregion, 25.19% of the national tomato production was obtained. The biggest production achieved was 241,906 (2011). Macroregion Three is in the third position, in terms of tomato production. The highest yield of tomatoes in this macro-region was 228,284 tonnes (2011).
Macroregion Three, in 2015, obtained 24.52% of tomato production in Romania. The smallest tomato production was obtained in Macroregion One. In 2015, this macro-region has produced 98,781 tons, which represented 14.20% of the national production. Unlike the rest of the macroregions that produced the largest production in 2011, the largest production in this macroregion was made in 2008 (123,676).
It is worth mentioning that in 2015 Romania achieved 2.6% of tomato production at the European Union level. The most representative countries in terms of tomato production are: Italy; Spain; Portugal; Greece; Netherlands; Poland and France [5, 6, 10, 16].
In the period 2008-2015, average production per hectare of tomatoes registered fluctuations from year to year (Fig.3). The highest average yield per hectare of tomatoes at national level was achieved in the year 2011 (17,602 kg / ha). In 2011, the largest national tomato production was obtained. In 2015, in Romania there was an insignificant increase in tomato production, with only 0.5% compared to 2008. In 2015, the highest average yield per hectare was registered in Macroregion Two (17,615 kg / ha).

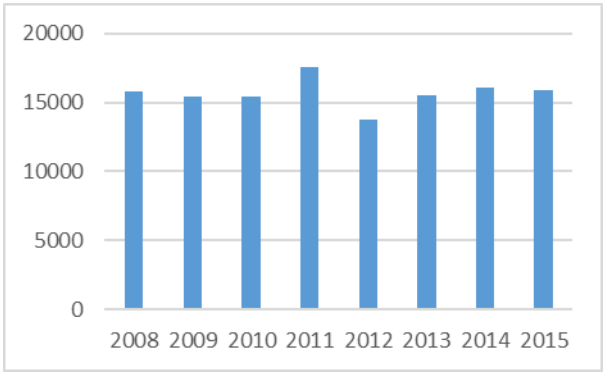

Fig.3. Dynamics of average production by hectare of tomatoes at national level (kg / ha)
Source: http://statistici.insse.ro/shop, 2017, [13]

In this macro-region the average yield per hectare of tomatoes registered an increase of 8.5% in 2015 compared to 2008. The lowest average productivity per hectare of tomatoes was registered in 2012 (17,602 kg / ha). The Macroregion Three ranks second in terms of production per hectare for tomato category. In 2015, an average yield per hectare of 15,436 (kg / ha) was achieved in this macro-region. In Macroregion Three, the average yield per hectare of tomatoes declined in 2015, by 5.6% compared to 2008. In Macroregion Four, the highest average yield per hectare of tomatoes was recorded in 16,028 kg / ha (2011). At macro-region level in 2015, the average yield per hectare of tomatoes decreased by 0.9% compared to 2008. Macro-region One recorded the lowest average yields per hectare over the analyzed period. The average yield per hectare of tomato grown in Macroregion One was 18,198 kg / ha (2011). In 2015, the average yield per hectare of tomatoes dropped by 5.9% compared to 2008. Mainly, the decrease in average yields per hectare was due to factors such as drought; Lack of irrigation and massive snowfall [7].
The average purchase prices for tomatoes registered fluctuations from year to year in 2008-2015 (Fig.4). From the data presented it can be seen that the highest average purchase

price was registered in 2012 (3.06 lei/kg). On the opposite side, the lowest purchase price for tomatoes was 0.98 lei/kg. In 2015, there was an increase in average purchases of tomatoes by 5.6% compared to 2008. Average purchasing prices are influenced on the one hand by the quantity of tomatoes offered by domestic producers and on the other by imports of tomatoes.

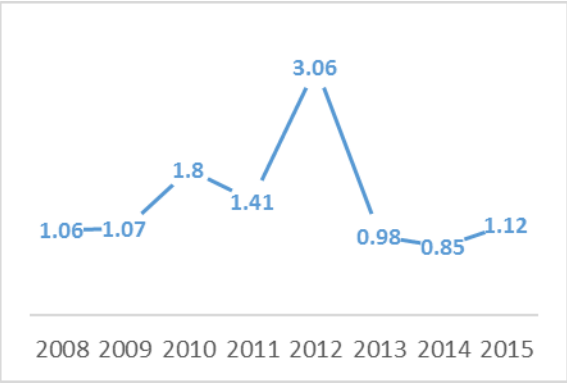

Fig.4. Dynamics of average purchase prices for tomatoes at national level (lei/kg)
Source: http://statistici.insse.ro/shop, 2017, [13]

Annual average consumption per capita in Romania has fluctuated from one year to the next (Fig.5). The highest annual average of tomatoes consumption per capita was recorded in 2008 (42.6 kilograms per capita) and the lowest was 35.4 kg/inhabitant. In 2015, the annual average consumption of tomatoes decreased by 9.4% compared to 2008.

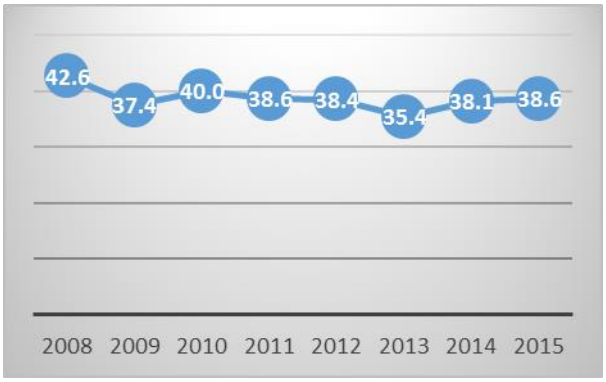

Fig.5. Annual average consumption of tomato per capita in Romania, 2008-2015 (kg)
Source: http://statistici.insse.ro/shop, 2017, [13]

Regarding the monthly average of tomato consumption per person, at national level and by residence area, it was found that it varied from one year to another (Fig.6). The highest consumption is registered in the urban environment as opposed to rural areas. The highest monthly average consumption of tomato per person in the urban area was registered in 2009 (1.284 kg / inhabitant), and in the rural area was 0.982 kg/inhabitant (2009).

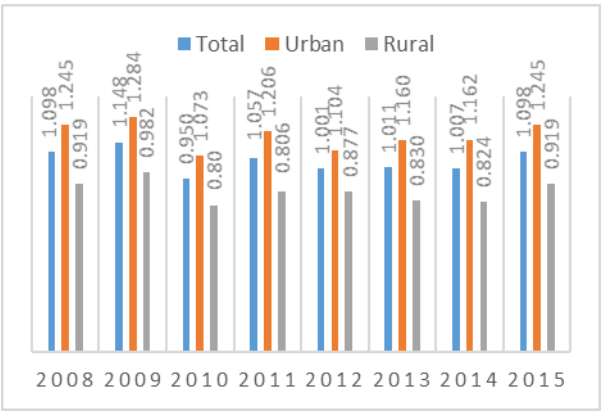

Fig.6. Monthly average consumption of tomatoes per person at national level and by residence area, 2008-2015 (kg)
Source: http://statistici.insse.ro/shop, 2017, [13]

The amount of tomatoes purchased by a household by residence area varied from one year to the next in the analyzed period (Fig. 7).

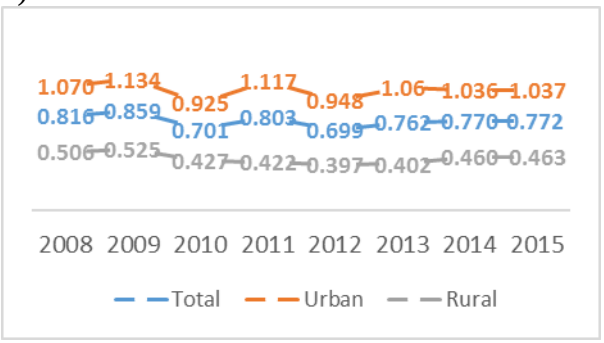

Fig.7. The quantity of tomatoes purchased by a household by residence area (monthly average per person - kg)
Source: http://statistici.insse.ro/shop, 2017, [13]

In 2015 there is a decrease (-5.4%) of the tomatoes quantity purchased at national level. The biggest quantity of tomatoes purchased was recorded in 2009 (0.859 kg), and the lowest was 0.699 kg (2012). From the data presented, it can easily be noticed that the situation in the residence area is different. In the urban area, the amount of tomatoes purchased by a household is definitely

superior to that purchased in rural areas. This is explained by the fact that part of the rural population produces in their households the tomatoes required for consumption. In winter, when imported tomatoes are generally eaten, rural households buy a small amount of tomatoes because of high prices for the category of tomatoes and, on the other hand, the small incomes of these households. In 2015, in the urban area, there is a 3.1% decrease in the quantity of purchased tomatoes. This decline can also be explained by the fact that consumers in the urban area acquire other categories of imported vegetables. In rural areas, in 2015, the amount of tomatoes purchased by a household accounted for only 44.6% of the amount purchased by the urban population. The smallest amount of tomatoes purchased by a household was 0.397 kg (2012), and the highest was 0.525 kg.

Monthly average spends per person for tomato purchases at the national and resident levels recorded fluctuations from one year to the next (Fig.8).

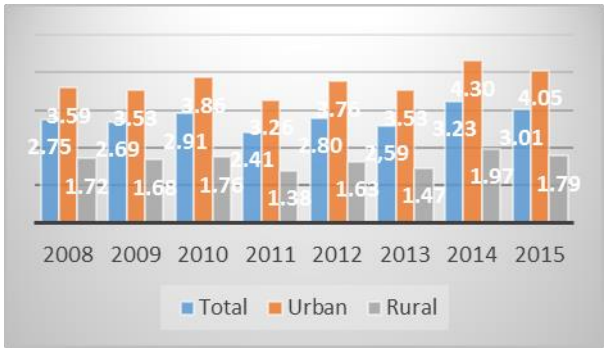

Fig.8. Monthly average expenses per person for buying tomatoes by residence area (lei)
Source: http://statistici.insse.ro/shop, 2017, [13]

At national level, the largest expenditures were recorded in 2014 (3.23 lei). In 2015, the monthly average expenses per person for the purchase of tomatoes grew by 9.4% compared to 2008. During the analyzed period the lowest monthly average expenses for the purchase of tomatoes were recorded in 2011 (2.41 lei). These small expenses recorded in 2011 were possible due to the large supply of tomatoes at low prices. According to the published statistic data, in the urban area, the average consumption per person for the purchase of tomatoes is much higher than in rural areas. Large urban spending is mainly due to the fact that they buy predominantly tomatoes on the market. In 2015, in the urban area, the monthly median spending per person for tomato purchases increased by 12.8% compared to 2008. In the rural area, the average monthly expenses per person for the purchase of tomatoes accounted for 44.1% of those made in the medulla urban. Most expenditures were recorded in 2011 (1.38 lei) and the highest were 1.79 lei (2015).

Import values for the category "Tomatoes prepared or preserved otherwise than in vinegar or acetic acid" have recorded variations from one year to the next (Fig.9).

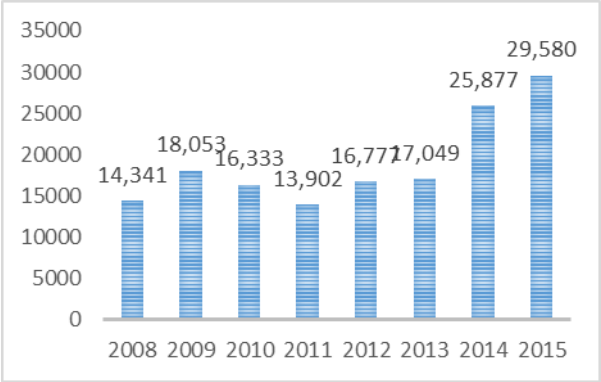

Fig. 9. Imports for the category "Tomatoes prepared or preserved other than in vinegar or acetic acid" (thousand Euros)
Source: http://statistici.insse.ro/shop, 2017, [13]

The largest value imports were recorded in 2015 (29,580 thousand Euros). On the opposite, the lowest value imports were registered in 2011 (13,902 thousand Euros). In 2015, value imports increased by 106.2% compared to 2008.

Value exports for the 'Tomato, fresh or chilled tomatoes" category recorded oscillations during the analysis period (Fig. 10). In 2015, value exports increased by 124.4% compared to 2008.

The smallest value exports were registered in 2008 (433 thousand Euro), and the highest ones value exports were recorded in 2012 (2,362 thousand Euro).

The exports and imports of tomatoes during the analyzed period have varied from one year to the next (Fig.11).

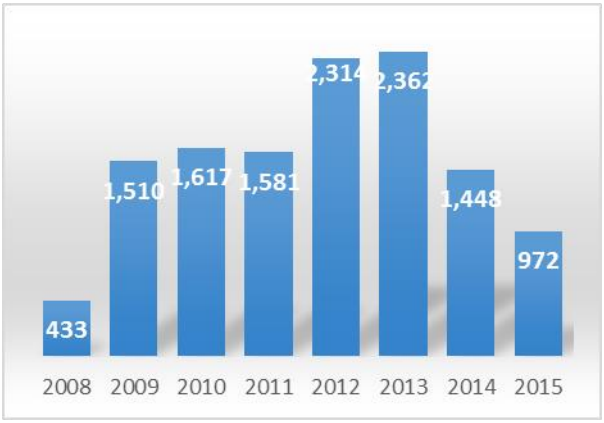

Fig. 10. Value exports for "Tomatoes, fresh or chilled" (thousands of euros)
Source: http://statistici.insse.ro/shop, 2017, [13]

Quantitative tomato exports increased from 694 tonnes (2008) to 4 421 tonnes (2015). The largest quantity exported from the analyzed period was recorded in 2014 (16,470 tonnes).
In terms of quantitative imports of tomatoes, they were clearly higher than quantitative exports.

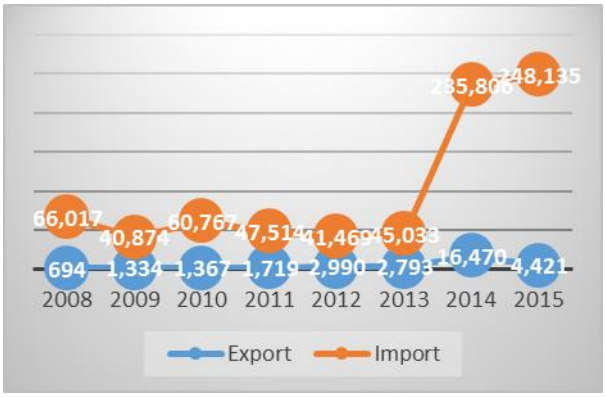

Fig. 11. Dynamics of Romania's tomatoes imports and exports during 2008-2015 (tones)
Source: http://statistici.insse.ro/shop, 2017, [13]

The most significant amount of tomatoes imported was in 2015 (248,135 tonnes), and the smallest imported quantity was registered in 2009 (40,874 tonnes).
In 2015, the quantity of tomato imports increased by 275.8% compared to 2008. This increase in quantitative imports was due, on the one hand, to the decrease in domestic tomato production and, on the other hand, to the consumption of tomatoes in the winter / spring production is greatly diminished.
The Romanian vegetable sector contributes to ensuring the food security and safety of the population, and for this reason there is a need for a consolidated system [2].
This association between producers would lead to easier access to European funds.
These funds would give the possibility to realize investments in the vegetable sector [3].
Starting from 2017, the state will grant an aid for tomato cultivation in protected areas, amounting to 3000 euro/ year [8].
This aid is to ensure the consumption needs from the domestic production. The aim is also for:
• increasing the quality of products;
• increasing economic efficiency on chain (production and valorization)
• Increasing competitiveness.

CONCLUSIONS

This research shows that Romanian tomatoes market has multiple weaknesses. In the analyzed period (2008-2015), the area cultivated with tomatoes and production decrease. Regards from area decreased in 2015 with 15.1%.
Also, total tomatoes production decreased with 14.7% and average production registered the same trend. The most significant average production per hectare of tomatoes was obtained in 2011 (17,602 kg / ha).
This made to increase quantitative imports of tomatoes and to decrease exports. As a result the highest average annual consumption per capita of tomatoes was achieved in 2008 (42.6 kilograms per capita).
The highest average annual per capita consumption was recorded in urban areas as opposed to rural areas. The quantity of tomatoes purchased by residential household has recorded oscillations by year to year.
Also, the highest average price was registered in 2012 (3.06 lei / kg). The average monthly expenditure per person for the purchase of tomatoes increased by 9.4% in 2015 compared to 2008.
The highest value imports were recorded in 2015 (€ 29,580 thousand) for the category "Tomatoes prepared or preserved otherwise than in vinegar or acetic acid" and the exports for the category "Tomatoes, fresh or chilled" recorded variations. In 2015, value exports increased by 124.4% compared to 2008.

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INDICATORS WHICH MEASURE A LEVEL OF SIGNIFICANCE OF AGRICULTURE IN SERBIA

Jonel SUBIĆ[1], Biljana GRUJIĆ[1], Marijana JOKSIMOVIĆ[2]

[1]Institute of Agricultural Economics, 11060 Belgrade, 15Volgina Str., Serbia, Email: jonel_s@iep.bg.ac.rs, biljana_g@iep.bg.ac.rs
[2]John Naisbitt University, 11070 Belgrade, 8 Boulevard Marsala Tolbuhina, Serbia

Corresponding author: jonel_s@iep.bg.ac.rs

Abstract

Although agriculture is a significant activity for every country, many are frightened out of being engaged in this activity, due to insufficient importance given to it. This paper will show three indicators, by which can be measured the significance of agriculture for a certain country, and these are: the share of rural population in total population, the share of employed population in agriculture in total number of employees and the share of agriculture in creating a gross domestic product (GDP). It's also an important indicator of agricultural share in foreign trade exchange. The obtained data will be shown for the period 2012-2015 and commented in accordance with the obtained values. Processed results did provide the following results (the change index 2015/2012): the share of rural population in total population was decreased for 2.5 percentage points (p.p.), the share of population employed in agriculture in total number of employed population was decreased for 2 p.p., while a chain index of GDP share in agriculture is at extremely low level and in the year 2015, in regard to the year 2014, was lower for 7.5 p.p. Declining values of indicators only point out to a low level of significance of agriculture for Serbia, which is characterized by favourable natural factors for farming. An indicator „the share of agriculture, forestry and fishery in total export of Serbia" is the only one which records the increasing values in the period 2013-2015 for 1.2 p.p., but in regard to the initial year 2012, is yet lower for 1.5 p.p. The conclusion is drawn, by using the mathematical-statistical methods and research methods, that agricultural activity for Serbia is not sufficiently important.

Key words**:** *agriculture, GDP, rural population, indicators, export*

INTRODUCTION

Three quantitative indicators were shown in this paper: the share of rural population in total population, the share of employed population in agriculture as an activity in total number of employed population and the contribution of agriculture in the creation of GDP. Equally important for a country is the export structure of agriculture and food industry and the share in total export of a country. These indicators can help to determine how farmers and the state attach importance to this activity, which there are favourable conditions for.

Agriculture is a traditional economic activity that people have been engaged in since olden times, and at the same time the only activity which have implied the performance of production process. Over time, it has become significantly important, the most important economic branch. Nowadays it is a very significant field of production with the fact that it is significantly modernized, and doing business is made easier by the introduction of a modern technical-technological process of production.

Census of Agriculture, which was conducted in Serbia in the year 2012, has only determined a fact on its underdevelopment and neglect. It is obvious that plots are fragmetized, holdings are old people's, 1-2 elderly members live in them, and there prevail family agricultural holdings.

Only 0.5% of a total number of holdings is holdings of legal entities and entrepreneurs. According to a legal form, there are the most of limited liability companies 34%, entrepreneurs 16% and agricultural cooperatives 13% (SORS, 2013) [7].

The author Bogdanović M. (1967) [1] considers that the significance of agriculture decreases with the development of economy. More specifically, underdeveloped economy of a country implicates a high percentage of rural population, population employed in

agriculture and a high percentage of agriculture in the creation of GDP and *vice versa*.

The obtained results show that agriculture for Serbia is not a significant activity, because there constantly decreases a number of rural population, population employed in agriculture, while the share of agriculture in the creation of GDP varies permanently.

MATERIALS AND METHODS

The following indicators were used for the analysis of indicators, for measuring the significance of agriculture for a country: total number of population, total number of agricultural population, total number of employed population, total number of population employed in agriculture, contribution of agriculture in the creation of the GDP, total export and import, the share of agricultural activity in total export and import, as well as the balance of foreign trade exchange of agriculture and food industry. There was also analysed the share of rural population in total population, the share of rural population employed in agrarian sector in total number of employees.

The analysed indicators were collected for the period 2012-2015 by searching the internet, journals and other professional publications Data were collected from the Statistical Office of the Republic of Serbia [5,6,7,8,9,10,11,12,13,,14,15,16], and there were used publications issued by the relevant financial institutions, and some calculations were done by the authors and represented graphically and/or tabulated.

RESULTS AND DISCUSSIONS

Considering that the Republic of Serbia is predominantly an agricultural country, of particular importance is the accession to the European Union (EU) in order to ensure the additional financial support. First of all, it has to adjust its agricultural policy to the EU agricultural policy (*CAP – Common Agricultural Policy*) [2].

Agriculture and rural development (as a particular section) is the most demanding section for Serbia, since regulations that regulate this field represent almost one third of all EU regulations. These regulations imply all issues related to subsidies for farmers, marketing and sale of agricultural products. The regulations also refer to legislation in the field of protection of geographic origin and the production of traditional products[2].

During the screening, several very important problems were identified. Probably the most important adjustment to the EU practice concerns the issues of farmers' subsidies, which in EU implements at regional level and is very complicated regarding its structure, while it identified different categories of aid recipients, as well as the conditions under which they can get an aid. During the screening, a special attention was paid to the explanation of innovation introduced with a reform, which was very important for Serbian delegation, since Serbia will have to transfer them completely into Serbian legislation and include them in its practice before it accesses the EU. As an especially prominent issue within the screening imposes the issue of environmental protection standards in the sector of agricultural production, which has become a strict condition in order to receive subsidies.

First indicator for measuring the significance of agriculture for a certain country is a ratio between total and rural population. These indicators trend will be shown by a chain index. These indicators record an inter-annual decline in both categories (Table 1).

Table 1. Chain index changes of total and rural population in Serbia (2012-2015)

Description	2012	2013	2014	2015
Total population	-0.5	-3.4	-0.3	-0.3
Rural population	-1.8	-7.2	-1.6	-1.2

In the year 2012, an inter-annual rate of changes in the total population was decreased for 0.5%, then in the year 2013 an additional decline was 3.4% in regard to 2012, while in 2014 and 2015 this indicator was stagnated (constant decline of 0.3%).

[2]http://europeanpolicy.org/cinjenice-o-eu/institucije/180-dokumentacioni-centar/cep-pogled/418-poljoprivreda-u-srbiji-sta-mozemo-ocekivati-u-procesu-pristupanja-eu.html

In 2012, the inter-annual rate of changes in the total population was decreased for 1.8%, in the year 2013 was recorded the highest decline of 7.2% in regard to 2012, and in 2014 was decreased for 1.6%, i.e. for 1.2% in 2015. After the described inter-annual rate of changes in the total population also the share of agrarian population in the total population will be described (Fig. 1).

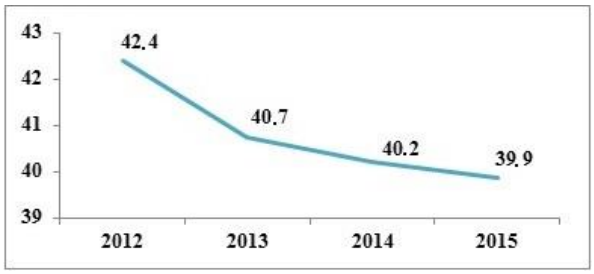

Fig 1. Share of rural population in total population in Serbia (2012-2015, in %)

The description indicates that the share of agrarian population in total population has decreased for 2.5 p.p. (percentage points), and more drastic decline was recorded in 2013 in regard to the year 2012 (value of 1.7 p.p.).
The second indicator implies the relation of totally employed population and the population employed in an agrarian sector. Variation of these indicators will be shown tabulated at the inter-annual level (Table 2).

Table 2. Chain index changes of employed population and total employed in agriculture in Serbia (2012-2015)

Description	2012	2013	2014	2015
Total number of employees	-0.5	-3.4	-0.3	-0.3
Employed population in agriculture	-1.8	-7.2	-1.6	-1.2

The inter-annual rates of changes in the total population record fewer declines in regard to the population employed in agriculture.
In the year 2013, the biggest decline of totally employed population was obvious (3.4%) in regard to 2012, while the decline in other years was ranged from 0.3% to 0.5%.
The highest decline of population employed in agriculture was recorded in 2013, and was amounted 7,2%. In other years, the decrease has ranged from 1.2% to 1.8%.
The next description (Fig.2) will show changes in the structure of population employed in agriculture in the total employed population.

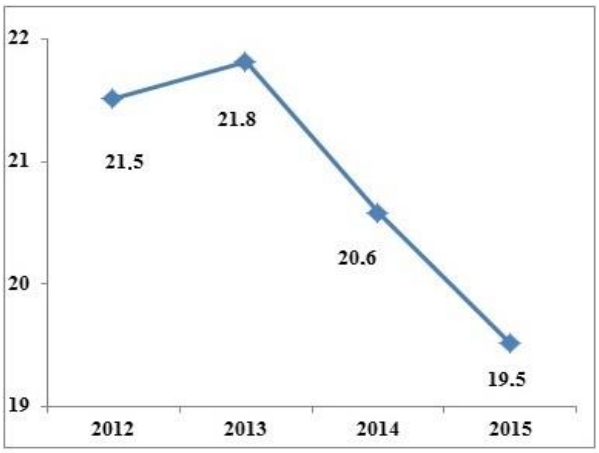

Fig. 2. Share of population employed in agriculture in total number of employees in Serbia (2012-2015, in %)

The description shows that the share of population employed in agriculture in the total employed population was decreased for 2 p.p. in the year 2015 in regard to the year 2012, and more drastic decline was recorded in 2014 in regard to 2013 in a value of 1.2 p.p.
The third indicator for the interpretation of agricultural significance is the contribution of agriculture in the creation of GDP value in agriculture.

Table 3. Chain index changes of GDP in agriculture of Serbia (2012-2015)

Indicator	2012	2013	2014	2015
GDP	-0.8	3.3	-2.0	0.9
GDP excluding agriculture	1.1	1.6	-2.5	1.9
Agriculture	-0.8	3.3	-2.0	0.9

There can be noticed, by analysing only one economic activity (Table 3), that this indicator has recorded also positive values (unlike the previous two, which has recorded only negative values).
After the decrease in agricultural activity contribution in the creation of GDP in 2012 in regard to the year 2011 (for 17.3%), the year 2013 was concluded with the sudden increase of 20.9% in regard to 2012. Slightly lower increase was recorded in 2014 in regard to 2013 for 2.0%, and in the year 2015 the decrease was for 7.5% in regard to 2014. Such large fluctuations point out to the significant share of agriculture in the creation of GDP value. Causes of these changes can be following factors[3]:

[3] Petrović, P., Brčerević, D., Minić, S. (2016): *Ekonomski oporavak, zaposlenost i fiskalna konsolidacija: pouke iz 2015. godine i izgledi za 2016 i 2017. godinu*, str. 8. [4]

-Drought in 2012 and 2015 have affected occassionally large decline of agriculture,
-Floods in 2014, which have led to the temporary decline in energy due to immersed coal mines.

For the year 2016 is planned that the contribution of agriculture to the GDP growth is going to be 0.8 p.p. Regarding that in 2015 the contribution of agriculture to the GDP growth was recorded the decline of 7.5%, there can be concluded that the planned shift in 2016 was satisfying. This positive trends can be assessed as a revival of agricultural production after drought in 2015. The decline of agricultural production in the GDP structure in 2015 in regard to 2014 has appeared due to the impact of drought on autumn crops, while the other sectors of GDP has left at the same level in regard to the year 2014[4].

Besides three mentioned indicators for the determination of level of agricultural significance in a specific country, there can also be helpful the share of agriculture in total foreign trade exchange and the structure of agriculture and food industry of a country (Tables 4 and 5).

The share of export within the agriculture-forestry-fishery (AFF) activity in total export has ranged from 5.9% in 2013 to 8.6% in 2012. It means that the export of AFF has decreased in the period 2012-2013, while since the year 2014 has recorded a constant growth. The share of AFF activity export in total export has ranged from 2.9% in 2013 to 3.2% in 2015. More accurately, in the period 2012-2013 this share has decreased, so it has recorded a minimum growth since 2014.

Table 4. Participation of agriculture, forestry and fisheries (AFF) in total exports and imports of Serbia (2012-2015, in %)

Year	Share of exports of AFF in total	Share of imports of AFF in total
2012	8.6	3.1
2013	5.9	2.9
2014	6.7	3.1
2015	7.1	3.2

[4] Foundation for the Advancement of Economics (2015): *Economic activity*, Quarterly monitor no. 43, October-December, 2015, p. 13. [3]

In regard that the share of export is higher than the share of import, there can be concluded that this activity records a surplus in foreign trade exchange, and thereby also contributes to equilibrium of balance of payments. In table 5 was given a description of trends of foreign trade exchange of agriculture and food industry of Serbia in the period 2012-2015.

Table 5. Chain index changes of foreign trade of agriculture and food industry in Serbia (2012-2015)

Indicator	2012	2013	2014	2015
Export of agriculture and food industry	21.0	-0.1	14.1	14.4
Total export of country	15.2	25.6	5.1	11.0
Import of agriculture and food industry	28.9	1.7	15.4	5.8
Balance of foreign trade in agriculture and food industry	12.6	-2.2	12.6	25.5
The share of exports of agriculture and food industry in total exports (in%)	5.0	-20.5	8.6	3.0

In the table we can see:

-Export of agriculture and food industry records a positive inter-annual rate of growth from 14.1% to 21.0%. The exception is the year 2013, when was recorded a minimum decline of export for 0.1% in regard to the year 2012,

-Total export of a country records the positive values that range from 11.0% in 2015 to 25.6% in 2013, or the increase of 14.2% on average annually,

-Import of agriculture and food industry records a positive inter-annual growth that records higher values than export, and it was approximately 13.0% annually. Surely, it is evident that it is about five times lower in 2015 than in 2012 (decreased from 28.9% to 5.8%),

-Due to significantly higher import than export of agriculture and food industry in 2013 in regard to other years, there was recorded the decrease of foreign trade exchange balance of agriculture and food industry for 2.2% in regard to 2012. The highest inter-annual growth was realised in 2015 and is higher for 25.5% in regard to the year 2014,

-Chain index of trends of agriculture and food industry export in the total export was achieved a significant decrease of 20.5% in 2013, in regard to the year 2012, while other years had the positive growth rates. For example, the growth of 8.6% was realised in 2014 in regard to 2013.

Taking into consideration all previously stated, there can be concluded that agriculture is an immensely important branch, which should be developed and modernized, because that is the only way to provide appropriate results.

CONCLUSIONS

Number of indicators for measuring the significance of agriculture is multiple for a country, but these have singled out as the most significant. Surely, each of them gives results that can be comparable and contribute in solving problems that can occur in agriculture.

The analysed indicators point out that agriculture is not sufficiently important for our country, although has all natural characteristics necessary for its performance.

An indicator „the share of rural population in total population“ shows a constant decline of the total rural population, which migrates to towns or leaves the country, because they can't see purpose in staying in the countryside and their engagement in agricultural production.

An indicator „the share of rural population employed in agriculture in the total number of employed population“ shows a decreasing trend, which means that decreasing number of rural population employs in this activity.

An indicator „the contribution of agriculture in the creation the GDP“ is the only indicator that was shown the significance of agriculture, the state realizes the contribution in the creation of the total GDP.

An indicator on the share of export and/or import in the total foreign trade exchange is equally significant. It is commendable that this activity makes a surplus, which was the lowest in the year 2013, due to import which was higher than expected.

Generally, it is necessary to make an effort and invest work in order to inform farmers on the significance of agriculture for every country.

Serbia awaits a very difficult process of adjustment, to which should be paid great attention first of all due to the economic significance of this sector. During this period of time, Serbia will have a chance to realize better its status in this sector and get specific advices in order to prepare for reforms as better as it is possible.

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DEVELOPMENT OF IMPLEMENTATION OF AGRICULTURAL INSURANCE IN TURKEY

Ayse TEKIN, Bahri KARLI, Mevlut GUL

University of Suleyman Demirel, Faculty of Agriculture, Department of Agricultural Economics, 32260, Isparta, Turkey, Email: prof.aysetekin@gmail.com, mevlutgul@sdu.edu.tr

Corresponding author: prof.aysetekin@gmail.com

Abstract

The share of the agricultural sector in employment in Turkey is 23%. Turkey is among the world's leading countries in the production of many agricultural products. In this respect, it has a great potential in terms of agricultural insurance. In 2005, in Turkey, "Law on Agricultural Insurances" was enacted with the law numbered 5363. In this 10-year period, premium production was realized as 5 billion Turkish Liras. The total number of farmers who have insurance in Turkey reached 2,031,061 in 2016 and the 316,000 damage file has been processed, 900 million Turkish liras were paid to the producers. In case producers have to insure agricultural insurance, the price they will pay per decare is 330 TL. These farmers will be able to pay close to 10 thousand Turkish liras in case of damage to their land. In this study, it was aimed to examine the agricultural insurance schemes existing in Turkey, the agriculture insurance pool system and the 10 years development under the law numbered 5363. In this context, the development of plant life, animal life, greenhouse, beekeeping, poultry life and aquaculture life insurance was examined. Proposals were developed for the producers to benefit more from agricultural insurance premium subsidies. Findings obtained from other studies related to the subject were also examined. In insurance premium subsidies, the innovations and objectives of the year 2017 implementations were also mentioned. In this system, 50% and/or 66.7% of the insurance premium is covered by the government as unrequited support. In total premium production in Turkey, there is a plant product insurance with a share of 28.0% at the maximum and an animal life insurance with a share of 20.8% in the second. The number of policies and insurance premiums increased by 27% and 32% respectively in 2015 compared to the previous year in Turkey. As of December 30, 2016, total premium production in Turkey has reached TL 1.3 billion. As of 2016, 2 million 470 hectares of land belonging to 562 thousand farms in 72 provinces were damaged from natural disasters. However, it is noteworthy that the ratio of insured farmers was between 10-20%. Therefore, it is necessary to increase the producers' regularly insured agricultural insurance rates. In this regard, actions are being proposed to increase awareness of more producers. In this way, there may be a minimum loss of producer income in the agricultural sector where risk and uncertainty are high.

Key words**:** *agricultural insurances, TARSİM, state supported agricultural insurances, Turkey*

INTRODUCTION

The agriculture which provided the indispensable lifestyles of life from the existence of mankind to today has been shaped by different forms of production at various periods and different strategies have been developed for this. Depending on these strategies, productivity has increased both in plant production and in animal production. The agricultural sector maintains its importance for every country in terms of ensuring community nutrition, contributing to employment, supplying industrial raw materials, increasing export revenues and contributing to the national economy, and is seen as an indispensable sector. Therefore, today the agricultural sector is seen as an indispensable sector for every country.

Agricultural production differs from other sectors due to dependence on natural conditions, discrete producing, seasonal characteristics, high risk and uncertainty, and limited control on production and agricultural market. Hence, it is more affected by both natural and economic risks and uncertainties. The main natural phenomena that cause uncertainty in crop production are drought, frost, fullness, storm and flood damage, and fire resulting from human neglect. In animal production, risks such as death, illness and accident are observed.

Measures must be taken against the risks and uncertainties faced by producers in both vegetable and animal production and the producers must be assured. Agricultural insurance is the basis of this insurance system. The agricultural insurance system aims to meet the losses of producers arising from risks and uncertainties.

In this study, the development of agricultural insurance applications in the world and Turkey was examined using primary and secondary data.

MATERIALS AND METHODS

The research material consisted of data compiled from secondary sources. The data taken from Agricultural Insurances Pool Operation Inc. (Tarsim) was included in the study. In addition, the Agricultural Insurance Pool's annual reports, work done by institutions and organizations related to the sector, personal interviews with employees working in the sector and national studies on agriculture insurances. The part of the research related to the world consists of the information obtained from scientific researches and activities related to the subject. The data obtained from Turkey in general could be taken over a period of 10 years between 2005 and 2016. Insurance values, damage assessment fees, premium production, number of insurance policies and number of insured persons were examined numerically in insurance branches. It was interpreted using simple indices with inter-period chain indices. Besides these, the shares of the branches in TARSİM were calculated and evaluated. The future goals of the sector for the future were also examined for 2017-2018.

RESULTS AND DISCUSSIONS

Agricultural Insurances in the World

In the face of risks and uncertainties, the most effective assurance system has been 'Insurance'. Insurance is born with the motivation to think of the living creatures themselves. Latin comes from the word "sicurta" meaning "assurance". It is possible to bring the emergence of insurance and insurance-like applications in the world to the Hammurabi Laws about 4000 years ago [10]. The contract, which was regarded as the first insurance policy, was carried out on October 23, 1347 and was organized to provide the burden of the "Santa Clara" ship to Italy from Genoa Harbor to Mallorca.

The first insurance company was founded in 1424, again in Genoa. In the following periods insurance and similar concepts have been developed and implemented in overseas countries such as maritime trade, sailing trade vessels, fire, traffic, individual accidents, trains, agricultural fields and engineering insurance with the development of the industry [7]. Among these areas, agriculture, which is one of the most important sectors of world economy; Natural, economic, social, political, technological, personal risks and uncertainties. These uncertainties cause producers to lose revenue, financial disturbances in agricultural businesses, and fluctuations in the national economy. That is why foreign countries have adopted the model of agricultural insurances in order to take measures against these risks and uncertainties.

In the modern sense, it started in Europe between 1770 and 1800, and for the first time, animal insurances in Ireland and fire insurance in Germany were made. However, in the first applications, although it failed, this system has been developed, implemented and applied in time depending on the types and scope of enterprises, economic development of countries, place and importance of agriculture in country economy [6]. The numbers of hazards covered by the insurance and the insurance technique have been determined by taking into consideration such factors as the degree to which the grown products are affected by natural risks, the frequency of natural risks, the amount of damage, [2]. Even some of the countries in the world, such as Spain, have come to the forefront and have been adopted by other countries. In the world, agricultural insurances are shaped as risk management models in the form of state insurance, private insurance and state-private cooperation, and these models are subdivided into programs such as single risk insurance, multi risk insurance, yield

insurance and income stability insurance.

Today, the US, Spain, Italy, Greece, Portugal, France and many other countries has the support of the state in agricultural insurance premium application. Agricultural insurance schemes are regulated by state support for premiums [8].

Agricultural Insurances in Turkey

The concept of "insurance" in Turkey passes for the first time in Anatolian Seljuk periods. A certain fee is taken from the caravans coming to the caravanserais and in case the caravans are subjected to any looting / theft, the loss is covered by the owner of the caravanserai. Care and protection of the caravans accommodating in this way was provided. At that time, the Anatolian lands provide security and are considered to be the starting point of the insurance [10].

It is observed that the first move in the field of agricultural insurance in Turkey started with the insurance of foreign insurance companies in Turkey at the beginning of the 1900's. Efforts to increase the efficiency of domestic capital have accelerated in the field of insurance as well as in other sectors with the declaration of the Republic of Turkey, and various institutions and organizations have undertaken various studies to develop the agricultural insurance program [4].

In Turkey, various practices of the government in this respect started in the period of Ataturk in order to compensate for the damages that the farmers would face in the face of the natural risks in agriculture and to help the farmers. Later, the first provisions related to the concept of agricultural insurance were found as agricultural insurances in the Turkish Commercial Code in 1926. At this time, some experts have examined applications in various countries. In addition, foreign experts have been brought to the country and reports on the possibilities of applying the agricultural insurance in Turkey have been prepared. In general, these studies indicated that agricultural insurance should be made by the state institution and that it is necessary to carry out compulsory insurance in fields where cotton, tobacco, grapes, etc., which are very important in terms of Turkey's economy [1].

In the first years of the Republic, T.C. Ziraat Bank has been working on agricultural insurance. The Ministry of Commerce prepared the "Draft Law on Agricultural Insurance" in 1940 and 1944 and this bill was replicated in 1952 and 1956 [2].

The first agriculture insurance policy was made by Sugar Insurance to sugar beet producers in 1957 as a crop product insurance policy. In 1960 Başak İnsurance started to carry out activities such as full herbal product (full) and animal life insurance, poultry life in 1984, aquatic life in 1990 and pilot region in grape vineyards in 1991. However, this system has not been successful due to the low income of the farmers, lack of information in the sector and the lack of state infrastructure for agriculture insurances for many years.

In 1987, under the heading "Agricultural insurance should be made agriculturists", it was worked for the explanation, introduction and dissemination of agriculture insurances in the framework of "Development Plan for Agricultural Insurances for Turkey" and preparation of a healthy agricultural insurances infrastructure for farmers. This work continued until 1995 [4]. In 1995, the Agricultural Insurance Foundation was established to aim at correct damage detection in the main purpose agricultural insurance, immediate payment of damages in real value to the farmers and establishment of a pool system [6].

In the framework of the "Agricultural Reform Implementation" initiated by the Ministry of Agriculture and Rural Affairs in 2000, the start of state-sponsored natural disaster insurance for agriculture is foreseen. In 2001, one of the two legislative measures preventing agricultural insurance in the framework of the program was abolished. The other, though in effect, was rendered inactive. In 2001, a preliminary study was initiated by one side to support the project "Agricultural Reform Implementation Project" with the World Bank loan. On the other hand, infrastructure works related to legal regulations were carried out [3].

Representatives of the relevant institutions have conducted reviews and evaluations of agricultural insurance in Spain, the United

States and Mexico to establish a viable agricultural insurance system in Turkey. As a result, a consensus was reached that the most appropriate model to comply with the Turkish conditions would be the Spain case [14]. As a result of the changes made in line with these targets, "Agricultural Insurances Law" numbered 5363 was accepted in Turkey on 14.06.2005 [12].

State Supported Agricultural Insurance Pool in Turkey (TARSİM)

In order to eliminate the grievances of the producers against the risks and to create a solution against the risks, the Spain Agricultural Insurance Pool model was taken as an example to establish the appropriate agricultural insurance system in Turkey. The foundation is a modern form of risk management built on top of the "agricultural insurance foundation". With the application of the pool in Turkey, catastrophic risks such as drought and frost that an insurance company cannot undertake alone can be covered. In addition, reinsurance capacity and coverage have been expanded by encouraging reinsurance participation. It is ensured that the information, personnel and financial resources of insurance companies are used more efficiently in common. It was aimed to increase the contribution of insurance to the state by preventing the unfair competition in the prices, using the premiums, excessive support of the damage more effectively [8].

This model is based on legal regulations, communiqués and instructions to encourage farmers to insure. The system has its own stakeholders, its corporate structure and a board of seven members. It has been decided that state support should be applied in two ways, as premium support and damage support. There is a condition to register in necessary institutions and institutions and insurance is based on volunteerism. In other words, the farmer is insured with his own expedition. In addition, all operations and operations of the Pool are carried out by a profitable "Joint Stock Company". This is a joint-stock company of insurance companies that come together with equal capital. This company is referred to as TARSİM or Operator Company. In the first years of implementation of the agricultural insurance, in 1963, there were two companies in Turkey that engaged in agricultural insurance. In the years when TARSIM was put into practice, the number of insurance companies has been fifteen. Later, during the periods when TARSIM's activity increased, the number of agricultural insurance companies increased to 24 (Table 1).

Table 1. Share of agricultural insurance companies in other companies in Turkey according to years

Years	Insurance companies	Agricultural insurance companies	Rate
1963	35	2	6
1973	38	3	8
1983	35	5	14
1993	38	14	37
2003	58	14	24
2004	56	13	23
2005	55	15	27
2006	55	16	29
2007	55	22	40
2008	58	23	40
2009	58	22	38
2010	59	23	39
2011	63	24	38

There are inspectors in the pool who perform risk assessment and damage assessment. From the system point of view; Insurance inspectors are always the most important stakeholder group, from the individual, face to face, with the farmer. This important stakeholder group should tell the truth to the producer and tell them, they should never make mistakes. The future of the system also depends on the correct and error-free operation of this group of stakeholders. This stakeholder group also serves the producers paid by the Agricultural Insurance Pool (TARSİM) for a certain fee and commission. Pool experts are needed every semester according to the increase in the number of policies between regions. According to this number, insurance inspectors are purchasing. Insurance experts are trained by the Insurance Training Center (SEGEM). As of 2016, the 17th training plan was made. In 2015, the number of experts reached 2,225 [13].

The Agricultural Insurance Pool and the operating company are controlled annually by the under secretariat of Treasury and all other transactions (administrative and financial) are

carried out by the Ministry of Food, Agriculture and Livestock.

In Turkey, in 2006 (crops, greenhouses, cattle life, poultry, aquatic life, small ruminant life, beekeeping), 3,672 producers made agricultural insurance. Producers have started to show interest in agricultural insurance with the introduction of new types of agricultural insurance and the effect of informing activities. With the increase of agricultural insurance types and the effect of information activities, the number of producers having insurance was reached 403,569 in 2016. In the last 10-year period (2005-2016), the number of insured producers increased by about 110 times (Table 2).

In Turkey, 83.26% of the numbers of farmers who have undergone agricultural insurance in 2016 are farmers who are engaged in crop production activities. Herbal product activity is followed by bovine life with 8.69%, small animal life with 2.97%, and greenhouse with 2.55% and apiculture with 2.47% (Table 2).

Table 2. Number of producers of agricultural insurance in Turkey

Branches	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Crop insurance	2,333	49,787	71,627	74,619	82,832	129,719	172,962	214,780	239,470	320,294	336,012
Greenhouse insurance	624	748	1,242	1,751	1,694	3,082	6,303	7,428	7,549	8,554	10,292
Cattle insurance	711	10,116	8,082	17,748	17,074	29,662	29,553	25,308	222,888	26,143	35,082
Poultry insurance	4	8	17	21	36	27	79	43	27	81	139
Aquaculture insurance	-	6	9	8	14	11	40	30	35	41	54
Sheep and goats insurance	-	-	-	-	-	1,701	6,315	8,033	9,788	11,837	12,004
Bee hive insurance	-	-	-	-	-	-	-	-	6,811	7,704	9,986
Total	3,672	60,665	80,977	94,147	101,650	164,202	215,252	255,622	486,568	374,654	403,569
Index (2006=100))	100	1,652	2,205	2,564	2,768	4,472	5,862	6,961	13,251	10,203	10,990

Source: TARSİM, 2017 [17]

In 2006, the number of policies that were cut off as guarantees of insurance coverage for producers was 12,252, but nowadays the number was increased by about 118 and reached 1,444,285. As the number of policies increases in Turkey, the number of insurance experts also increases. The state allocates a certain amount of premium to the annual Agricultural Insurances Pool for the budget. Farmers pay premiums according to the instructions to cover the insurance. The State and farmers paid TRL 4,447,303 in total in 2006. Today, this value was increased by 291 times to reach a premium production payment of 1,298,096,872 TRL The total amount of insurance that the insurance company has undertaken against the assets insured by the producers was 207,322,324 TRL in 2006. Today, this value was increased 111 times and reached 23,066,785,113 TRL. (Table 3).

Table 3. Agricultural insurance premium production, insurance value and policy number in Turkey

Year	Premium production	(%)	Insurance price	(%)	Number of policies	(%)
2006	4,447,303	100	207,322,324	100	12,252	100
2007	62,939,522	1,415	1,471,449,519	710	217,710	1,777
2008	100,063,129	2,250	2,236,288,884	1,079	262,202	2,140
2009	119,861,920	2,695	2,882,903,205	1,391	306,560	2,502
2010	187,504,736	4,216	3,968,434,248	1,914	366,603	2,992
2011	442,055,989	9,940	7,020,918,054	3,386	587,693	4,797
2012	499,379,139	11,229	9,424,334,436	4,546	743,692	6,070
2013	528,392,158	11,881	11,322,033,156	5,461	892,332	7,283
2014	682,906,490	15,356	13,847,363,096	6,679	1,086,595	8,869
2015	968,820,976	21,784	18,363,516,231	8,857	1,375,397	11,226
2016	1,298,096,872	29,188	23,066,785,113	11,126	1,444,285	11,788

Source: TARSİM, 2017

State Premium and Damage Increase Support

Premium Support

One of the most important reasons why government support is needed in agricultural insurance is that risks and premium prices are generally high. At the same time it cannot insure agricultural products, especially because small farmers suffer from the difficulty of payment. For this reason, the importance of state support in the amount of premiums paid by producers for the purpose of ensuring stability in producers' income and supporting the producer in the social direction arises in agricultural production. This support is indirectly funded by the government in accordance with the World Trade Organization (WTO) and European Union (EU) criteria. According to the Agricultural Insurance Law, part of the insurance premium to be paid by the producers is covered by the government. This allows producers to pay lower premiums and insure agriculture. The state provides 50%, 60% and 66,6% of support premiums at varying rates depending on the branches of agriculture insurance. Amounts of premium support to be provided by the government in terms of products, risks, regions and scale of enterprises are determined annually by the Council of Ministers with the proposal of the Pool Executive Board and with the approval of the Ministry. In 2006, Ministry of Agriculture allocated 200 million TRL premium budget for TARSİM. With this budget, the government paid a total premium production of 2.7 billion TRL over 10 years.

Damage Extra Support (Reinsurance Support)

It is very difficult to find reinsurance capacity in the insurance of the natural risks outside the hail in agricultural products. All insured risks incurred by the insurance companies are transferred to the pool. The pool is responsible for reinsurance agreements with national and international companies to purchase protection in connection with these risks. In case the protection provided from the national and international market is not sufficient or in case of extraordinary damage in case of extraordinary damage, the amount of additional allowance required by the decision of the Council of Ministers can be compensated by the state by transferring it to the Pool in the form of Damage Extra Support. As of 2016, the state has paid TRL 900 million in damages for 316 thousand damage files.

Types of State Supported Agricultural Insurances

Crop Insurance

Crop insurance started in 2006. A total of 211,854,304 decare crop farming area was available in Turkey in 2006. In 2006, 0.06% of this agricultural land was covered by crop insurance. The number of producers who had insurance in the first years started with 2,333 persons, and it increased by 144 times and reached 336,012 producers in 2016. The 10.67% of the total agricultural land is covered by crop insurance. Within 10 years, the area where the crop insurance was made within the total agricultural area reached 21,151,161 decares. As a result of this, the number of the area and the number of farmers who have insured crops for 10 years have increased.

Crop insurances' share of total premium production in Turkey was 75.26% in the year 2016. In this year, the amount of premium collected in the crop insurance was 977,007,569 TRL. The share of the crop insurance in the total insurance cost was 65.90% in the 2016 and 15,200,835,463 TRL was paid for the crop insurance. The share of the number of crop insurance policies in the total agricultural insurance policy was 94.62%. The number of crop insurance policies reached 1,366,548 in 2016. Crop insurances had the highest share within the total number of producers and total insurance cost. This trend continued for ten years.

Cattle Insurance

A considerable part of the agricultural population in Turkey earns its living from livestock farming. However, many producers are victims of natural risks such as theft, food poisoning, animal diseases, feed poisoning. Cattle insurance has been started for bovine producers in Turkey not to be a victim and to protect animals in 2006. There were a total of 10,971,880 cattle in Turkey in 2006. About

0.06% of these animals have cattle insurance. The number of producers who have insurance in the first year was 711 persons. This number increased by 49 times in 2016, reaching 35,082 producers. The 3,18% of the total cattle have cattle insurance. That is, at the end of 2016, the number of insured animals reached 17,891,240. As a result, the number of animals and the number of persons who have been insured for bovine animals increased during the ten year period.

The share of cattle insurance in Turkey's total insurance premium production was 18.10% and insurance premium of TRL 234,995,674 was collected in 2016 agriculture insurance. The share in total insurance cost was 14.93% and for cattle insurance amount was 3,443,177,922 TRL. The share of cattle insurance policies in the total agricultural insurance policy was 2.48% and today it has reached to 35,777 policies.

Sheep and Goat Insurance

Farmers who provide their livelihoods from small ruminant farming in Turkey are often victims of risk and uncertainty such as animal diseases, animal deaths caused by poisoning, sunstroke, theft. In order to eliminate these grievances, sheep and goat insurances in Turkey had been actived in 2011. There were 32,309,518 small ruminant animals in Turkey in 2011. About 0,2% of these animals were insured. So sheep and goat insurances started with insurance of a total of 6,355 breeders in the first year. This number increased 70 times in 2016, reaching 12,004 breeders. Small animal insurances were made for 1.99% of total small ruminants. At the end of 2016, the number of insured small ruminant animals rose to 1,122,002. Though small ruminant animals insurances are a new insurance in Turkey, the number of insured animals and the number of insured breeders increased during the periods examined.

In the case of 2016 agriculture insurance, the share of sheep and goat insurance in total insurance premium production was 2,12%. Premium production of sheep and goat insurance was 27,495,051 TRL. The share of total insurance cost was 2.44%. For sheep and goat insurance, 563,027,543 TRL was paid in 2016. The share of the number of sheep and goat insurance policies in the total agricultural insurance policy rose to 0.83% and the number of policies reached 12,027 breeders.

Greenhouse insurance

Climate conditions in some regions in Turkey are not suitable for growing every crop. Therefore, producers especially in the Mediterranean region, grow crops in the greenhouse. There are greenhouses and victims who suffer from various factors such as hail, frost, fire, car crash and snow weight. Greenhouse insurance began to protect producers from such risks in 2006. A total of 469,081 decares of greenhouse farming were available in 2006, in Turkey. The greenhouse insurance was made in 0.66% of the greenhouses area. The number of producers having greenhouse insurance started with 624 people in the first years. In 2016, the number of producers increased 164 times and reached to 10,292. The share of greenhouse insured area also increased to 9.02%. In other words, insured greenhouse farming reached 59,861 decares, and there has been a significant increase in the insured greenhouse area and the number of insured producers in this decade.

In greenhouse insurance, the share of premium production in total agricultural insurance was 3,67% in 2016 and a total of TRL 47,680,898 premium was collected. The amount of insurance paid for this accounted for 14.02% of the total insurance cost. In 2016 this value was 3,234,450,769 TRL. The share of greenhouse insurance policies in the total number of agricultural insurance policies was 1.36%, and the number of policies reached 19,649 in this type of insurance.

Poultry Insurance

Poultry insurance began in 2006. The number of producers having insurance was 4 in 2006. These number increased 34-fold and 139 poultry producers in 2016. In poultry insurance, the number of insured farmers increased in 10 years, although not so much compared to other types of insurance.

The share of poultry insurance premium production in total premium production was 0.11% and a total of TRL 1,470,483 was collected in year 2016. The share of the insured amount paid for poultry husbandry

insurance in the total insured amount was 0,4% and the poultry husbandry insured amount was 104,364,985 TRL in 2016. The share of poultry insurance policies in the total number of agricultural insurance policies is 0.11%. Poultry insurance policy number was 225 in 2016.

Bee hives Insurance

Bee hive insurance started in Turkey in 2014. Turkey had a total of 7,082,732 new and old hives in 2014. The share of the total number of beehives in the hive was 19%. Turkey's ratio of beehive insurance in the total number of generic hives increased by 25.10% and rose to 1,934,936 hives in 2016. In the year 2014, this number increased by 130 times in 2016 and reached 9,986 beekeepers.

In Turkey general agricultural insurance data, the share of bee hive insurance premium in total insurance premium was 0.45% in 2016. Beehive insurance premium was 5,548,962 TRL this year. The share of the insured amount paid for the bee hive insurance in the total insured amount was 1.89% and the insured amount of 435,381,265 TRL was realized. Beehive insurance policy number rose to 9,998 people. The share of beehive insurance policies in the total number of insurance policies was 0.60% in 2016.

Aquaculture insurance

Aquaculture insurance activity passed in 2007 in Turkey. The 174 decares were made to insure the aquatic products in 2007. The number of producers having insurance for the first year was only 6 persons. Only 590 acres of general aquaculture production area was insured in 2016, the number of insured persons increased 9 times and rose to 54 persons. During the 9-year adjustment period, there were no significant increases and remained below 1%.

According to the aquaculture insurance issued in Turkey, premium production of TRL 3,898,234 was realized in 2016. The share of the aquaculture insurance in total insurance premium was 0.30%. The share of insurance premium paid for aquaculture insurance was 0.37%. The price of aquaculture insurance was 85,547,166 TRL in 2016 and the number of policies rose to 61.

District-Based Drought Yield Insurance

This insurance provides insured against the loss of yield in the face of the catastrophic risks that occur in the whole district in the wheat crops produced in insured dry farming areas registered to the Farmer Registration System (ÇKS) in the provinces determined by the decision of the Council of Ministers in 2017.

There have been some studies on agriculture insurance in Turkey. For example, in Eraktan's [5] study, he took into consideration the data of 1960-1969, showing the importance of agricultural insurance in Turkey, the reasons for the need for agricultural insurances, the extent of the needs of the agricultural insurances applied and the applications in general. This research was one of the first studies in the field of agricultural insurance in Turkey.

Güngör [6] pointed out that the negative effects of natural risks on agriculture sector and economy could be mitigated by developing risk management systems and transferring risks to the global market. Güngör [6] stated that with these methods the income stability of the agricultural sector can be achieved and the contribution of the agricultural sector to the economy of the country can be increased.

Keskinkılınç [8] stated that the agriculture insurance system in Turkey had many problems. Some of these problems stem from insurance companies with insufficient resources, reinsurance and technical staff, some of them due to legal reasons and some of them due to insufficient state policies. But the most important problems are; He stated that the problems caused by the agriculture of Turkey and the economic problems related to it. He pointed out that catastrophic risks should be more focused on agricultural risk management programs, adding to increased participation in insurance programs and keeping farmers' premiums at a low level. Farmers who showed interest in the insurance also stated that they are generally commercialized agricultural enterprises.

Sumer et al. [11] reported that Turkey, along with TARSİM, has made a significant progress in agricultural insurance. They stated that this system encourages the producer to

produce and contributes to the provision of stable agricultural production. The more efficient and healthier the system was, the greater the involvement of the farmers in the system and the lowering of the premium amounts.

Kipkemoi [9] stated that the most important reason why farmers do not have agricultural insurance is that the coverage of insurance policies is narrow. The author listed as lack of confidence, lack of understanding of the insurance policy, intense bureaucracy, lack of information about insurance coverage, high premium price, farmers' limited agricultural land availability and long waiting time for compensation as other factors preventing the extension of agricultural insurance. The author determined that about half of the farmers are willing to pay for the agricultural insurance policy. According to the author, the provision of publishing services to farmers on agricultural insurance could accelerate the adoption and dissemination of agricultural insurance. In addition, the author informed that the content of the insurance policy should be revision; the interest of the farmers to the agricultural insurance may increase with the reduction of the bureaucracy. He pointed out that focusing on farmers who are more agricultural land of their training and publishing work, may increase success.

CONCLUSIONS

In this study, evaluations were made about the recent developments of agricultural insurance in Turkey. In Turkey, agriculture insurance has a ten-year young infrastructure. Today, climate change and risk / uncertainty conditions in Turkey can aggriate the agricultural sector. Especially in recent years, the damage caused by natural risks has increased. In 2016, 7,270 provinces in Turkey and 562,000 farmers in 530 provinces were affected by natural disasters. In 2016, an increase of 105.00% in the agricultural insurance policy, 109.75% in the insured land, 123.21% in cattle insurance, 122.10% in the greenhouse and 119.67% in the insured hive were detected as compared to 2015. In addition, in the face of these and similar risks, producers secure both their products with TARSİM and they also get credit by pledging their fruit trees / animals. As a result, it can be said that the diversification of agricultural insurance and awareness of farmers in Turkey will lead to more application areas of agricultural insurance. TARSİM is shown as an exemplary application not only in Turkey but also in the world. The example of the existing agricultural insurance in Turkey is also being applied by some countries in the world. It has been observed that the agricultural insurance system implemented by TARSİM in Turkey is now successful and that more farmers are benefiting as a result of increasing demand applications every year.

At the time of the TARSİM period, the agricultural insurance system was started with 4 branches first, this number was removed from the 7th and 8th branches in time. In February 2017, wheat drought yield insurance was initiated to eliminate the grievances of producers in grain breeding. For the year 2018, a target including all grain groups was reported. In addition, in the year 2017 crop product insurance, fruit trees grown outside the fruit, quality losses due to cherry rains and grape leaves in vineyards were secured. Furthermore, in 2018, it is planned to implement income stability insurance for the producers and studies are being made in this regard.

The structural features of the agricultural enterprises and the characteristics of the operators are the most important handicap in the development of the agricultural insurance in Turkey. At this point, the greater awareness of the agricultural insurance system and the transfer of its benefits to the producers may be effective in eliminating this handicap.

In addition, with increasing agricultural insurance diversification and government support, it is anticipated that the number of insurance applications and the transaction volume will expand further in the agriculture sector in the coming years.

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MANAGEMENT OF ENHANCING THE EFFICIENCY OF INVESTMENT USE IN THE AGRICULTURAL SECTOR FROM THE REPUBLIC OF MOLDOVA

Elena TIMOFTI, Aliona ȘARGO

State Agrarian University of Moldova, 44 Mircesti St., MD - 2049, Chisinau, Republic of Moldova, phone: +373 767 15 222, Fax: (+373 22) 31-22-76, E-mail:e.timofti@uasm.md
Phone: (+373)069232743; E-mail: alionasargo@yahoo.com

Corresponding author: alionasargo@yahoo.com

Abstract

The need for funding of the agricultural sector in recent years is growing in the situation when agricultural enterprises are consolidating in order to sell the produced products on domestic and international markets. On the one hand, there is a trend of land consolidation, and on the other hand, farmers want to buy all the tools and equipment necessary for carrying out their business. Heavy investments are made in inputs (quality seeds, fertilizers, animal varieties and breeds with high efficiency, etc.) and how these are mostly imported at world prices, the need for further funding increases. All these lead to the continuous growth of the need for financial resources. Another problem lies in the inefficient management of funding sources. With increasing investment in agriculture, Republic of Moldova faces constraints of implementation capacity. The research purpose is to analyze the efficiency of investment in agriculture and to determine the optimal level of investment for 1 ha of agricultural land.

Key words**:** *development, economic growth, agricultural sector, investment, productivity*

INTRODUCTION

The role of investments is very complex in the economic development of a country, because they influence ownership structures, economic structures on branches and sub-branches, technological structures, employment structures, influencing the pace of development of the country.

In this respect, P. Drucker, mentions on the relationship between innovation, production and market demand; specifically it is that innovation will lead to changes in the production structure which, in turn, lead to changes in the structure of demand for goods and services, and these in turn, draw after them changes in the market structure in the sense of the emergence of new markets, new products [Drucker, 1993] [3].

Formation of the first principles of the theory of investment is related to mercantilist school: Tomas Mun, J.B. Colbert, J. Behera, F. Gorniga. They examined the capital as an outstanding source of investment resources, which improves production volume. Mercantilist school argued the need for regulation by the state of conditions that ensure inflow of foreign investments in the country. In their view, only an active protectionist policy in international trade can provide the state with an active trade balance and a surplus of money in the country. This surplus, in their view, reduces the interest rates and stimulates capital investment [Moldovanu, 1992] [4].

The first essential parameters of the investment model were formulated by representatives of the classical school - A. Smith, D. Ricardo, T. Malthus, I. B. Say. Economists of this school have clearly defined concepts of money and capital; they have clarified the role of capital accumulation in the formation of investment resources and examined the role of the credit in developing investment [Blank, 2001] [2].

In agriculture, priority efforts should be directed towards improving successfully the adaptability and management capacity of the agricultural system. Thus, if we use effective management practices, resilience against vulnerabilities that the sector is subject to will increase, including those related to difficult

financing. There are of course key obstacles to be overcome, including the adaptation of legislation, clarifying the roles of public / private sector, developing solutions for poor infrastructure and sufficient awareness of the importance of this financing instrument among farmers.

MATERIALS AND METHODS

The investigations were focused on the statistical yearbooks NBS data, the Ministry of Agriculture, data from statistical reports and financial statements of agricultural enterprises. The research used several methods and processes: observation, grouping, comparison, the table and graphs method, analytical time series leveling, time series, Cob-Douglas production function, marginal analysis.

RESULTS AND DISCUSSIONS

It is difficult to list, in order of importance, all factors that contribute to the economic growth. However, by aggregating factors on categories it can be mentioned that there are three factors: production funds (K); labor (L) and technical progress. The role of production factors evolves, changes over time, but for a relatively small period of time, the factor of technical progress can be omitted. Economic growth in this case depends solely on capital (K) and labor (L). Frequently, in the study of economic growth, there is used a function $Y=A^{K^{\alpha}L^{\beta}}$, called Cobb-Douglas production function. By using this function, paths of economic growth can be determined. [Dinu și Socol, 2006] [5].

With the function $Y=AK^{\alpha}L^{\beta}$ the elasticity of the final product (Y) can be determined in relation to the means of production (K) and labor (W). Means for producing (K), while „are worn" are consumed in the process of operation. Growth rate of the volume of productive capital can be written as:

$$\frac{dK(t)}{dt} \qquad (1)$$

Physical wear in a unit of time is getting greater together with the increasing of capital volume. Between decreasing the capital volume in a unit of time $\frac{dK(t)}{dt}$ and the volume of physical wear and tear (aK (t)), the dependence is reversed, ie:

$$\frac{dK(t)}{dt} = -aK(t) \qquad (2)$$

The dynamics of physical depreciation of capital means of production $K(t) = K_0 \ell^{-at}$ is introduced in the Cobb-Douglas function $Y=AK^{\alpha}L^{\beta}$ and we obtain the function:

$$Y_1 = A(K_0 \ell^{-at})^{\alpha} L^{\beta} = AK_0^{\alpha} \cdot \ell^{a\alpha t} \cdot L^{\beta} \qquad (3)$$

So, in the initial period, till the supplementation of productive capital with investments (I) efficiency is $e = \frac{Y}{aK_0}$. The volume of effect (E_{fct}) and the volume of investments (I) are in direct dependence: additional investments generate growth of the effect, but to a certain level, further increasing investment leads to a decreasing effect on one leu. [Cataranciuc și Maximilian, 2013] [6].

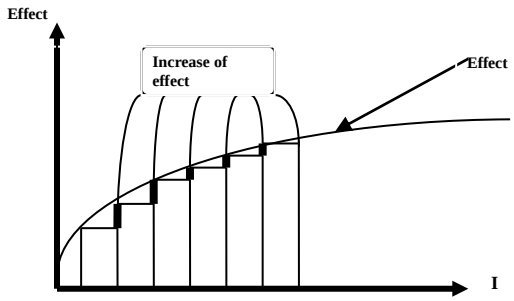

Fig. 1. The link between the level of investment and the volume of effect.

Increase of investment generates the diminish of efficiency and increase of effect. Ie: the effect after supplementation of productive capital with investments (I) increases; however, „increased effect" being divided to a growing number, to the amount of additional investment, it will decrease per unit of

investment, so the efficiency of investment will reduce. Supplementation of investment can not continue permanently.

Increase the volume of investments should be restricted by the value of ratio:

$$e = \frac{E_{fct}}{I} \quad (4)$$

If the ratio (efficiency) $e = \frac{E_{fct}}{I} > 1$, then $E_{fct} > 1$; investment costs can be covered with $E_{fct} - 1 > 0$;

If the ratio (efficiency) $e = \frac{E_{fct}}{I} = 1$, then $E_{fct} = I$; investment costs are equal with „effect" and further supplementation of the investment volume, is not economically justified. In this case the volume (I) will be the maximum acceptable volume, called marginal investments. We note the volume of investments by I_{max}. So, $I \leq I_{max}$, otherwise these economic activities will generate only losses.

If the ratio (efficiency) $e = \frac{E_{fct}}{I} < 1$, then $E_{fct} < I$; investment costs will continually generate only losses.

In other words, the volume of additional investments must satisfy the condition: $e = \frac{E_{fct}}{I} \geq 1$.

So, *investment restriction will be satisfied if* $\frac{Y}{\alpha K_0} \geq 1$; $Y \geq \alpha K_0$.

Otherwise the final product, expressed in value, will not cover any costs of productive capital. From the ratio there result: effectiveness depends directly on the volume of the final product (Y) and is in inverse depending on the volume of productive capital (K_0). The increase of investment volume generates the growth of volume of final products, but the specific effect per unit of investment is reduced.

Table 1. Dynamics and analysis of marginal efficiency of investment in agricultural sector from the Republic of Moldova in the period 2004 -2014

Year	**Value of investment in agriculture, mil. lei**	**The value of global agricultural output (in comparable prices), mln. lei**	**Agricultural production value per 1 leu invested, lei**	**Increase (+), decrease (-) in absolute measures in comparison with the previous year**		**Additional agricultural production value to 1 leu of additional investment, lei**
				of value of investment, mil lei	of value of agricultural production, mil. lei	
Conventional values	V_i	V_p		ΔV_i	ΔV_p	$\Delta_p \div \Delta_i$
2004	317.9	12,301.3	38.8	-	-	-
2005	455.9	12,402.2	27.01	138	100.9	0.73
2006	489.2	12,266.7	25.08	33.3	-135.5	-4.07
2007	731.6	9,432.5	13.0	242.4	-2,834.2	-11.69
2008	1,020.2	12,460.3	12.2	289.0	3,027.8	10.77
2009	923.3	11,259.5	12.9	-97.2	-1,200.8	-12.35
2010	1,045.6	12,146.7	11.6	122.3	887.2	7.25
2011	1,808.2	12,757.8	7.06	763.2	611.1	0.80
2012	1,641.8	9,908.5	6.0	-166.2	-2,849.3	-17.14
2013	1,785.1	13,772.8	7.7	-143.3	3,864.3	26.9
2014	2,298.5	14,902.18	6.48	509.4	1,129.4	2.22
Total in average	9,834	133,610.5	13.5	+1,690.9	+2,600.9	1.54
R_c, %	119.3	102.0	84.0	x	x	x

Source: developed based on data of NBS, for years investigated [Anuarul statistic 2005-2015] [1]

For the argumentation of the obtained conclusion in the mathematical model developed by using the Cobb-Douglas function, analysis of marginal efficiency of

investment in agriculture in the Republic of Moldova was made and there were grouped data of agribusinesses after grouping feature - the value of investments per 1ha of agricultural land (Table 1).

Analysis made based on data from Table 1 demonstrates a dynamic growth both in investments and the value of agricultural production, ie effect grows with increasing of effort, but in the average, annual value of investment (119.3%) is higher than the value of production (102.0%) by 17.3 pp.

This disproportion has a negative impact on investment performance [Timofti, 2010] [9].

So, for example, in 2014, investments being 7.2 times higher compared with 2004, the value of agricultural output per investment was decreased from 38.8 lei to 6.48 lei. The annual average reduction is for about 16%.

Marginal efficiency of investment analysis attests that additional investment returning at first glance, seems to be growing only in 2008, 2010 and 2013. It should be noted that the increase in additional investment performance is obtained immediately after the unfavorable years for the country's agriculture, and during the rest of periods it is decreasing. [Timofti, 2009, 2015] [7, 8].

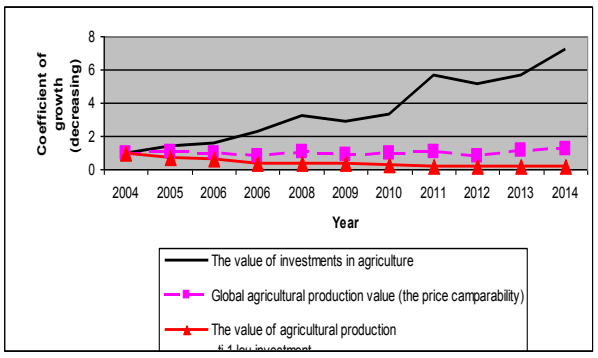

Fig. 2. Dynamic of growth (decrease) rate of the overall production value, investment value and return on investment

Source: calculated based on data from table 1

Note: $\overline{Rc}_1 = 1.193$; $\overline{Rc}_2 = 1.02$; $\overline{Rc}_3 = 0.836$

In the average of years 2004-2014, for 13.5 lei of the production value at 1 leu total investment return only 1.54 lei or 11.4% (1.54 lei: 13.5 lei) to production value at 1 leu of additional investment.

So, the return on investment in agriculture is decreasing although investments for agricultural development have an innovative character. Management of efficient use of investment is the basic condition for agricultural enterprises. [Sargo, 2015] [10].

Investments should be used for promoting technical progress designed to ensure the improvement of production, technologies, forms of organizing production and ensure economic development and restructuring of the economy of agricultural sector. Promoting technical progress through investment provides:

-improvement of material and technical base of enterprises;

-application of scientific and technological research results;

-increasing the productivity of crops and livestock, volume of qualitative products to ensure

-food security and the need to satisfy internal and external market, as well as international economic cooperation.

In order to identify the optimal level of investment that allow to obtain higher yields, grouping of agribusinesses was performed according to the level of investment at 1ha of agricultural land (Table 2).

Analysis of data from Table 2 shows that increasing investments at 1 ha of agricultural land, leads to increase of the effect, ie the value of agricultural production at 1ha of agricultural land. In group III of enterprises this indicator contains 12,996 lei / ha, ie 36.2% higher than in group I and 16.5% compared with companies from group II.

But the return on investment is higher in group II of enterprises – 15.6 lei. This demonstrates that:

-the optimal level of investment at 1ha of agricultural land is 1,655.6 lei or within the limit of 1,000-3,000 lei / ha. Its increase further diminishes the return on investments, ie economic efficiency by 32%.

-investments applied on averaged of 557.2 lei at 1ha of agricultural land are not sufficient and do not generate high results – yields of agricultural land and investment are low.

-investments applied on average at 1ha of agricultural land of 8,664.8 lei contribute to the increase of global production at 1ha of agricultural land, but the efficiency of

investments decreases, ie investments in high volume are not effectively used.

Further calculations show that if enterprises from group III would have used investments at 1 ha at the level of group II, they would have saved money sources amounted to 93,488.7 thousand lei, and return on investment would have been bigger – 5 lei / ha confirmed below:

-Difference of investments at 1ha of agricultural land between group III and group II:

8,664.8 lei – 1,655.6 lei = 7,009.2 lei/ha

-Amount of over-consumed investments throughout the agricultural land in group III:

13,338 ha * 7,009.2 lei/ha = 93,488.7 thousand lei

-The difference in yield per 1ha:

15.6 lei – 10.6 lei = 5 lei/ha

Table 2. The influence of investment levels at 1 ha in selected enterprises in the Republic of Moldova, on the growth of economic effect and investment efficiency in the average of years 2012-2014

Indicator	**Groups of enterprises according to the level of investments at 1 ha of agricultural land, lei**			
	I Less than 1,000	II 1,001-3,000	III Over 3,000	Total/in average
Number of enterprises, units	17	19	19	55
Value of investments at 1 ha of agricultural land, lei	557.2	1655.6	8664.8	2993
Agricultural land surface on which the investment was made, ha in average at 1 enterprise	1193	1022	702	972.3
Mineral fertilizers at 1 ha, kg	16.5	29.6	99.2	48.4
Energetic potential at 1 ha of agricultural land, c.p	0.91	1.19	3.15	1.74
The average annual value of fixed assets at 1 ha, lei	6547	12243	22297	13696
The number of workers at 100 ha, people	10.7	9.7	9.5	9.9
Costs at 1 ha of agricultural land, lei	9061.4	10089	7876	9743
Value of global production la 1 ha, lei	9538	11154	12996	11229
Value of agricultural production at 1 leu of investment, lei	3.0	15.6	10.6	9.74

Source: developed by the authors based on data from agricultural enterprises in 2012-2014

CONCLUSIONS

Based on the carried out analysis, it was found that in 2004-2014, investment and agricultural production value increased, ie by the increase of the effort, the effect also growths, but the average annual value of investment growth (119.3%) is higher than the value of production (102.0%) with 17.3 p.p. This disproportion influences negatively on efficiency of investments use.

In 2014 the investment being 7.2 times higher compared with 2004, the value of agricultural output per investment declined from 38.8 lei to 6.48 lei up. The annual average reduction is 16%.

Return on investment in agriculture during 2004 to 2016 is decreasing. From 13.5 lei of production value at 1 leu total investment return only 1.54 lei or 11.4% of production value at 1 leu additional investment.

The optimal investment level at 1 ha of agricultural land is 1,655,6 lei or within the limit of 1,000-3,000 lei per hectare. Its increase further diminishes the return on investments, ie economic efficiency by 32%.

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OPTIMALITY IN AGRICULTURE: GENERATING OPTIMAL STRUCTURE OF CULTURES WITHIN A FARM USING GENETIC ALGORITHMS

Victor TIȚA[1], Doru Anastasiu POPESCU[2], Nicolae BOLD[2]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Email: victortita@yahoo.com
[2]University of Pitești, Faculty of Educational Sciences, Physical Education and Informatics, 1 Targul din Vale St, 110040, Piteși, Argeș, Romania, Phone: +40348453102, Email: bold_nicolae@yahoo.com

Corresponding author: bold_nicolae@yahoo.com

Abstract

Optimization in agriculture can have various forms, depending on its various processes or the market evolution. It can be financial or product-based and can lead to minimization, if related to costs, or maximization, related to profit. In this paper we will present a method of determining an optimal repartition of an agricultural surface for a number of cultures based on a genetic algorithm in order for the profit to be maxim. The model takes into consideration several requirements related to cultures selling price, obtained production, direct costs and costs related to human workforce. The genetic algorithm uses basic structures (chromosomes, genes) and operations (mutation, crossover) to generate a repartition. In this case, the chromosomes are defined as the surface itself, a gene within a chromosome being the surface for a specific culture. The length of the chromosome is equal to the number of cultures desired to be cultivated. The operations are basic and will be described in the paper. The fitness function is defined as the difference between the incomes and the costs, thus the profit. The results will be then compared to the results obtained by the traditional method that uses linear programming.

Key words**:** *genetic algorithms, culture, rotation, optimality, surface*

INTRODUCTION

In the process of production, there are many parameters that influence the final result. A great deal of them is found beyond the limit of controllability, such as weather, geolocation, topology or market dynamics. Thus, the control over some key parameters (irrigation, cost control, quality raw material etc.) offers the possibility of maximizing the output, either physical or financial. Another implication of the agriculture is the impact on the environment [2], which is extremely important for a sustainable agriculture.

One of the easiest ways to maximize the output and protect the environment is the determination of the optimal repartition of cultures, taking into consideration key requirements, such as the cropping-system [5], the direct and indirect costs and the cultures prices on the market. Deciding the repartition of culture, in the sense of determining the order and the surface within the total arable land, has the great advantage of quasi-inexistent costs for the implementation, while the effects are more than satisfactory.

In the literature, there exists a very efficient method for finding the optimal surfaces for every culture. This method is based on linear programming, as described in paper [1] and can be suited to a model that fits the pattern of a linear programming model that maximizes an objective function with requirements owed to surfaces, workers and labour quantity.

Based on the same idea that maximizes the same objective function and takes into consideration the same requirements, we have built a method that has the same finality, but obtained in a different way. We used a genetic-based algorithm, in order to obtain the optimal structure of cultures.

Added to this method, we have previously built a method that generates a cropping-

system order, based on the restriction given by the species of the culture, is known as cropping-system [6]. This method has as result an order of crops that suits these restrictions.
The two combined methods create a powerful tool that can be used successfully to maximize the profit of an agricultural enterprise.
Of course, other types of optimizations exist, such as cost control [7] for consumables (diesel, insecticide etc.) or sustainable operations (e.g., soil tillage [3]) and agricultural education [8].

MATERIALS AND METHODS

We have used for applying the genetic algorithm classical structures and operations.
The structures that were used are genes and chromosomes. An example of a chromosome is presented in Figure 1. A chromosome actually codifies the entire surface, while a gene represents the codification of the surface of a single crop within the cropping-system. The data contained by a gene is the number of hectares that the crop can be cultivated.

62.50	3.43	4.24	0.25	2.23	14.30

Fig. 1. Representation of a chromosome with 6 genes

The operations that we have used in the model were the mutation and the crossover in one point. Mutation consists in replacing a gene within a chromosome with a randomly-generated gene. Crossover consists in choosing randomly a common position within two chromosomes and replacing the second part of the first chromosome with the second part of the second chromosome and the first part of the second chromosome with the first part of the first chromosome. The scheme of the two operations is shown in figure 2.

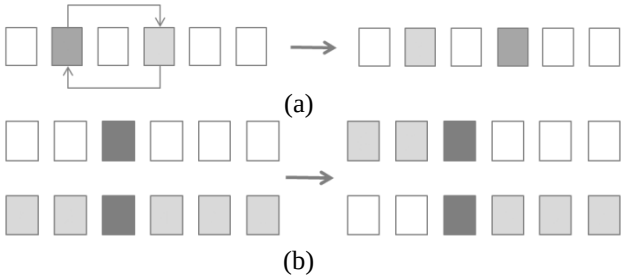

Fig. 2. Mutation (a) and crossover (b)

At each appliance of an operation, the requirements are checked to be accomplished.
Firstly, an initial population of chromosomes is generated randomly, and then mutation and crossover are applied. After each operation, the chromosomes are sorted descending based on the objective function. These operations are repeated for a fixed number called the number of generations.
The fitness function (the correspondent of objective function for genetic lexicon) is calculated as the difference between the total income for the data in the genes and the costs according to the same data (i.e., the profit of the whole cropping-system).
The results of the method depend greatly on the parameters of the genetic algorithm: the size of the initial population, the mutation rate and the crossover rate.
The order of the crops is a separate subject studied in previous papers ([4]) and is based on a matrix (practically, a database) that contains data related to an extended series of crops that can be fully updatable with new crops. The matrix let the user know whether a crop can follow another crop (if crops can be neighbours).

RESULTS AND DISCUSSIONS

The implementation was made in Java programming language. A print-screen of the resulting implementation is shown in Figure 3. The database contains now data for only 9 crops, but it can be extended. The interface contains also a possibility for a demonstrative test.

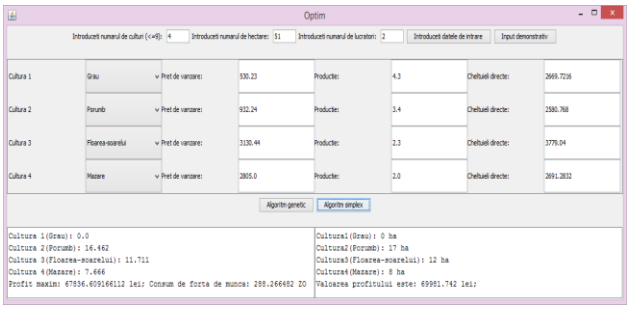

Fig. 3. Interface of the implementation

The results obtained for the demonstrative input (4 crops, 51 hectares and 2 permanent workers) given by the interface is presented in Table 1.

Table 1. Results for the input

Crop	Price	Production	Direct costs	No ha genetic	No ha LP
Wheat	480	4.3	2,669.72	0	0
Corn	500	3.4	2,580.77	0	0
Sunflower	1,100	2.3	3,779.04	0	0
Peas	2,805	2.0	2,691.28	8	7,995
Total				22,474.47	22,488.52

As we can observe, for the same input data, the maximum obtained profit is almost the same.

We will try to find the optimal parameters for the genetic algorithm. Figures 4, 5, 6 and 7 present data for different values of the size of the initial population (N), the mutation rate (m), the crossover ratio (c) and the number of generations (NG).

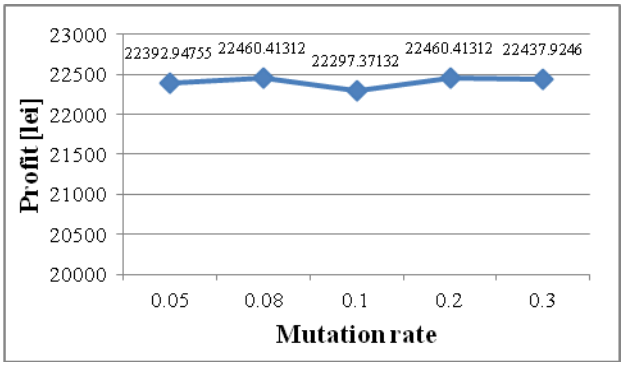

Fig. 4. Evolution of profit based on mutation rate (c=0.6, N=100, NG=3,000)

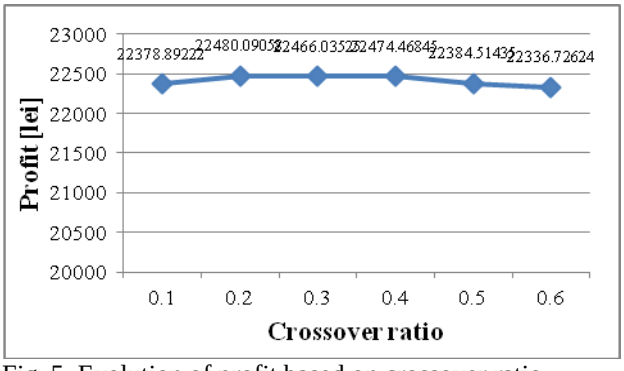

Fig. 5. Evolution of profit based on crossover ratio (m=0.1, N=100, NG=3,000)

We can observe that the optimal mutation rate states somewhere under 0.1, the crossover ratio between 0.2 and 0.4, the size of the initial population under 150 chromosomes and as higher number of generations as possible.

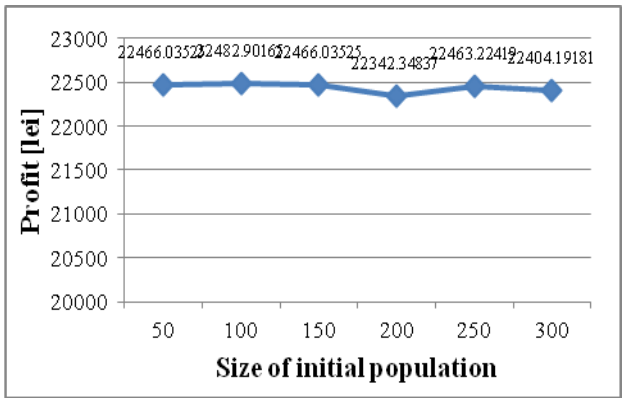

Fig. 6. Evolution of profit based on size of initial population (m=0.1, c=0.2, NG=3000)

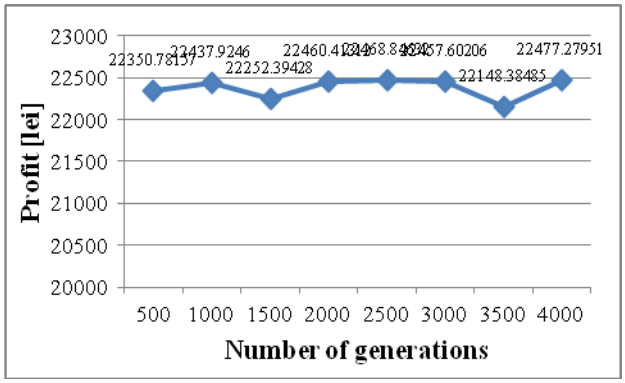

Fig. 7. Evolution of profit based on the number of generations (m=0.1, c=0.2, N=100)

CONCLUSIONS

Finding ways to optimize the activity in agriculture has strong implications in the agricultural domain and in the economy branches that are connected to agriculture. Lower costs for raw material in industry and services from agriculture mean lower prices for the final user. In addition, scale economies are made and the efficiency in agriculture increases.

Any method of optimization, either by reducing costs, increasing incomes or growing average productions, means larger profits, efficiency in consuming resources and a healthier environment.

Regarding the method presented, we intend to develop it by creating a global application which will provide valuable data for the user, helping him in the farming activities and economic tasks.

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CLUSTER DEVELOPMENT AS A FACTOR IN IMPROVING THE COMPETITIVENESS OF THE AGRO-INDUSTRIAL COMPLEX OF THE REPUBLIC OF MOLDOVA

Liudmila TODOROVA

State Agrarian University of Moldova, 42 Mircesti Str., Sector Rascani, Chisinau, MD-2049, Republic of Moldova, E-mail: liudmila.tod@gmail.com

Corresponding author: liudmila.tod@gmail.com

Abstract

In today's world, the scenario of long-term economic development of any country presupposes the growth of its competitiveness in both traditional and new knowledge-intensive sectors, a breakthrough in improving the quality of human capital and labor productivity trends, the transformation of innovative factors into the main source of economic growth. Solving these problems requires creating a system of clear interaction between government, business, science and education through the use of effective tools of innovation development, among which an important role is played by the cluster approach. The relationship between the clustering process, strengthening of competitiveness and accelerate of innovation activity - a new economic phenomenon, which allows resisting the onslaught of global competition and properly meet the requirements of national and regional development. The cluster approach - this is a new management technology that allows to improve the competitiveness of a particular region or industry, and the state as a whole. And this approach has become a basic element of development strategies in most countries. The most important characteristic of the modern cluster is an innovative component, which determines its competitiveness. As a result, innovation clusters are beginning to prevail over the traditional industrial clusters.

Key words**:** *effective instruments, innovative development, the clustering process, the cluster approach, strengthening competitiveness*

INTRODUCTION

Research centers and universities, as integral parts of innovation clusters, generating new knowledge and innovation, provide a high educational level of the regions in which they operate.

As part of the innovation clusters, it is possible to coordinate the efforts and financial resources to create new products and technologies, and output them to the market.

In fact, within such clusters, it is possible alignment of the closed process chain - from the creation of the product to its manufacturing and bringing to the market.

The most important difference from traditional innovation clusters of industrial - is the creation within them mainly export-oriented products and technologies, i.e., intra-cluster competitive advantages are significant on an international scale.

Should pay special attention on the state's role in the formation of cluster strategies. If initially the clusters are formed only due to the "invisible hand of the market", that recently many governments began to "grow" their own initiative in the framework of public-private partnership, giving this process a tangible material and moral assistance. Thus, an important factor in the process of cluster development, especially in agricultural complex is the development and implementation of public policies to support cluster development.

MATERIALS AND METHODS

In this study, the statistical analysis methods were used. To determine the competitiveness of Moldovan products on foreign markets and trade potential of the country used the methodology Lafay index. Documentary research base consists of the laws and regulations adopted by the Government of the Republic of Moldova: the development Strategy of the small and medium enterprises

for 2012-2020, the Concept of cluster development of industries in the Republic of Moldova, Strategy for the period of 2013-2020 – „Innovation for Competitiveness", the roadmap for improving the competitiveness of Moldova [3, 5, 6].

RESULTS AND DISCUSSIONS

In Moldova, the development of the cluster policy started in 2013, when the Government of the country has approved the Concept of cluster development of the industrial sector.

The main task of the state policy of supporting cluster development of the industrial sector, defined of this concept is to intensify the development of industries and increase their share in the national economy by combining administrative and organizational efforts, support for innovation and growth of competitiveness of industrial enterprises, both large and of SME sector.

To create a scientific-technological parks and innovation incubators have been installed and operate the scientific and technological clusters shown in Table 1. (AITT, 2016) [1].

Table 1. Scientific and technological clusters in the Republic of Moldova

Cluster name		Year of creation	The purpose of the cluster establishment and functioning	Number of residents
1)	Scientific and technological cluster "Academica"	2007	Creation of STP "Academica" and II "Inovatorul"	19
2)	The Science and Technology cluster in the field of Ecology and Intensive Agriculture	2008	Creation of the Scientific and Technological Park "Inagro"	4
3)	The Science and Technology cluster in the field of micro and nano technologies "Micronanoteh"	2008	Creation of the Scientific and Technological Park "Micronanoteh"	2
4)	Scientific-Education Cluster "UniverScience"	2011	Creation of innovative and educational incubator "Universcience"	20
5)	A cluster of innovative entrepreneurial incubators	2012	Creation of: II "Nord" in 2012 and II «Antreprenorul Inovativ» in 2013	5
6)	A cluster of innovative entrepreneurial incubators in Chisinau	2012	Creation of: II "Itech" at the AESM and II "Inventica-USM» within the SUM	2
7)	Scientific-Education Cluster "InnOCluster"	2012	Creation of Innovative Incubator "InnOCenter"	6
8)	The Science and Technology cluster in the field of modern technologies "ELCHIM - MOLDOVA"	2013	Activities of the cluster are in the beginning stages	10
9)	The Science and Technology cluster in the field of nano-technology and information technology	2014	In 2014, the cluster presented a proposal for the creation of an innovative incubator	3
10)	Moldovan-Lithuanian cluster	2014	Creation of Innovative Incubator "Media Garaj"	6
11)	The Science and Technology cluster in the field of IT	2015	Creation of Innovative Incubator "IT4BA" at the AESM	5

However, this process is not sufficient, and the proportion of clusters in the country's exports, the number of jobs created and the new business is insignificant. There is no concrete policy of the state, which would stimulate and encourage this process. State actions in this direction were limited basically just introducing the notion of a cluster in the legislative and regulatory acts. It is important that the declaratory action and expressions of intentions to proceed as soon as concrete actions. In time, we contemplate and realize clustering process, other countries already actively implemented over 15-20 years clustering policies. (Tornea I., 2016) [4] Now some renovation efforts are required in the cluster high-technological branches.

This can be achieved by attracting FDI in these sectors, diffusing elements of global competitiveness in national economies, whatever the structural development of stage where they are to be found, but also by implementing policies the targeted support for the creation and development of clusters. To

identify which areas are potentially the biggest clustering, we will analyze the sectors which have the largest share in the gross value added (GVA) and those with the largest share in exports, granting sectors with the largest share 1 point for each category (GAV / exports). (Tornea I., 2016) [4] Following such an analysis we can conclude that the sectors with the greatest potential formation of clusters are:
-machinery and electrical appliances;
-manufacture of other food products (including sugar);
-beverage industry;
-non-metallic mineral products industry (especially glass and glass products, cement and articles thereof);
-manufacture of wearing apparel/dressing and dyeing of fur;
-manufacturing of textiles;
-processing and preserving fruits and vegetables (Tornea I., 2016) [4].
Also, there is a relatively high potential in such areas as:
-production / processing and preserving of meat and meat products;
-dairy products and eggs of birds;
-chemical industry;
-furniture production and other industrial activities;
-manufacture of machinery and equipment;
-production of rubber and plastic;
-production of leather, leather products and footwear;
-manufacture of fabricated metal;
-manufacture of vegetable and animal oils and fats (Tornea I., 2016) [4].
Identify sectors with high potential for clustering is especially important in terms of measures and policies to support the creation and development of clusters to be promoted to support the clustering of national economy.
Some authors believe that because of the small internal market, to identify potential clusters, should be considered only sectors with the largest share in exports. (Moldovanu D., 2009) [2]. For this purpose is used Lafay index, which is identified by the following formula:

$$LI_j^i = 100 \cdot \left(\frac{X_j^i - M_j^i}{X_j^i + M_j^i} - \frac{\sum_{j=1}^{N}(X_j^i - M_j^i)}{\sum_{j=1}^{N}(X_j^i + M_j^i)} \right) \cdot \frac{X_j^i + M_j^i}{\sum_{j=1}^{N}(X_j^i + M_j^i)}$$

where X_j^i and M_j^i - export and import of products *j* into the country *i*. *N* - number of product types.

Table 2. Groups of goods for export in the Republic of Moldova, 2015

Categories of goods for export, 2015	Lafay Index	Categories of goods for export, 2015	Lafay Index
Clothing; Clothing accessories	4,2	Preparations of vegetables; Fruit or other parts of plants	0,9
Cereals	3,2	Sugar; Sugar products	0,9
Alcoholic beverages; Spirits and vinegar	3,1	Metallic mineral products (glass and glassware, cement)	0,8
Edible fruits and nuts	3,0	Footwear and similar items, leather goods, travel goods and similar products	0,7
Oilseeds; Seeds and fruit; Industrial and medicinal plants	2,6	Carpets and other textile floor coverings	0,5
Machinery; Electrical equipment and parts thereof	1,5	Meat and edible offal	0,2
Furniture; Luminaires, and the like; Prefabricated constructions	1,4	Residues and waste from food industries; animal feed	0,1
Fats and oils of animal or vegetable origin; Cleavage products	1,2	Pharmaceutical products	0,1

Lafay index shows that conglomeration potential have such branches of agriculture as production of cereals, fruit growing and different types of nuts. They are followed by oilseeds, production of vegetable and animal fats, further processing of fruits and vegetables, as well as sugar and its derivatives. The rest of the branches of production with a high index of export of goods and clustering relate to other sectors of

the economy.

The main efforts to identify and promote possible measures and state policy of supporting the creation of clusters in these sectors should be directed towards building / strengthening links of these areas to the local economy and the integration of Moldovan enterprises, especially SMEs in the supply chains of foreign companies.

The share of agriculture in GDP of the country is ≈ 13%, along with the processing industry of agricultural production, it provides 17% of GDP and 45% of the country's total exports.

The most exported agricultural products are cereals, edible fruits (fresh and dried) and nuts, oilseeds, natural honey, grapes, vegetables, meat, poultry and eggs. Together these categories account for over 25% of total exports. Moldovan agricultural sector can be divided into two main sub-sectors:

(1)*the corporate sector* consisting of large enterprises;

(2)*the individual sector*, including small farms and households.

Large agricultural enterprises mainly specialize in producing low-value crops (cereals, oilseeds, sugar beet), and a small amount of fruit mainly for export.

To achieve stable growth of production and export of agricultural products, support policies in this area should be oriented mainly towards diversification and increased access to markets.

Small farms are generally subsistence and produce only a small amount of high-value agricultural products for commercialization (fruits, vegetables, nuts, grapes, potatoes, natural honey) on the domestic markets.

Republic of Moldova is difficult to name a country with a functional market regulation mechanisms, so government intervention is necessary to correct the weaknesses of the market relations. In addition, the state should encourage and consolidate the basic elements of the efficient functioning of the market economy. In this case, the clusters are important competitive advantages of the economy, and the task of the state is to support the emergence and development of such relations.

One of the most important factors in the development of the cluster policy of Moldova is to support existing clusters, given the current state of the national economy, features of the development of agro-industrial complex and the investment climate in the country. In this direction, it is advisable to make maximum use of available resources and mechanisms.

International experience of creation and development of clusters allows us to formulate the basic aspects of the feasibility of the development of cluster policy in the Republic of Moldova, as presented in Fig.1.

Fig. 1. Policy options for developing clusters in Moldova

The problems of development of existing clusters is becoming increasingly important in the discussion of ways of development and economic growth. Therefore, clusters already operating upcoming governments of most countries are considered as potential engines of

innovation.

It should be noted that the simple accumulation of enterprises geographically does not guarantee the successful operation of the agglomeration. That is, the advantages associated with the clustering process can not be achieved automatically.

This applies primarily to the countries with inefficient institutions and are in the process of market mechanisms formation.

Especially relevant for Moldova is the fact that clusters are seen as effective tools of regional development, which allows to concentrate resources in the targeted sectors and regions that possess the necessary potential for economic growth and development. And the results of such cooperation, in consequence, may impact on other non-target sectors and regions.

CONCLUSIONS

Analysis of the current cluster development and implementation of cluster policy leads to the following conclusions:

-For the sustainable and accelerated development of the clustering of industries and regions of Moldova is necessary to gain the attention of the state in this direction, since the state now holds more supervisory position.

-It is necessary to develop and adopt for the implementation of the regulatory framework for the efficient development of the clusters on the basis of good practices in the European Union.

-In implementing the cluster development policy, it should be considered separately from the process of regional development. These processes should be complementary, rather than substitute.

It is necessary to develop and implement a clear advance for all parties measurement criteria and evaluation of clusters of activity. This procedure should be performed periodically with consecutive introduction of the necessary changes in the regulations.

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RANKING EUROPEAN COP FARMS IN TERMS OF FINANCIAL VIABILITY THROUGH A PCA-TOPSIS APPROACH

Elena TOMA

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone/Fax: 00 40 723 3313 95; Email: elenatoma2001@yahoo.com

Corresponding author: elenatoma2001@yahoo.com

Abstract

The aim of this paper is to assess the evolution of European farms from COP sector (in 2009 and 2013) in terms of financial viability. In our research approach, we applied a combination between the non-parametric method PCA, the multi-criteria decision analysis method TOPSIS and k-means cluster analysis. Our database comprised eight ratios, calculated based on FADN data from 94 regions specialised in COP production (23 countries). The results revealed the disparities created between farms during the 2009-2013 period due to different agricultural political conditions and to different recovery from financial crisis.

Key words**:** *economic and financial performance, profitability ratios, financial ratios, dimension reduction (PCA), multi-criteria evaluation (TOPSIS)*

INTRODUCTION

Farm financial viability is an important issue in the assessment of European farms. These papers analyse in general the relation between financial viability and subsidies [13], prices [8] [8] [12], agricultural practices [10], etc. Aggelopoulos [1] proved that farms with low labour intensity have also a low level of financial viability and Strijker [12] indicated that fluctuating balance of input and output prices is the main risk to financial viability of farming. Also, according to Vrolijk [15], about 20% of the farms from COP sector were affected by the abolishment of the decoupled payments. Many farmers from France, Ireland, Finland, Germany, Sweden, the UK etc. are included in this category due to their level of loans or interest levels and due to their financial structure.

All these papers and many more tried to assess the financial viability of farms to explain ultimately the differences in performance between regions and countries. In terms of performance, many authors indicate in the last years a decrease in overall costs and investments or an increase in production level [14], but we can't generalize the situation due to the cost differences between farm sizes [3] or to the inequality in the distribution of direct payments [2].

MATERIALS AND METHODS

The performance of a firm can be measured in terms of financial, operational, technical, etc. effectiveness [6]. According with actual literature, the financial performance can be analysed through different indicators like ROE, ROA, ROI, ROS, profit margin, etc. and there are a lot of methods which are used to assess firm performance (AHP, PCA, DEA, etc.) [17]. The multiple-criteria evaluation of alternatives methods (TOPSIS, ELECTRE, etc.) are frequently used in this type of studies (see [16]). We mention here the studies of Šišková [11] and Kuncová [7] in which the economic performance from agriculture is measured by TOPSIS approach.

TOPSIS method ('Technique for Order Preference by Similarity to Ideal Solution') can be used when we have to compare numerous alternatives according to the different selected criteria. This method can rank the alternatives based on the relative distance from the ideal alternative and the information about the weights of criteria [9].

To apply this method, we firstly defined the criteria for assessment starting from the available information from FADN database for COP farms. The farms used like alternatives in the decision matrix were selected from FADN, based on the available

data of 94 European regions from COP sector (last available year 2013) (Table 1):

Table 1. Available data 2009-2013

Country	Regions	Country	Regions
Austria	1	Italy	13
Bulgaria	6	Latvia	1
Cyprus	1	Lithuania	1
Czech Republic	1	Poland	4
Denmark	1	Portugal	3
Estonia	1	Romania	7
Finland	2	Slovakia	1
France	18	Slovenia	1
Germany	12	Spain	10
Greece	3	Sweden	1
Hungary	1	United Kingdom	4
Ireland	1		

Source: based on FADN

To evaluate the profitability and financial viability of farms we use eight ratios:

- Labour intensity (AWU/100 ha):

$$LI = \frac{Total\ labour\ (SE010)}{Total\ UAA\ (SE025)} \quad (1)$$

- Capital intensity (Euro/100 ha)

$$CI = \frac{Total\ assets\ (SE436)}{Total\ UAA\ (SE025)} \quad (2)$$

- Input/Output Ratio

$$IO = \frac{Total\ input\ (SE270)}{Total\ output\ (SE131)} \quad (3)$$

- Cost-Revenue with subsidies Ratio

$$CRS = \frac{Total\ specific\ costs\ (SE281)}{Gross\ Farm\ Income\ (SE410)+Total\ subsidies\ (SE605)} \quad (4)$$

- Cost-Revenue without subsidies Ratio

$$CR = \frac{Total\ specific\ costs\ (SE281)}{Gross\ Farm\ Income\ (SE410)} \quad (5)$$

- Financial stress Ratio

$$FS = \frac{Rent\ paid\ (SE375)+Interest\ paid\ (SE380)}{Total\ output\ (SE131)} \quad (6)$$

- Indebtedness Ratio (solvency)

$$I = \frac{Total\ liabilities\ (SE485)}{Total\ assets\ (SE436)} \quad (7)$$

- Leverage Ratio

$$L = \frac{Total\ liabilities\ (SE485)}{Net\ worth\ (SE501)} \quad (8)$$

Labour and capital intensity are used to measure structural performance. Lower values of labour intensity and higher values of capital intensity are characteristic for medium and large farms with usually a higher economic performance. For the other selected financial indicators, a lower value means better economic performance. Taking this in account, in our approach to use TOPSIS, we selected inside the model to maximize the value of CI and to minimalize the value of LI, IO, CRS, CR, FS, I and L.

The weights for criteria (indicator) needed in TOPSIS were establish based on principal components analysis. PCA application implied the checking up of the internal consistency of the data base, the calculation of the *KMO test (*Kaiser-Meyer-Olkin) for partial correlations between variables verification (close to 60% or over), the Varimax rotation option selection (minimization of the number of variables with big factor loadings) and the Bartlett scores verification (the Bartlett test must have a $p<0.05$ probability).

The final TOPSIS scores were processed inside a cluster analysis. This method permits the classification of variables into relatively homogeneous groups and the identification of groupings with similar characteristics [4]. The application of this analysis supposes: the utilization as inputs of scores resulting from TOPSIS; the visual identification of cluster number by hierarchical clustering using Ward's method [5]; *k-means cluster* application to generate the number of clusters which characterizes European COP farms according with financial performance.

We used in our research the SDI Tool Triptych (demo version) to generate TOPSIS and SPSS (demo version) to apply PCA and cluster analysis.

RESULTS AND DISCUSSIONS

Database construction

The descriptive analysis of the necessary variables for the TOPSIS model reveals from

structural point of view a decrease in labour intensity and an increase in capital intensity and an improvement from financial performance point of view (Table 2):

Table 2. Descriptive statistics

	Year	Minimum	Maximum	Mean	Std. Deviation
LI	2009	0.747	6.808	2.181	1.409
	2013	0.652	6.287	2.142	1.387
CI	2009	46495.4	3159669.2	621157.2	637941.3
	2013	52300.7	3762577.9	725587.0	714699.1
IO	2009	0.529	2.941	1.209	0.288
	2013	0.694	1.852	1.029	0.205
CRS	2009	0.153	0.701	0.414	0.139
	2013	0.190	0.731	0.410	0.121
CR	2009	0.251	1.495	0.709	0.267
	2013	0.284	1.151	0.617	0.197
FS	2009	0.000	0.381	0.135	0.073
	2013	0.000	0.354	0.110	0.063
I	2009	0.000	0.530	0.161	0.158
	2013	0.000	0.475	0.157	0.149
L	2009	0.000	1.128	0.245	0.289
	2013	0.000	0.903	0.229	0.249

Source: Based on FADN

Principal component analysis

The Kaiser-Meyer-Olkin Measure test on the global sampling measure was 0.603 in 2009 and 0.529 in 2013, which suggests that the analysis is acceptable (Table 3). The Bartlett's sphericity test measuring the difference between the proper correlation matrix and the identity matrix is significant ($p < 0.001$), which permits us to reject the null hypothesis and to conclude that there are correlations within the database opportune for PCA running.

Table 3. The variable correlation matrix, KMO test, Bartlett test and communalities

	2009		2013	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.603		.529	
Bartlett's Test of Sphericity	Chi-Square	774.759	Chi-Square	833.893
	df.	28	df.	28
	Sig.	.000	Sig.	.000

Source: Data processing in SPSS

The optimum factorial solution is that with three extracted factors (Table 4). In 2009 the first factor explains 53.35% of the total common variance of variables, the second factor 13.03% and the third 11.53%. In 2013 the first factor explains 49.09% of the total common variance of variables, the second factor 16.53% and the third 13.41%. On a cumulated basis, these factors explain 77.92% of the total common variance of variables in 2009 and 79.03% in 2013.

Table 4. Factor projection and explained variance of variables

PC	Extracted sum of the quadratic saturations			
	2009		2013	
	% of variance	% Cumulative	% of variance	% Cumulative
1	53.352	53.352	49.092	49.092
2	13.033	66.385	16.526	65.618
3	11.533	77.918	13.408	79.025

Source: Data processing in SPSS of FADN data

After the factor rotation, it can be noticed that the variables *I* and *L* correlate strongly and positively with the first factor, while the variables *LI* and *CI* correlate moderate and negatively. *CRS* and *CR* correlate strongly and positively with the second factor and *IO* and *FS* correlate strongly and positively with the third factor (Table 5).

Table 5. The structure matrix by the orthogonal rotation of factors

		Rotation 2009			Rotation 2013		
		1	2	3	1	2	3
1	LI	-.542			-.757		
2	CI	-.677			-.664		
3	IO			.837			.874
4	CRS		.926			.917	
5	CR		.913			.935	
6	FS			.825			.753
7	I	.812			.831		
8	L	.817			.811		

Source: Data processing in SPSS

Starting from the degree of representativeness of principal components and the variables loading on factors we calculated average values for each criteria to establish the estimated weights necessary for TOPSIS model (Table 6).

Table 6. Weight of criteria for TOPSIS model

	Criteria weight
LI	14.194
CI	14.870
IO	8.285
CRS	9.387
CR	9.432
FS	7.600
I	18.183
L	18.049

Source: Own calculation

TOPSIS ranking

Table 7 shows the final ranking of farms in years 2009 and 2013 based on TOPSIS method that reflects the weights of criteria calculated in Table

6 (the data are sorted according with 2013 ranking). The table presents and compares the scores of relative closeness to ideal solution and the ranks of farms of those two years, which can reveal the trends of regional disparities regarding financial performance.

Table 7. Comparison of farms´ ranking by TOPSIS in the years 2009 and 2013

	2009	Rank 2009	2013	Rank 2013	Rank +/-
Austria (0660)	0.605	31	0.596	25	6
Bulgaria (0833)	0.503	68	0.428	71	-3
Bulgaria (0831)	0.468	75	0.432	70	5
Bulgaria (0832)	**0.426**	**80**	**0.449**	**65**	**15**
Bulgaria (0834)	0.570	49	0.426	72	**-23**
Bulgaria (0835)	0.389	82	0.381	80	2
Bulgaria (0836)	0.534	59	0.397	76	**-17**
Cyprus (0740)	0.594	37	0.562	36	1
Czech (0745)	0.524	63	0.481	62	1
Denmark (0370)	0.551	54	0.452	64	**-10**
Estonia (0755)	0.479	71	0.441	66	5
Finland (0670)	**0.563**	**50**	**0.555**	**39**	**11**
Finland (0690)	0.529	60	0.501	58	2
France (0121)	0.435	78	0.412	73	5
France (0131)	**0.363**	**86**	**0.400**	**75**	**11**
France (0132)	0.303	94	0.342	86	8
France (0133)	0.309	92	0.285	94	-2
France (0134)	0.359	87	0.341	87	0
France (0136)	0.343	90	0.313	92	-2
France (0141)	0.509	66	0.396	78	**-12**
France (0151)	0.378	85	0.347	85	0
France (0152)	0.477	72	0.388	79	-7
France (0153)	0.419	81	0.355	84	-3
France (0162)	0.388	83	0.368	81	2
France (0164)	0.346	89	0.330	88	1
France (0182)	0.428	79	0.324	91	**-12**
France (0183)	0.439	77	0.357	82	-5
France (0192)	0.475	74	0.397	77	-3
France (0193)	0.476	73	0.408	74	-1
France (0201)	0.381	84	0.310	93	-9
France (0203)	0.452	76	0.436	68	8
Germany (0010)	0.615	29	0.540	48	**-19**
Germany (0030)	0.641	22	0.643	15	7
Germany (0050)	0.651	21	0.637	18	3
Germany (0060)	0.596	36	0.549	44	-8
Germany (0070)	0.592	38	0.548	45	-7
Germany (0080)	0.547	55	0.512	57	-2
Germany (0090)	0.688	13	0.644	14	-1
Germany (0112)	0.357	88	0.357	83	5
Germany (0113)	0.309	91	0.329	89	2
Germany (0114)	0.516	65	0.483	61	4
Germany (0115)	0.481	70	0.434	69	1
Germany (0116)	0.497	69	0.473	63	6
Greece (0450)	0.605	32	0.569	32	0
Greece (0470)	**0.580**	**43**	**0.571**	**31**	**12**
Greece (0480)	0.601	34	0.581	27	7
Hungary (0764)	**0.524**	**62**	**0.531**	**52**	**10**
Ireland (0380)	0.815	2	0.714	3	-1
Italy (0222)	0.701	10	0.690	7	3
Italy (0230)	0.726	8	0.701	6	2
Italy (0243)	0.846	1	0.787	1	0
Italy (0244)	0.752	5	0.707	4	1
Italy (0260)	0.755	4	0.761	2	2
Italy (0270)	0.756	3	0.683	8	-5
Italy (0281)	0.668	15	0.640	16	-1
Italy (0282)	0.689	12	0.667	11	1
Italy (0292)	0.615	28	0.612	24	4
Italy (0301)	0.678	14	0.639	17	-3
Italy (0311)	0.745	6	0.704	5	1
Italy (0312)	0.691	11	0.648	13	-2
Italy (0320)	0.658	20	0.654	12	8
Latvia (0770)	0.308	93	0.326	90	3
Lithuania (0775)	0.518	64	0.487	60	4
Poland (0785)	0.547	56	0.521	53	3
Poland (0790)	0.589	39	0.539	49	**-10**
Poland (0795)	0.573	47	0.552	41	6
Poland (0800)	0.585	40	0.535	50	**-10**
Portugal (0615)	0.577	45	0.561	37	8
Portugal (0630)	0.545	57	0.521	54	3
Portugal (0640)	0.601	33	0.554	40	7
Romania (0840)	0.559	51	0.533	51	0
Romania (0841)	0.576	46	0.546	46	0
Romania (0842)	0.545	58	0.520	55	3
Romania (0843)	0.554	52	0.544	47	5
Romania (0844)	**0.551**	**53**	**0.569**	**33**	**20**
Romania (0845)	0.577	44	0.556	38	6
Romania (0846)	0.571	48	0.551	42	6
Slovakia (0810)	**0.508**	**67**	**0.515**	**56**	**11**
Slovenia (0820)	0.584	41	0.550	43	-2
Spain (0515)	0.583	42	0.494	59	**-17**
Spain (0520)	0.598	35	0.577	28	7
Spain (0530)	0.613	30	0.577	29	1
Spain (0535)	0.718	9	0.615	23	**-14**
Spain (0545)	0.631	24	0.563	35	**-11**
Spain (0550)	0.616	27	0.575	30	-3
Spain (0555)	0.623	25	0.588	26	-1
Spain (0560)	0.727	7	0.620	21	**-14**
Spain (0570)	0.618	26	0.568	34	-8
Spain (0575)	0.660	18	0.625	20	-2
Sweden (0710)	0.527	61	0.438	67	-6
UK (0411)	0.638	23	0.631	19	4
UK (0412)	0.664	16	0.675	9	7
UK (0413)	0.659	19	0.674	10	9
UK (0431)	0.663	17	0.619	22	-5

Source: Own calculation with Triptych

The shortest relative closeness to ideal solution are achieved by farms from Italy and the farthest are achieved by farms from France. Like we may observe farms from different regions of Bulgaria, Finland, France, Greece, Hungary, Romania and Slovakia performed better from a financial point of view and farms from other regions of France, Spain, Germany, Bulgaria and Poland present low financial viability.

Cluster analysis

By applying hierarchical cluster method on TOPSIS data we observed that, according with their score and by Ward option, the COP farms can be grouped in four clusters. The k-means method generated the four-cluster solution by countries (see fig. 1). In table 8 we point out the major changes in financial performances by regions and in table 9 we detailed the main characteristics of generated clusters. We observe changes in cluster classification in the case of 28 types of COP farms (Table 8), but also the disparities created inside each cluster in 2013

faced to 2009 (Fig. 1).

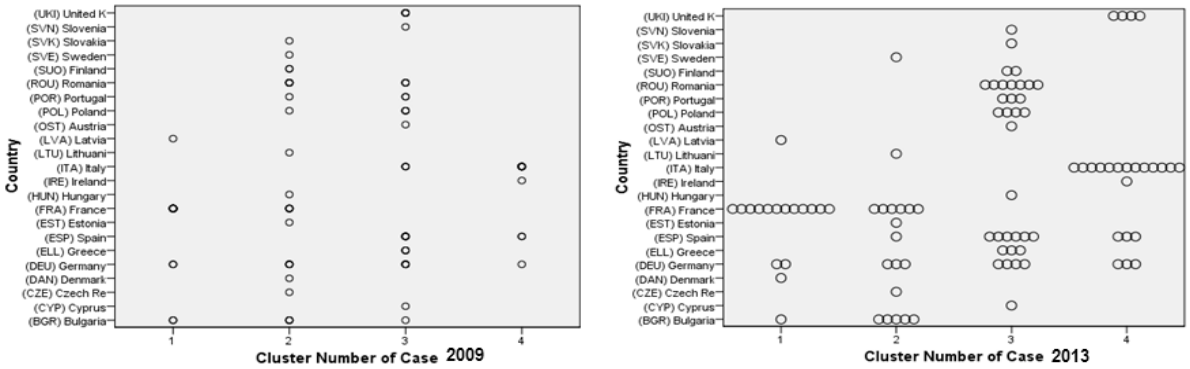

Fig. 1. COP farms clustering by TOPSIS score in 2009 and 2013

Table 8. Changes in financial performance – COP farms, 2009-2013 periods

Country	Regions'farms	Cluster 2009	Cluster 2013	Tendency	Country	Regions'farms	Cluster 2009	Cluster 2013	Tendency
(BGR) Bulgaria	(0832) Severen tsentralen	1	2	higher	(ITA) Italy	(0320) Sicilia	3	4	higher
(BGR) Bulgaria	(0834) Yugozapaden	3	2	lower	(POL) Poland	(0785) Pomorze and Mazury	2	3	higher
(DAN) Denmark	(0370) Denmark	2	1	lower	(POR) Portugal	(0630) Ribatejo e Oeste	2	3	higher
(DEU) Germany	(0080) Baden-Württemberg	2	3	higher	(ROU) Romania	(0840) Nord-Est	2	3	higher
(DEU) Germany	(0030) Niedersachsen	3	4	higher	(ROU) Romania	(0842) Sud-Muntenia	2	3	higher
(DEU) Germany	(0050) Nordrhein-Westfalen	3	4	higher	(ROU) Romania	(0843) Sud-Vest-Oltenia	2	3	higher
(ESP) Spain	(0515) Pais Vasco	3	2	lower	(ROU) Romania	(0844) Vest	2	3	higher
(ESP) Spain	(0575) Andalucia	3	4	higher	(SUO) Finland	(0670) Etela-Suomi	2	3	higher
(FRA) France	(0152) Alsace	2	1	lower	(SUO) Finland	(0690) Pohjanmaa	2	3	higher
(FRA) France	(0121) Île-de-France	1	2	higher	(SVK) Slovakia	(0810) Slovakia	2	3	higher
(FRA) France	(0131) Champagne-Ardenne	1	2	higher	(UKI) United K	(0411) England-North	3	4	higher
(HUN) Hungary	(0764) Észak-Magyarország	2	3	higher	(UKI) United K	(0412) England-East	3	4	higher
(ITA) Italy	(0281) Marche	3	4	higher	(UKI) United K	(0413) England-West	3	4	higher
(ITA) Italy	(0292) Abruzzo	3	4	higher	(UKI) United K	(0431) Scotland	3	4	higher

Source: Data processing in SPSS

In the Cluster 4, with the better financial performance, are included farms from the following regions: Germany (3 - Niedersachsen, Nordrhein-Westfalen, Bayern), Spain (Andalucia), Italy (13 - Marche, Abruzzo, Sicilia, Piemonte, Lombardia, Veneto, Friuli-Venezia, Emilia-Romagna, Toscana, Umbria, Molise, Puglia, Basilicata), United K (4 - England-North, England-East, England-West, Scotland), Spain (2 - Cataluna, Comunidad Valenciana) and Ireland. They present in average a higher and increasing labour and capital intensity and they succeeded to reduce all the financial viability indicators. As observed, they present a decrease of financial stress with almost 30% and of indebtedness with over 50% and of financial leverage with almost 65% (Table 9).

Table 9. The main characteristics of clusters in terms of financial viability in 2013 faced with 2009

	1	%	2	%	3	%	4	%
Number	17	-	19	-	34	-	24	-
LI	1.241	**95.03**	1.345	**81.45**	2.472	**97.78**	2.941	107.83
CI	290156.4	**78.51**	400894.7	**125.83**	443805.6	**95.04**	1685641.2	134.07
IO	1.118	**86.41**	1.084	**85.42**	1.012	**82.53**	0.947	88.01
CRS	0.533	**97.87**	0.440	**97.75**	0.381	**100.81**	0.346	99.82
CR	0.805	**83.56**	0.650	**83.88**	0.586	**89.22**	0.507	91.95
FS	0.130	**83.71**	0.156	**88.08**	0.103	**80.97**	0.070	71.37
I	0.391	**120.74**	0.273	**107.30**	0.068	**69.92**	0.029	47.51
L	0.649	**121.93**	0.385	**98.29**	0.078	**61.32**	0.032	35.07

Source: Data processing in SPSS

On the last places (Cluster 1) are the farms from the following regions: Denmark, Bulgaria (Yuzhen tsentralen), Germany (2 - Brandenburg, Mecklenburg-Vorpommern),

France (Alsace, Picardie, Haute-Normandie, Centre, Bourgogne, Lorraine, Franche-Comté, Pays de la Loire, Poitou-Charentes, Aquitaine, Midi-Pyrénées, Languedoc-Roussillon) and Latvia. They have a higher indebtedness (a lower solvency) due to a higher share of liabilities in total assets and their costs are higher compared with their revenues. The farms from Cluster 2 and 3 are very similar, with a medium financial viability.

CONCLUSIONS

Faced with year 2009, only 24 types of farms have really improved their performance comparing with the others and they moved in a superior group of farms and 4 had a lower financial performance. All the others farms maintained their position to the ideal solution. From 94 analysed European types of COP farms, 53 had a medium financial performance, 17 had a lower financial viability and only 24 had a higher financial viability. The evolution of the clusters revealed however an improvement in financial viability with the exception of farms from the first cluster.

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THE ANALYSIS OF THE CULTIVATED AREAS, THE PRODUCTION AND THE SELLING PRICE FOR MAIZE CROPS DURING THE PRE- AND POST-ACCESSION PERIODS OF ROMANIA TO THE EUROPEAN UNION AND TRENDS OF EVOLUTION OF THESE INDICATORS

Valentina Constanta TUDOR[1], Daniela POPA[2], Gabriela Florentina GIMBĂȘANU[1]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, Emails: valentina_tudor@yahoo.com, gimbasanugabriela@yahoo.com
[2]State Agrarian University of Moldova, 44 Mircesti, Chisinau, Republic of Moldova, Email: d.popa@uasm.md

Corresponding author: valentina_tudor@yahoo.com

Abstract

Corn, one of the most important cereals, ranks second in the world ranking in terms of cultivated area, being overtaken only by wheat crops with a cultivated area of 220 million hectares, compared to 185 million hectares Corn, representing 80% of the cereal production. However, at U.E. And implicitly of Romania, it is noted that the area cultivated with corn begins to decrease significantly, being gradually replaced with sunflower or rape, far more profitable crops. By studying the cultivation of maize in Romania, we observe specific conditions determined by weeds and pests. The area cultivated with maize in 2015 was 2.6 million hectares. The presence of the Tanymecus dilaticollis corn root crop requires the treatment of seed with neonicotinoid products, for which Romania has managed each year to obtain a derogation from the European Commission, despite the fact that the trend at European level is to These products are forbidden from use. A possible ban on neonicotinoid-based products could mean a substantial reduction in corn-grown areas. This study was conducted in order to identify the critical periods of maize culture in Romania, but also to identify potential trends, taking into account the specific situation at European level.

***Key words**: maize, production, cultivated area, prices, trends*

INTRODUCTION

Maize (Zea mays ssp. Mays), cultivated for the first time more than 8,000 years ago, began to spread relatively quickly, managing to cover significant areas. Today, maize is dethroned only by wheat in terms of the area cultivated globally, while maize production is more pronounced than that of wheat [2].

The uses of corn are most diverse, ranging from human nutrition to feeding animals and even for bioethanol production [1]. If on the American continent the most important area cultivated with corn is genetically modified, in Europe the areas cultivated with genetically modified maize are quite small and the purpose of these plantations is more experimental. At 2015, 2.5 hectares of genetically modified maize were cultivated in Romania within the Agricultural Research and Development Section of Secuieni, while for 2016 no cultivation authorization was requested.

At the level of 2015 the area cultivated with maize in Romania was 2,604,475 hectares, being an extremely important crop for Romanian farmers. The European trend is to reduce the areas cultivated with corn and replace it with rape or sunflower, more profitable crops. The same trend is also noted at a national level, where more and more Romanian farmers choose to reduce the areas cultivated with maize and to increase the area planted with rape, a culture that has proved its profitability in recent years.

The main issue that has led farmers to reduce corn-cured areas is linked to its sales price, the last two years being extremely unpredictable, and the price of corn has dropped far enough under the pressure of

huge global stocks. Without a commodity exchange, the sale price of grain is dictated by traders [5].

Corn crop in Romania also suffers from specific climatic conditions but also from pests. The presence of the Tanymecus Dilaticollis in maize requires the need to protect crops by seed treatments with neonicotinoid products. In 2017, Romania managed to obtain a derogation from the European Commission for the use under certain conditions of these products, but it is likely that in the near future it would be forbidden to use such products at European level. Under these circumstances, the corn crop in Romania could range from several hundred hectares or even from the disappearance of this plant.

MATERIALS AND METHODS

The study consisted of the research, analysis and interpretation of the statistical data provided by the National Institute of Statistics in Romania, as well as the Eurostat international data base, on the surfaces cultivated with maize, the registered productions, as well as the sale prices during the pre-accession and post-accession period (Romania to the European Union), at the level of Romania, as well as at the level of the big corn producing countries. These, combined with the theoretical aspects extracted from the literature, have allowed the evolution trends of these indicators to be determined. The methodology consisted of descriptive analysis of data and comparative analysis, the results being presented in tabular and graphical form.

RESULTS AND DISCUSSIONS

According to the data provided by the National Institute of Statistics, the area cultivated with maize in Romania fell significantly. If in 1996 the area cultivated with corn was 3.2 million hectares, in 2015 the area cultivated with maize reached 2.6 million hectares, down 600,000 hectares. This was caused by the evolution of the land stock, by the evolution of prices for this crop, but also by the increased interest of farmers for other crops that are more profitable on UM.

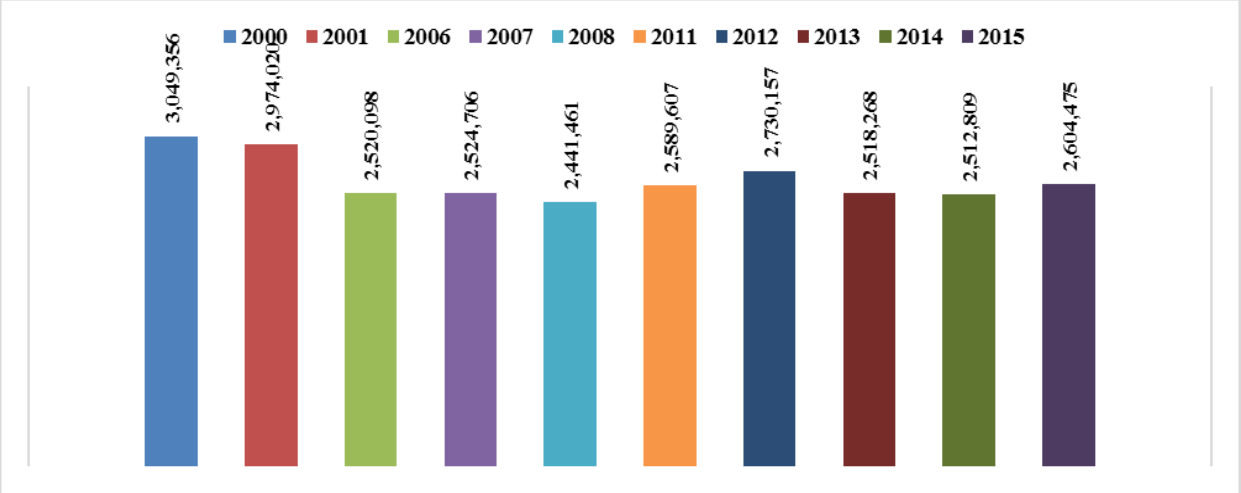

Fig. 1. Evolution of the surface cultivated with maize during the pre-accession and post-accession periods of Romania to the European Union (hectares)
Source: National Institute of Statistics database, accessed 18.02.2017.

Analyzing the evolution of the areas cultivated with corn it is noted that this culture was marked by important events in Romania. Thus, if in 2000, in Romania, an area of just over 3 million hectares of corn was cultivated, in 2007, the year of our country's accession to the EU. The area cultivated with maize was reduced to 2.5 million hectares, down 17.2%. In 2008, the first year in which Romania was officially part of the EU structures, the area cultivated with maize registered a decrease of 19.93% as compared to 2000, thus the most significant decrease of the maize surface since the

accession of Romania to the EU.

At the year 2015, maize was the main cereal cultivated in Romania with an area of 2.6 million hectares, compared to wheat cultivated on an area of 2.1 million hectares, 23.8% less.

Table 1. Analysis of the area cultivated with maize at EU level (thousands of hectares)

The surface cultivated with corn	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
European Union (28 countries)	**-**	**-**	**8,334.97**	**9,286.37**	**9,846.52**	**9,774.71**	**9,610.21**	**9,255.25**	**8,447.62**
%			**100**	**100**	**100**	**100**	**100**	**100**	**100**
Belgium	-	66.70	69.80	72.03	67.20	74.17	62.83	58.40	52.30
%			0.84	0.78	0.68	0.76	0.65	0.63	0.62
Bulgaria	329.30	274.20	327.52	399.42	466.80	428.30	408.40	498.64	422.00
%			3.93	4.30	4.74	4.38	4.25	5.39	5.00
Germany	520.50	464.30	466.59	487.90	526.20	497.00	481.30	455.50	416.20
%			5.60	5.25	5.34	5.08	5,01	4.92	4.93
France	1,758.50	1,679.80	1,600.33	1,596.71	1,718.64	1,839.83	1,848.07	1,639.49	1,488.74
%			19.20	17.19	17.45	18.82	19.23	17.71	17.62
Hungary	1,191.80	1,177.30	1,078.83	1,230.25	1,191.29	1,242.61	1,191.42	1,146.13	1,054.19
%			12.94	13.25	12.10	12.71	12.40	12.38	12.48
Romania	**2,441.64**	**2,339.39**	**2,098.47**	**2,589.78**	**2,731.16**	**2,518.88**	**2,513.56**	**2,607.37**	**2,366.51**
%			**25.18**	**27.89**	**27.74**	**25.77**	**26.16**	**28.17**	**28.01**

Source: EUROSTAT processed data.

According to Eurostat data, in 2016 Romania cultivated an area of 2.36 million hectares of corn, an area that places our country at the top of the European ranking in terms of corn covered area at EU level. The 2.36 million hectares of maize grown in Romania represent 28.01% of the total maize-grown area in the European Union of 28 countries. Significant areas of corn were cultivated in France (1.48 million hectares) and Hungary (1.05 million hectares).

Romania is at the forefront of the European ranking of the area cultivated with maize since 2010, when 25.18% of the total area cultivated with maize at U.E. was the area cultivated in our country. In contrast, in France, the second country in terms of the cultivated area, maize culture began to experience a decrease in surface area, from 1.6 million hectares in 2010 to 1.4 million hectares in 2016. This can be explained first of all by the fact that yields per hectare have increased quite a bit in France, but also because farmers are also heading towards more profitable crops than maize, such as rape or oilseeds in general.

At the level of 2016, Germany and Bulgaria have set up small corn fields. While Bulgaria has allocated an area of 422.000 hectares, Germany has set up 416.200 hectares.

Regarding the level of production recorded in maize crop, it is noted that it is not necessarily dependent on the cultivated area, but rather on the evolution of technologies and equipment used in agriculture. As can be seen, the most important corn production was recorded in 2014 when maize production amounted to 11.9 million tonnes, a quantity that was harvested from an area of 2.6 million hectares, Resulting in a country average yield of 4.57 tonnes/ha.

Table 2. Evolution of the production of maize crop during the pre-accession and post-accession period of Romania to the European Union (million tons)

Specification	**2000**	**2001**	**2006**	**2007**	**2008**	**2011**	**2012**	**2013**	**2014**	**2015**	**2015/2000 (%)**	**2015/2007 (%)**
Wheat	4.4	7.7	5.5	3	7.1	7.1	5.2	7.2	7.5	7.9	79.56	161.54
Maize	4.8	9.1	8.9	3.8	7.8	11.7	5.9	11.3	11.9	8.9	83.45	133.13

Source: Processing, database National Institute of Statistics; Date of access: 18.02.2017

Analysing comparatively the production obtained in 2015 compared to the year 2000, it is observed that the production of maize registered an increase of 83.45%, from 4.8 million tons in 2000 to 8.9 million tons in 2015. Corn production also grew significantly if we analyze the situation in 2007, the year of Romania's accession to the EU and the 2015

reference year, the production being twice as high as in 2007, from 3.8 million tons to 8.9 million tons.

Compared with the production of wheat, it is noted that the most important crops were recorded in the crop, exceeding even 11 million tons, while the wheat production surpassed 7.5 million tons.

Table 3. Average production of the maize in the main producing countries of the European Union (tonnes)

Maize average production	2008	2009	2010	2011	2012	2013	2014	2015	2016
European Union (28 countries)	-	-	7.13	7.55	6.03	6.82	8.06	6.36	7.15
Belgium	-	12.12	10.69	11.94	10.92	11.29	12.39	11.87	8.01
Bulgaria	4.16	4.71	6.25	5.53	3.68	6.39	7.68	5.41	5.40
Germany	9.81	9.75	9.03	10.62	10.48	8.83	10.68	8.72	8.79
France	9.11	9.11	8.83	9.97	9.09	8.17	10.03	8.38	8.19
Hungary	7.47	6.39	6.47	6.50	4.00	5.44	7.82	5.79	8.64
Romania	3.21	3.41	4.31	4.52	2.18	4.49	4.77	3.45	3.74

Data resulting from the reporting of total production on the cultivated area.

In terms of yield per hectare, the situation here is at least dramatic for Romania. If we are on the surface first, and total production in the second place in the U.E. With 28 states, we are at the bottom of the ranking, on the last place. A significant development was registered by Bulgaria, which has overtaken the yield in our country in recent years, so that Bulgarian farmers have recorded an average yield of 5.40 tonnes / ha, with 1.67 tonnes / ha more than Romania. In 2016, Hungary recorded an average production of 8.64 tonnes / ha, exceeding France by 8.19 tonnes / ha, while Romania recorded an average production of 3.74 tonnes / ha, 2.3 times less than that in Hungary.

Table 4. Comparative analysis of maize production registered in the main producing countries of the European Union (thousands tons)

Maize production	2008	2009	2010	2011	2012	2013	2014	2015	2016
European Union (28 countries)	-	-	59,418.95	70,124.25	59,329.14	66,659.53	77,460.27	58,901.30	60,414.21
%			100	100	100	100	100	100	100
Belgium	858.80	808.10	745.90	859.69	733.60	837.60	778.57	692.96	418.80
%			1.26	1.23	1.24	1.26	1.01	1.18	0.69
Bulgaria	1,368.30	1,290.80	2,047.41	2,209.20	1,717.80	2,738.67	3,137.48	2,696.92	2,280.00
%			3.45	3.15	2.90	4.11	4.05	4.58	3.77
Germany	5,105.90	4,527.20	4,211.50	5,183.60	5,514.70	4,387.30	5,142.10	3,973.00	3,658.70
%			7.09	7.39	9.30	6.58	6.64	6.75	6.06
France	16,012.50	15,299.90	14,134.92	15,914.12	15,614.12	15,031.14	18,541.78	13,738.24	12,191.84
%			23.79	22.69	26.32	22.55	23.94	23.32	20.18
Hungary	8,897.10	7,528.40	6,984.87	7,992.44	4,762.71	6,756.44	9,315.10	6,632.78	9,110.27
%			11.76	11.40	8.03	10.14	12.03	11.26	15.08
Romania	7,849.08	7,973.26	9,042.03	11,717.59	5,953.35	11,305.10	11,988.55	8,984.74	8,844.86
%			15.22	16.71	10.03	16.96	15.48	15.25	14.64

Source: EUROSTAT processed data.

At European level, in 2015, world maize production was 58.9 million tonnes, and the most significant production was recorded in France (13.7 million tonnes) and Romania (8.9 million tonnes). Significant outputs were also recorded in Hungary (6.6 million tonnes), but also in Germany (3.9 million tonnes) and Bulgaria (2.6 million tonnes).

As reported by Eurostat, even if Romania ranks first in the EU. From the point of view of the surface cultivated with maize, in terms of recorded production, our country ranks second, after France.

If in Romania in 2015 the average yield per hectare was 4.57 tons / ha, in France the average production per hectare recorded was 8.37 tons / ha, with 83.36% more than the one recorded in the our country.

While production of maize harvested in Romania at the level of 2016 represents

14.64% of the total European production, French production represents 20.18% of the total production, and that recorded in Hungary represents 15.08% of the total.

Table 5. Analyzing the sale price of maize during the pre-accession and post-accession periods of Romania to the European Union (lei/kg)

Sale price maize	2006	2007	2008	2011	2012	2013	2014	2015	2016	2016/2006 (%)	2016/2007 (%)
Total	0.3	0.55	0.72	0.79	0.87	0.74	0.61	0.6	0.62	106.67	12.73
North West Region	0.36	0.54	0.7	0.85	0.84	0.73	0.56	0.55	0.6	66.67	11.11
Center Region	0.33	0.6	0,74	0.94	0.95	0.93	0.62	0.63	0.67	103.03	11.67
North East Region	0.31	0.63	0,7	0.79	0.83	0.78	0.58	0.6	0.66	112.90	4.76
South East Region	0.29	0.57	0.67	0.77	0.89	0.73	0.6	0.59	0.59	103.45	3.51
Bucharest - Ilfov Region	0.38	0.62	0.78	0.82	0.98	0.85	0.67	0.67	0.66	73.68	6.45
South-Muntenia Region	0.3	0.61	0.7	0.78	0.85	0.68	0.67	0.65	0.65	116.67	6.56
South-West Oltenia Region	0.34	0.65	0.71	0.74	0.89	0.73	0.6	0.59	0.66	94.12	1.54
West Region	0.27	0.35	0.77	0.69	0.85	0.74	0.55	0.56	0.56	107.41	60.00

Source: Database Processing National Institute of Statistics, date of access: 18.02.2017.

The price is the indicator that decisively influences the decision to cultivate a plant to the detriment of another. Agricultural activity is directly influenced by the sale price of cereals, whether it be corn or wheat. The price of maize in Romania registered a significant evolution after Romania's accession to the EU. As it can be seen, corn is sold at an average price of 0.3 lei / kg in 2006, while the year 2007 led to a price increase Corn sale of 0.55 lei / kg.

Ten years after Romania's accession to the EU, the price of grain utilization remained one that was subject to hazards. In general, in Romania, the price of cereals is dictated by the level of production, so that, if it is a good year in which farmers manage to get significant output, the price of corn drops considerably, while, if it is a weaker year In terms of production, corn is sold at a better price. This is explained by the fact that there is no agricultural commodity exchange in Romania, where to set a minimum price and a maximum price for the capitalization of agricultural products. Without this tool, farmers leave the price to traders [6].

The year 2012, marked by an extremely aggressive drought in Romania, resulted in a production of only 5.9 million tons. At this level of production, the highest sales price was recorded, from 2006 to now, of 0.87 lei / kg. Conversely, in 2014, when a production of 11.9 million tons of corn was registered in our country, the capitalization price was 0.61 lei / kg.

Analyzing comparatively the corn price of the maize in the year 2016, compared to 2006 it is noted that there was an increase of 106.67%, from 0.3 lei / kg in 2006 to 0.62 lei / kg in 2016 In 2007, the corn sale price was 0.55 lei / kg, 12.73% less than the price recorded in the year 2016.

The price also varies according to the grain production area, so that the best price is obtained by those farmers operating in agricultural areas close to the port of Constanta, and the lowest prices are obtained by those farmers who are distant from the The main export point of Romanian cereals. The value of the U.E. Maize production in the year 2016 was 9.4 billion euros, down from 2007, the last major wave of US accession in the EU, when the value of maize production amounted to 10 billion euros.

In 2007, the value of corn production was 894.42 million euros, and nine years later, 2016, corn production increased to 1,549,05 million euros, up 73.19 percent. As you can see, Italy and France are the two states in the United States. Which recorded the most important incomes for maize production. At the level of 2016, these two countries recorded total revenues of EUR 3,230.47 million, representing 34.18% of the total value of maize production in the European Union of 28 countries.

Table 6. The evolution of corn production at EU level (million euro)

The value of maize production in the EU	2007	2008	2011	2012	2013	2014	2015	2016
European Union (28 countries)	10,078.61	10,138.57	13,952.01	12,718.49	12,394.02	11,806.17	9,335.36	9,451.09
%	100	100	100	100	100	100	100	100
Belgium	9,731.11	9,872.09	13,567.75	12,353.39	12,067.78	11,508.72	9,116.52	9,253.97
%	35.79	38.65	90.68	92.17	122.13	98.41	93.53	50.81
Bulgaria	0.36	0.38	0.65	0.72	0.99	0.83	1.00	0.54
%	40.46	210.54	371.37	303.07	355.27	397.56	377.32	324.17
Germany	0.40	2.08	2.66	2.38	2.87	3.37	4.04	3.43
%	729.98	706.35	1,034.00	1,136.00	858.00	803.45	632.42	581.27
France	7.24	6.97	7.41	8.93	6.92	6.81	6.77	6.15
%	2,854.10	2,124.90	2,962.50	3,302.20	2,571,30	2,726.30	2,248.60	2,025.76
Hungary	28.32	20.96	21.23	25.96	20.75	23.09	24.09	21.43
%	1,782.93	1,656.87	2,218.78	1,791.32	1,710.16	1,657.16	1,132.89	1.204.71
Romania	17.69	16.34	15.90	14.08	13.80	14.04	12.14	12.75
%	794.50	1,082.87	1,389.66	963.94	1,151.41	1,270.09	933.14	1,284.27
European Union (28 countries)	7.88	10.68	9.96	7.58	9.29	10.76	10.00	13.59
%	894.42	2,141.39	2,782.42	1,395.75	2,638.14	2,125.38	1,552.23	1,549.05
Belgium	8.87	21.12	19.94	10.97	21.29	18.00	16.63	16.39

Source: EUROSTAT processed data.

At the level of 2016 Hungary recorded a value quite close to that of Romania in terms of maize production. Thus Hungarian maize production amounted to 1,284.27 million euros, with only 20.61% less than Romania. Compared to Bulgaria, Romania is much better off, with Bulgarian farmers achieving a total value of 324.17 million euros by the end of 2016, five times less than the value of maize production in Romania.

The value of maize production in Romania is 16.36% at the level of 2016, while in France this represents 21.43% of the value of the total maize production registered in the EU.

Table 7. The evolution of the price of 100 kilograms of maize in the main producing countries of the European Union (euro)

The price of 100 kg of maize (euro)	2006	2007	2011	2012	2013	2014	2015
European Union (28 countries)	8.52	14.32	17.36	18,15	15,59	14.21	13.99
Belgium	12.34	17.73	21.04	21,05	19,51	16.60	16.20
Bulgaria	13.13	18.73	21.04	29.2	26.27	20.5	20.1
Germany	13.74	18.17	22.77	22.5	22.56	18.61	16.33
France	9.91	18.20	17.53	19.6	16.43	13.44	13.71
Hungary	11.49	17.42	16.52	17.49	15.99	13.02	13.56
Romania	**10.78**	**23.10**	**23.59**	**23.32**	**22.63**	**17.1**	**17.1**

Source: EUROSTAT processed data.

Analyzing the price of 100 kilograms of maize sold in the main producing countries of the European Union, it is noticed that at the level of 2015 the best price was obtained in France of 20.1 euro per 100 kilograms this while in Romania. The same quantity received a price of 17.1 euro, 14.92% less.

In terms of price, compared to Bulgaria and Hungary, our country is better positioned, here the quantity of 100 kilograms was bought at an average price of 13.71 euro in Hungary and 13.99 euro in Bulgaria at the level of the year 2015.

Regarding the import of maize, according to data provided by I.N.S., the import value of maize is an extremely low total import in Romania during 2005-2015. As can be seen from the figures presented, corn imports represent 0.47% (EUR 298.8 million) of the total import (62,962 million euros) in the year 2015, the year when the import value of corn is something more significant, relative to the total import value.

Regarding the export of maize in relation to the total value of the export of Romanian products, it is noticed that it starts to have a more significant weight since 2010, signalizing that European policies and subsidies are starting to reach their proposed objective to produce more and implicitly to sell more important quantities.

Table 8. Analysis of the import of maize from Romania during the period 2005-2015 (million euro)

Import value	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Total import value	32,568	40,746	51,322	57,240	38,953	46,869	54,952	54,703	55,317	58,522	62,962
%	100	100	100	100	100	100	100	100	100	100	100
Import value of maize	95.39	97.54	130.29	138.973	133.633	92.921	127.668	193.663	126.458	126.61	298.797
%	0.29	0.24	0.25	0.24	0.34	0.20	0.23	0.35	0.23	0.22	0.47

Source: National Institute of Statistics - Data processed.

Table 9. Analysis of Romania's maize exports during the period 2005-2015 (million euro)

Export value	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Total export value	22,255	25,850	29,549	33,725	29,084	37,360	45,292	45,069	49,562	52,466	54,596
%	100	100	100	100	100	100	100	100	100	100	100
The amount of grain exports out of the total EU	67.124	83.35	93.66	143.726	365.231	434.195	505.613	574.012	501.26	674.891	691.192
%	0.30	0.32	0.32	0.43	1.26	1.16	1.12	1.27	1.01	1.29	1.27
The value of maize exports	44.062	37.963	76.121	138.571	254.722	396.255	606.707	608.25	744.319	772.93	982.639
%	0.20	0.15	0.26	0.41	0.88	1.06	1.34	1.35	1.50	1.47	1.80

Source: National Institute of Statistics - Data processed.

At the level of 2015, the share of corn exports in total export value reached 1.80% (982.639 million). On the other hand, in 2016, corn exports decreased by 257.5 million euros, to 702.4 million euros for a quantity of 3.43 million tonnes.

CONCLUSIONS

Corn crops remain extremely important for Romanian farmers, despite the fact that the profitability of this crop has dropped quite a bit lately. In the absence of a functional irrigation system, farmers remain dependent on weather conditions. In good years, when the drought is not so aggressive in summer, the level of production in maize increases substantially, whereas in times of drought and drought the yield per hectare is substantially reduced.

From the point of view of the cultivated area, at the level of 2016 Romania is at the top of the European ranking, with a cultivated area of 2.36 million hectares, on which a total production of 8.84 million tonnes was harvested compared to France. The main competitor who set up an area of 1.48 million hectares from which he harvested a production of 12.19 million tons.

Despite the fact that we are in the first place in terms of the surface cultivated with corn, Romania is ranked second in the ranking of the EU member states, the first being occupied by France. While Romania recorded an average production of 3.74 tonnes / ha, France recorded an average production of 8.23 tonnes / ha, 2.2 times higher than that in our country.

Although in Romania the largest area in the EU is grown. With corn, we do not touch either the European average or the one recorded in France. This is explained by the fact that our country does not have an irrigation system that reduces the dependence of Romanian producers on weather conditions. Also, the technical endowment of the Romanian farms is still quite precarious, and the excessive fragmentation of the property, as well as the fact that large crops are still being cultivated on small areas (5 ha), pull down the performance recorded in the large Romanian farms. This excessive polarization, but also the fact that we still have farms with a production of 4 tons / ha in maize, and farms where the average maize production exceeds 12 tons / ha, prevent us from taking a leading position in the European ranking .

The average yield per hectare for maize crops registered in Romania is on the last position in the European ranking, which can be explained by the fact that, unlike other states, most of the maize-cultivated area in Romania is cultivated in Non-irrigated system, while in other European countries maize is grown only on irrigated land. Dependence on weather

conditions, as well as summer heat, mean that average yields per hectare are so small in Romania.

Another thing that can explain this significant gap is related to the fact that the Romanian agriculture is still extremely polarized. According to recent data, 80% of Romania's active farmers work 20% of the land, while 20% of farmers work 80% of the land. The performance of the few can not exceed the recordings of many, sometimes below a tonne / ha.

Another explanation may also be the fact that there is no close monitoring of the production that farmers record in the field, and the official data is based on farmer reporting, such as the situation in France where there is a close monitoring of how much Produces monitoring, which is also done by capturing satellite images.

Neither do we feel good about the harvesting of corn and because we do not have a stock exchange of agricultural products, but also because the geographical position does not help us too much in the price negotiation process. While in Romania 100 kilos of maize sold with 17.1 euro, in France the same quantity of corn was sold at an average price of 20.1 euros.

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IMPACT ASSESSMENT OF TARIFF REDUCTION IN SUGAR MARKET IN TURKEY

Fatma İlknur ÜNÜVAR, İlkay DELLAL

University of Ankara Faculty of Agriculture, 06110, Ankara,Turkey,
Email: unuvar@ankara.edu.tr

*Corresponding author***:** unuvar@ankara.edu.tr

Abstract

The aim of this study is to assess the impact of the possible reduction in Tariff Rate of sugar in Turkey under The World Trade Organization's (WTO). Sugar is an important product for human life and obtained from sugar beet, sugarcane, starch-based sweeteners and chemical sweeteners. In almost all countries a protected product and 70% of world production is consumed in the domestic markets of the countries and remaining 30% share in the sugar trade between countries as an important product.Sugar is obtained from sugar beet in Turkey and it's Tariff Rate is 135%. Under the title of market access in WTO, tariff reduction for products which are protected by more than 130% is 46% in developing countries. In this study; there are four model considered such as production, consumption, import and export and analyzed with 2 different scenarios which are zero Tariff Rate and prices after 46% discount on Tariff Rates of sugar. Partial equilibrium model was used. According to research findings; in each of two scenarios consumer welfare is observed to be increasing but these increases remain in low level. Producer and social welfare have emerged negatively in all three scenarios and the negative effect has been observed.

Key words**:** *WTO, Tariff Rate, Sugar beet, Impact Assessment*

INTRODUCTION

Sugar is an important product for human life and obtained from sugar beet, sugarcane, starch-based sweeteners and chemical sweeteners. In the face of increasing health problems of our day, it is considered as one of the "three whites" that one should keep a distance to (flour, salt and sugar). Nevertheless, it is quite an important food item in the context of food culture of and dietary habits in Turkey.

Extraction of sugar from sugar beet first started in Europe and then spread to other parts of the world. Due to her geographical features, Turkey produces sugar only from sugar beet. As to sugarcane, it is grown in mild-climate and topic countries. Besides sugar obtained from this crop, the side products of the process such as molasses and sugar residues are used in producing feed and ethanol, which constitute a significant economic contribution to other industrial branches. Furthermore, sugar beet culture is politically important in countries where it is practised in terms food security, employment, added vale it brings to the economy and some social considerations. In approximately 110 countries around the world are producing beet and cane sugar (Coban, 2009) [7]. In almost all countries a protected product and 70% of world production is consumed in the domestic markets of the countries and remaining 30% share in the sugar trade between countries as an important product (Benirschka et al., 1996) [5].

Of total sugar output marketed in 2015/16 80.06% was from sugarcane and 19.94% from sugar beet (Anonymous, 2017) [4]. Sugar prices in world markets are determined by cane sugar which is relatively less costly and more productive than beet sugar (Anonymous 2011) [3]. Sugar is one of those products protected in world markets by highest tariffs (Gibson *et. al*., 2001) [9] Sugar production and consumption is rising over years. Countries to its sugar policy; provide large investments in sugar production, is an important employment area and continue to intervene with the aim to provide food security (Demirci, 2003) [8]. In Turkey beet derived from sugar cost is more than the sugar

cane by the efficiency is low and dominating the world of production from sugar cane is taking place due to the price of sugar to other countries and the world price is higher than. This price is high for a reason, is protected by the policy (Cakıroglu, 2010) [6]. Sugar, raw and refined sugar obtained form and both are subject to international trade (Koo and Taylor, 2008) [10]. As the years with the production of sugar consumption is also increasing. The leading sugar producer countries at the same time important consumers and these countries are still widely in commerce (Anonymous, 2006) [1].

The leading sugar producers in the world include according to 2016 India(29,100 million tons), Brazil (35,590 million tons), EU(15,270 million tons), China (10 million tons), Thailand (12 million tons), Mexico (6,275 million tons), Australia (4,800 million tons) and Turkey (2,055 million ton)(Anonymous, 2017) [4]. As far as beet sugar is concerned, the EU and Turkey lead the list. In terms of world sugar consumption, the leading countries are India (25,500 million tons), EU (19,456 million tons), Brazil (12,125 million tons), Australia (1,005 million tons), US (10,180 million tons), China (15,640 million tons) and Russia (5,550 million tons), indicating that some leading producers are leading consumers as well (Anonymous, 2017; OECD, 2017) [4,11]. In terms of per capita sugar consumption in 2015, we see Brazil, also the leading producer, at the top of the list with 59.10 kilograms followed by Israel (58.50 kg), Australia (47.60 kg) and EU (37.90 kg). Per capita sugar consumption in the US is 31.60 kg, which is nearly half of that in Brazil (Anonymous, 2017) [4].

Table 1. Total sugar production in the world (000 tons)

Years	Sugarbeet	Turkey (Sugarbeet)	Share of Turkey's in World Sugarbeet Production (%)	Sugarcane	World Sugar Production
2009/10	34,313	2,262	7	120,453	154,766
2010/11	34,100	2,275	7	131,500	165,600
2011/12	40,000	2,263	6	135,100	175,100
2012/13	37,907	2,128	6	145,577	183,484
2013/14	38,530	2,390	6	145,972	181,502
2014/15	39,279	2,055	5	142,789	182,068

Source: Anonymous 2017

Table 1 gives total sugar production figures for the period 2009/10- 2014/15. The peak in total sugar production took place in the interval 2012/2013 as 183,484 million tons. The production of sugarbeet reached its highest value in 2011/12 with 40 million tons. The total world output in the early 2000s was 142.4 million tons, later climbing to 182,068 million tons in 2014/15. According to 2014/2015 while sugar production from sugar beet has its weight mainly in Europe (22,582 million tons), Asia (60,011 million tons) is the leading producer of sugar from care, followed by Latin America (43,537 million tons)(Anonymous, 2017) [4]. Lower ranking in total output is shared by Northern and Central America and Oceania in 2014/15.

According to 2015 data supplied by the Turkish Statistics Institute (TURKSTAT) there are about 200,000 farmers in Turkey engaged in sugar beet production. Sugar beet is grown on some 273,000 hectares of land. According to same data the total sugar output is 2.055 million tons, share of Turkey's in World sugar beet production 5% and annual per capita sugar consumption is 29.40 kilograms. This production data suggests that Turkey ranks fifth in the world after France(4 million tons), Germany (3,228 million tons), the US (4,679 million tons) and Russia (5,540 million tons) in beet sugar production and third in Europe (Anonymous, 2009; Anonymous 2017) [2, 4].

Sugar is one of the important agriculture-

based commodities discussed in WTO negotiations. Turkey's Tariff (Custom Dutty Rate) in sugar is 135%. Turkey sustains her domestic sugar beet production by imposing a high tariff in sugar.

The World Trade Organization's advanced rounds of negotiation on agricultural products essentially target substantial reductions in tariffs for such products under its market access. The objective of the present study is to analyze the economic implications of possible reductions in sugar tariff by Turkey.

MATERIALS AND METHODS

The core material of the present study consists of data obtained from databases of national and international organizations. Analyses are based on production, consumption, export, import, figures and domestic and international prices for 7 years in the period 2009-2015.

Firstly, the study constructs four distinct models for production, consumption, import and export as follows.

$$Q_{consumpton} = f(p,t)$$

$$Q_{import} = f(p)$$

$$Q_{production} = f(p)$$

$$Q_{exxport} = f(p)$$

In equations $Q_{consumption}$ denotes domestic sugar consumption, Q_{import} sugar import, Q_{export} sugar export, $Q_{production}$ sugar production, α fixed coefficient βp sugar price coefficient and βt trend coefficient. In the model for domestic sugar consumption two independent variables as sugar price and trend are used while sugar price is used as the only independent variable in all other models. In the second phase of the study, Partial equilibrium model is used to calculate the effect of a possible reduction in tariff and the price is calculated as shown below as the point where supply matches demand. Then, by changing the price in the model with respect to 2 scenarios, the effect of a reduction in Tariff is calculated on the basis of 2015 data. The two scenarios are as follows:

$$p_W = -(\sum \alpha_{demand} / \sum \beta_{demand}) + (Q_{spply} / \sum \beta_{demand})$$

(i)46% reduction in the Tariff which is 135%, and (ii) Zero tariff rate.

RESULTS AND DISCUSSIONS

Coefficients corresponding to production, consumption, import and export models constructed are given below. In the production model, sugar price is taken as independent variable and its coefficient is calculated as 720,370. The coefficient of the constant term in the model is 910,999. Both coefficients affect production at a significance level of 5%.

Other statistics in the model include Coefficient of Determination, Adjusted Regression and F-test. R^2 expresses to what extent the independent variable used in the model can explain the dependent variable and it is desired to be close to 1. In this model, R^2 is 0.42 meaning that price as the independent variable taken explains 42% of production.

The sugar price coefficient in Sugar Import Model is found as -91.569. The statistical value for t in the confidence interval 99% is found as 2.882, which is statistically significant. The sugar price coefficient sign is found as negative, meaning that imports increase as price rises up. The constant term coefficient in the model is calculated as 179,601. Explaining 50.9% of importation, the coefficient of determination is 0.509.

Table 2. Sugar production model

Independent variables	*Coefficients*	*Standard Errors*	*t*	*P*	*Sign.*
Constant	910,999	461,600	1.974	0.084	0.05
Sugar Price	720,370	299,529	2.405	0.043	0.05

Statistics for the model: Original $R^2 = 0.420$ Corrected $R^2 = 0.347$ F-statistic = 5.784

Table 3. Sugar import model

Independent variables	*Coefficients*	*Standard Errors*	*t*	*P*	*Sign.*
Constant	179,601	48,960	3.668	0.006	0.001
Sugar Price	-91,569	31,770	-2.882	0.020	0.001

Statistics for the model: Original $R^2 = 0.509$ Corrected $R^2 = 0.448$ F-statistic = 8.307

In sugar consumption model, the sugar price and trend is taken as independent variable. Time has greater effect on consumption relative to price. While one may expect fall in consumption as the price of sugar rises up, consumption has increased over years. The price coefficient is (-65,134), denoting that a unit increase in price leads to decrease of 65,134 units in consumption. The trend coefficient is 55,408 which mean that sugar consumption increases by 55,408 units each year. The price effect is not found significant in the consumption model while that of trend is found significant at the level of 1%. R^2 is 0.932; in other words independent variables explain consumption by 93.2%.

Table 4. Sugar consumption model

Independent variables	*Coefficients*	*Standard Errors*	*t*	*P*	*Sign.*
Constant	1,856.241	182,966	10.145	0.000	0.001
Sugar Price	-65,134	163,191	-0.399	0.702	
Trend	55,408	13,448	4.120	0.004	0.001

Statistics for the model: Original $R^2 = 0.932$ Corrected $R^2 = 0.913$ F-statistic = 48.201

In the Sugar Export Model, sugar price as the independent variable has the level of significance of 1% and sugar price coefficient is calculated as 830,394. The coefficient of the constant term in the model is 1,421.884. The t statistics is found as 3.946 in the confidence interval 99%. The coefficient of determination in the model is 0.661, explaining 66.1% of exportation.

Table 5. Sugar export model

Independent variables	*Coefficients*	*Standard Errors*	*t*	*P*	*Sign.*
Constant	1,421.884	324,291	4.382	0.002	0.001
Sugar Price	-830,394	210,430	-3.946	0.004	0.001

Statistics for the model: Original $R^2 = 0.661$ Corrected $R^2 = 0.618$ F-statistic = 15.572

Table 6. Basic data in sugar welfare analysis

Data	**2014/2015**
Production (000 tons)	**2,055**
Import (000 tons)	**4.6**
Export (000 tons)	**15.9**
Consumption (000 tons)	**2,639**
Market Price in Turkey (TL/kg)	**2.68**
SCENARIO 1: 46% reduction Tariff Rate which is 135% (TL/kg)	**1.13**
SCENARIO 2: Zero Tariff Rate (TL/kg)	**0.77**

*1 Turkish Liras 3,01 Euro (Average 2015)

The Partial Equilibrium Analysis of the model was conducted through supply and demand coefficients calculated on the basis of data given in Table 5 and coefficients of models mentioned above. The analysis is conducted with respect to 2 different scenarios by taking the year 2015 as base.

According to 2015 data, production is 2,055 million tons whereas the level of consumption is 2,639 million tons sugar prices for Turkey 2.68 TL.(Anonymous, 2017) [4].

In vase there is 46% decrease in Tariff Rate which is 135% at present as a result of a possible reduction by the WTO, sugar price

will be 1.13 TL.

According to 2015 data again, the price of sugar will be 0.77 TL in case no customs tariff is imposed.

Table 7. Sugar supply and demand coefficients and welfare values

Data	**2014/2015**
Supply Function Constant	911,178
Supply Function Price Coefficient	720,279
Demand Function Constant	1,857.662
Demand Function Price Coefficient	-65,965
Producers' Welfare (000 TL)	2,887
Consumers' Welfare (000 TL)	30,951
Social Welfare(000 TL)	33,838

Sugar supply and demand coefficients and welfare values and Supply Function Constant are calculated as 911,178 and Supply Function Price Coefficient as 720,279. While the Demand Function Constant is 1,857.662, the Demand Function Price Coefficient is -65,965. Given these, while producers' welfare is 2,887 TL, consumers' welfare is found as 30,951 TL. Social Welfare value is 33,838 TL.

Table 8. Welfare analysis according to scenario 1

Coefficient			
	TL	**Variatio TL**	**Variation %**
Producers' Welfare (000TL)	1,792	-1.094	-37.91
Consumers' Welfare (000TL)	31,761	810.750	2.62
Social Welfare (000TL)	33,554	-284.034	-0.84

Under scenario 2, in case there is 46% cut down in the existing 135% Tariff Rate for sugar, production will decrease by 22.37% while consumption increases by 2.62%. Producers' welfare will turn 1.7 million TL with a decline by 37.91%. This points out to a loss on the part of producers. Consumers' welfare, under the same scenario, will be 31.7 million TL with an increase by 810.750 TL. In spite of an increase by 2.62%, the effect on consumers' welfare is not so significant. As the sum total of both consumers' and producers' welfare, social welfare is down by 284.034 TL, turning out as 33.5 million TL, a decrease by 0.84%.

Table 9. Welfare analysis according to scenario 2

Coefficient			
	TL	**Variation TL**	**Variation%**
Producers' Welfare (000TL)	1,228	-1.658	-57.45
Consumers' Welfare (000TL)	32,179	1.228	3.97
Social Welfare (000TL)	33,408	-430.386	-1.27

The scenario 2 shown producers', consumers' and social welfare situations in case Customs Tariff Rates are fully lifted and trade in sugar is completely free. In this case, production will decline by 33.89% while consumption rises by 3.97%. As for producers' welfare, it is now 1.22 million TL after a decline by 1,658 million TL. This means a decline by 57.45% over the previous welfare figures. This decline means losses incurred by producers and occurrence of a negative impact. The consumer rant, on the other hand, emerges as 32.17 million TL with an increase of 1,228,000 TL. This is a rate of increase by 3.97% over the year 2010. While this may appear as a plus in terms of consumer welfare, the actual effect is not so big. Social welfare, it turns out as 33.4 million TL, dropping by 430,386 TL, corresponding to a decline by 1.27**%.**

CONCLUSIONS

Given its climatic and geographical features, Turkey responds to consumers' sugar need by focusing on sugar beet which is presently an important crop in terms of its place in overall production, contribution to national economy and overall consumption pattern. The purpose of the present study is to analyze the economic effects any prospective discount in sugar tariff. Accordingly, first four distinct models were constructed with respect to production, consumption, import and export. Then, the equilibrium price for sugar was calculated on the basis of partial balance analysis. The market effect of any possible reduction in tariff was examined under 2 different scenarios as follows: (i)46%

reduction in the Tariff which is 135%, and (ii)Zero tariff rate.

By altering the equilibrium sugar price found at rates envisaged in respective scenarios, the impact of a possible tariff reduction on production, consumption and welfare was examined.

The findings show that price as a variable is meaningful and as expected in production, export and import models whereas time is the significant variable when it comes to the consumption model.

According to the first scenario which assumes 46% reduction in tariff of 135%, there will be 22.37% decrease in production, 2.62% increase in consumption, 37.91% decline in producers' welfare and 2.62% increase in consumers' welfare.

Under the second scenario, if there is no tariff at all as envisaged under the third scenario, production will decrease by 33.89% consumption will increase by 3.97%, there will be 57.45% decrease in producers' welfare and 3.97% increase in consumers' welfare.

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STUDENT'S WAYS OF SPENDING LEISURE TIME. A CASE STUDY ON THE BACHELOR DEGREE STUDENTS OF UASVM

Ionela Mituko VLAD, Elena STOIAN

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Emails: bmitsouko@yahoo.fr, stoian_ie@yahoo.com

Corresponding author: bmitsouko@yahoo.fr

Abstract

In this paper we have analysed the determinants of the students' leisure time, based on 198 respondents of an questionnaire. The students are at the bachelor level in the Faculty MIEADR, USAMV Bucharest. The questions have reffered to the conditions in which students used to spend their leisure time. The performed analysis consisted in several steps. First, we made a descriptive analysis of the variables, by doing the frequences tables; then, there were performed correlation tables and the crosstabulation between pairs of variables. In order to verify the level of the statistical significance among the variables, it was also performed a chi-square statistical test. As general requirement, we have chosen to emphasise the results by pointing out the influence of the gender and place of residence variables for the respondents. From the findings of this paper, we have concluded that students of our faculty have different approaches, divided by place of residence regarding the holidays spend abroad. Meanwhile, by taking into consideration the gender, we got significant results regarding the responses on level of disponible revenus (a), the average spending amount by stay (b) and on the persons that accompanies the respondent student during the holidays (c). There were other results reflected on the level of Pearson coefficient on correlations between variable regarding the average lenght of the stays, the averge amount spend on accommodation and food etc.

Key words**:** *leisure time, questionnaire, students, gender, residence*

INTRODUCTION

Focusing in the leisure time, we have tried to design a frame of the young people – student at our faculty, by conducting on this purpose an questionnaire. This tool was composed 16 questions on personal data (age, gender, residence area), on spending amount for accommodation and food during the holidays, type of booking, touristic services, transportation and preferences for travel destinations abroad and the average spending amount that they are ready to pay for holidays. For this study, we relied on a methodology that has been targeted a number of analyzes conducted, particularly in light of coordinates gender and place of residence of the respondents. Through this approach we wanted to find out if perception and approach problems for the students spending holidays, reflected in the responses received, are closely related to their gender or their place of residence, in other words, if there is a significant difference between the coordinates listed on the possibilities to spend their free time. Reffering to the litterature on the same topics, we have mentioned the appreciation at a general level on tourism that was made by Ghazal [3], stated that "Tourism should be given the status of industry in order that the facilities and benefits available to the industry are also available to tourism projects". Another approach given by Yoon, Heo and Lee [10] made from a different point of view, maybe strictly from a specific education profile, has shared experiences on "An adapted version of the Course Experience Questionnaire (CEQ) administered to tourism management students…with a questionnaire previously utilised with students taking tourism-related degree courses…and accepting that student loyalty is an important concern and When an educational institution enhances student loyalty, it is expected to improve its reputation and education quality…". In order to validate the uses of our

tool, this time with a different purpose, we have cited another type of analyze based on structured questionnaires made by Wong Shun and Wong Kin [11] who clearly appreciated that " Structural equation modeling approach was used to evaluate the explanatory power and casual links of the model. The results indicate that relationship commitment is a strong driver of student loyalty. Second, relationship benefits, relationship termination costs, and shared values are found to have positive influence on relationship commitment...". Because the perception is related also to the touristic sector and education, the authors Yong and Chih [9] stated that in order « To investigate and identify critical attributes for education, we focused on the professional competency held by the course designers and on the delivery creativity and entrepreneurship concepts for students participating in knowledge or skills training." Another approach on gender was made by Iorga [5] who said that "The contemporary rural family is subjected to structural and major identity changes. In this respect the role of gender identity signifies the degree to which a person assumes his or hers behaviors specific to their cultural role". We have had in this paper an approach based on area of residence, and if we think about this structured approach on gender, there were studies on that issue; among these, we have mentioned those where Iorga [6] has made statements regarding the rural area such as "... studying gender equality within the rural family setting we must take into account the social construction of both genders (male and female) manifested along the interaction between the sexes. Gender equality defines the principle goal of family and social development, in which the rights, responsibilities and personal growth of each individual is not influenced by being born male or female but by how they make the upmost use of their potential." On the other hand, Kuan [7], examining gender differencies with a different approach and has found that with his purpose to examine the gender differences „in creative performance by using the Consensual Assessment Technique and taken as a whole, the CAT shows some value in examining creative performance in adult learners." To underline, once again, that obtaining results on differences in gender, Baer and Kaufman [1] concluded in their study that "Lack of differences between girls and boys, and between men and women, is the most common outcome of the many studies reported above. In some cases, especially in the area of divergent-thinking testing, there are significant numbers of studies in which one group or the other scores higher, but these are generally counter-balanced by studies showing just the opposite." Even if there is not a very recent study, the paper written by Dale and Robinson [2] expressed at that date, in theirs research area, habits and youngs' choisis, that are actually present also in our country; thus, they stated that "Explores developments in tourism education to date is drawing on wider theoretical perspectives including the ``McDonaldization" and the ``Disneyization" of society…". Another validation of the methods employed in this study, was made also by Stoian, Dinu et al. [8] where it was stated that "…questionnaires are a good tool that allows quantification and comparison of observation sets of information. The limits the use this tool for analysis are those that it requires time for implementation, significant resources and also important logistics and finally, we will provide a simplified picture of reality". With a very specific investigation over a destination, Hassan and Shahnewaz [4], have made by explorations which pointed out a different point of view; thus, they "examines existing tourism services of the highly trafficked destination of Cox's Bazar Sea beach in Bangladesh using a tourist satisfaction analysis. Using observation and self-determined questionnaire survey, the study classified tourist to their demographic and socioeconomic characteristics.

MATERIALS AND METHODS

In this paper we have conducted an analyse shaped on three types of computations. The first approach was based on analysis of frequency tables. Another approach was the

correlation coefficients, in which we obtained statistically significant coefficients for a number of variables. These correlations were also conducted and presented in the light of the gender and the place of residence of the respondents. Thirdly, it was followed a crosstabulation tables analysis and by contingency tables with the results of chi-square tests coefficient; in turn, they were discussed in terms of gender and place of residence. Thus, we have divided the content of the questionnaire into three major groups, by the meaning of the questions. The first group refers to the general conditions of deploying stays, the second group refers to the practical aspects of the trips with two direct questions, and a third group of the questions, refers strictly to the financial aspects of the touristic services from which benefited students surveyed. The second approach of the study was made by using the correlation tables with the Pearson' coefficient, by bivariate correlation. The pairs for which the correlation coefficient was with a high level of signification, were naturaly found later in the next step; this step consisted in crosssection tables, which enphasized the level and statistical signification on pairs of variables. In that sens, we have investigated on three dimensions crosstabs and focused, once again, on gender and place of residence. In order to decide on the level of statistical significance, this analyse was, like as usually, followed by the contingency table of the chi-square test.

RESULTS AND DISCUSSIONS

In this article we used the results of 198 questionnaires processed based on responses from students of the MEEARD Faculty. In order to analyze these responses, we used primarily frequency table, especially for your personal profile. Thus, we mention that the sample was made up of 128 women (64.6%), of which 71 were from urban area and 57 came from rural areas. For males, there were in total 70 respondents (35.4%), of which 46 were from urban areas and 24 from rural areas. Overall, the 117 respondents in urban areas (59.1%) and 81 coming from rural areas (40.9%) were registered an average age of 22.48 years. Another details to be mentioned here is the existence of other occupations, apart from those of being student. In this respect, the answers showed 85 students (42.9%) which recorded another paid occupation, while the remaining 113 (57.1%) have the only current profession, that of student (see table 1 below).

Table 1.Gender and residence frequency

			Residence		Total
			1	2	
Gender	F	Count	71	57	128
		%	55.5%	44.5%	100.0%
	M	Count	46	24	70
		%	65.7%	34.3%	100.0%
Total		Count	117	81	198
		%	59.1%	40.9%	100.0%

Source : own calculations, 2017

For the correlation coefficients, we only mentioned that for the bivariate correlation with the Pearson' coefficient, and the test of significance with two tailed, there was one variable (responses for the questions regarding level of the average revenu) which is correlated with 10 other variable and among these with gender (but not with the residence) and for instance, not with the one related to the type of payement for the touristic services. There were another four variables correlated with 8 other variables. A closer look was made for the variables gender and residence. The first one registered significant correlations only with three other variables (level of disponible revenus (a), the average spending amount by stay (b) and the persons that accompanies the respondent during the holidays (c)); meanwhile, the second one is correlated only with one variable (the 12th) and is the one regarding the student' habits to spend their holidays abroad. Getting these results, the follow up computation was the cross-tabulation in order to establish the statistical significance of the correlation coefficient. The analyse based on the cross-tabs was made for summarize cathegorical variables, in our case with three types of variables; in order to get more than two dimensions in the responses variables, we have introduced a third control variable. Thus, from the three way cross-tabulation; one first result is returned in a summary casses with

valid, missing and total casses (values). Other results were given by counting and percentage within respondents, divided, in our case by gender, than by residence. These will tell us, what was happend, in average among the female and males, respectivly, among the urban and the rural areas. The next output is the continuously contingency table which shows two options for the independent variables (or predictor variable). We can thus see, the response' categories of the dependent variable; we can also identify the actual observed values associated with the outcome and the expected values (values if there is no association between the two variables). Next step was to determine if we have statistical significance in this relationship. Because of the third control variable, in our case gender and residence, we have got two partial tables and one for the total. Thus, in order to generate and interpret a three-way cross-section tables with a chi-square test for independence, we displayed in the tables below the results of the variable 3 („the level of the average revenue"), controlled by the third variable, residence. So, we observed that the lowest percentage of disponible revenu in urban places is for the higher amount and the highest percentage is for the interval 500-1000lei. We have the same results for the rural areas in what concern the percentage of the highest level of the revenu, while the bigest percentage for the this revenu was registered for the level 1,000-1,500 lei. The results splited by gender and on total level are displayed below (table 2). The chi-square test indicated us that, on total level, the variable gender and the revenu can be consider, with the Person's corelation coefficient, statistical significant (p-value < 0.05).

Table 2.Crosstab on gender * variable 3 Level of the average revenue * Residence

Crosstab on gender * variable 3 Level of the average revenue * Residence									
Residence				**Variable 3**					Total
				1	**2**	**3**	**4**	**5**	
Urban	**Gender**	**female**	Count	11	27	17	12	4	71
			Expected Count	10.9	21.8	17	15.2	6.1	71
			% within Gender	*15.5%*	*38.0%*	*23.9%*	*16.9%*	*5.6%*	*100.0%*
		male	Count	7	9	11	13	6	46
			Expected Count	7.1	14.2	11	9.8	3.9	46
			% within Gender	*15.2%*	*19.6%*	*23.9%*	*28.3%*	*13.0%*	*100.0%*
Rural	**Gender**	**female**	Count	15	15	13	10	4	57
			Expected Count	12	12.7	14.8	10.6	7	57
			% within Gender	*26.3%*	*26.3%*	*22.8%*	*17.5%*	*7.0%*	*100.0%*
		male	Count	2	3	8	5	6	24
			Expected Count	5	5.3	6.2	4.4	3	24
			% within Gender	*8.3%*	*12.5%*	*33.3%*	*20.8%*	*25.0%*	*100.0%*
Total			Count	35	54	49	40	20	198
			Expected Count	35	54	49	40	20	198
			% within Gender	*17.7%*	*27.3%*	*24.7%*	*20.2%*	*10.1%*	*100.0%*

Chi-Square Tests				
Residence		**Value**	**df**	**Asymp. Sig. (2-sided)**
Total	Pearson Chi-Square	12.692	4	0.013
	Likelihood Ratio	12.724	4	0.013
	Linear-by-Linear Association	10.866	1	0.001
	N of Valid Cases	198		

Source: own computation, 2017

In similar conditions, the second computation was made for the variable 4 (the average amount usually designated to be spend on holiday) together with gender, also controlled by the third variable residence. With one of three posibles responses (500 lei/person; 500-1,000 lei/person, >1,000lei/person), the results were that students from both urban and rural zones spending in average 500 lei/person during a stay.

The results divided by gender are slightly different (Table 3).

Table 3. Crosstab on gender* variable 4 Average amount usually designated to be spend on holiday * residence

Crosstab on gender* variable 4 Average amount usually designated to be spend on holiday * residence							
Residence				**Variable 4**			**Total**
				1	**2**	**3**	
Urban	Gender	female	Count	43	21	7	71
			Expected Count	36.4	25.5	9.1	71
			% within Gender	*60.6%*	*29.6%*	*9.9%*	*100.0%*
		male	Count	17	21	8	46
			Expected Count	23.6	16.5	5.9	46
			% within Gender	*37.00%*	*45.70%*	*17.40%*	*100.00%*
Rural	Gender	female	Count	33	21	3	57
			Expected Count	30.3	21.8	4.9	57
			% within Gender	*57.9%*	*36.8%*	*5.3%*	*100.0%*
		male	Count	10	10	4	24
			Expected Count	12.7	9.2	2.1	24
			% within Gender	*41.7%*	*41.7%*	*16.7%*	*100.0%*
Total			Count	103	73	22	198
			Expected Count	103	73	22	198
			% within Gender	*52.0%*	*36.9%*	*11.1%*	*100.0%*

Chi-Square Tests				
Residence		**Value**	**df**	**Asymp. Sig. (2-sided)**
Total	Pearson Chi-Square	8.926	2	0.012
	Likelihood Ratio	8.885	2	0.012
	Linear-by-Linear Association	8.812	1	0.003
	N of Valid Cases	198		

Source: own computation, 2017

From the chi-square tests with the value of the Pearson' coefficient and the p-value (Asymp.Sig. 2-sided), we have got statistical significance for the urban area and for the total. The 7th variable tabulated with the gender and controlled by the residence variable, reffered to the persons that accompanies the respondents during their holidays. There were three type of responses; these people could be only family members (a), family and friends (b) or only the student' colleagues (c). The cross-tabulation is listed below and indicated us that definetly, our students spend their holidays mainly with the family and friends; meanwhile, the lowest score is registered for the first response (spending holidays with family members). Still, there is a difference between gender; the female students, spend more time with the family, then the male students. So, for this variable 7, there were registered differences between gender.

Thus, we pointed out the fact that in urban area, both females and males spend the lowest nomber of holidays with family; while in the rural area, there is a difference between gender: females spend more time with family members, while the males did that in a very small proportion.

All in all, the students spend their holidays first with family and friends, secondly only with colleagues and third only with family members.

The significance of these results comes from the chi-square tests, which indicated us that the results are significants for the rural area and for the Total (p-value, associated to the chi-square value is < 0.05). From a statistical significant chi-square tests, we are going to reject the null hypothesis and say that there is a significant relationship between the two variables, so the variable contribute to the realisation of the analysed variable (in our case variable 3, 4 and 7).

Table 4. Crosstab on gender* var 7 Persons that accompanies the respondent during holidays * residence

Crosstab on gender* var 7 Persons that accompanies the respondent during holidays * residence							
Residence				**Variable 7**			**Total**
				1	**2**	**3**	
Urban	Gender	female	Count	7	52	12	71
			Expected Count	6.1	48.5	16.4	71
			% within Gender	*9.9%*	*73.2%*	*16.9%*	*100.0%*
		male	Count	3	28	15	46
			Expected Count	3.9	31.5	10.6	46
			% within Gender	*6.5%*	*60.9%*	*32.6%*	*100.0%*
Rural	Gender	female	Count	12	39	6	57
			Expected Count	9.1	38.7	9.1	57
			% within Gender	*21.1%*	*68.4%*	*10.5%*	*100.0%*
		male	Count	1	16	7	24
			Expected Count	3.9	16.3	3.9	24
			% within Gender	*4.2%*	*66.7%*	*29.2%*	*100.0%*
Total			Count	23	135	40	198
			Expected Count	23	135	40	198
			% within Gender	*11.6%*	*68.2%*	*20.2%*	*100.0%*

Chi-Square Tests				
Residence		**Value**	**df**	**Asymp. Sig. (2-sided)**
Total	Pearson Chi-Square	10.453	2	0.005
	Likelihood Ratio	10.501	2	0.005
	Linear-by-Linear Association	10.169	1	0.001
	N of Valid Cases	198		

Source: own computation, 2017

Thus, from the table of chi-square test, we can say that there is a very strong evidence (agains the null hypothesis) that among respondents residence there are two variables that are independent or not associated in the population, so we could confidently reject (with a risck smaller then 5%) the same hypothesis; thus, there is a strong evidence that among the analised respondents, there is a relationship, at least of 5% significance level. In the opposite case, so when the p-value associated to the chi-square Pearson value is greater then 0.05, we can interpret the statistics that among respondents are insufficient evidence against our null hypothesis that the two variables are independent or not associated. So, in other words, because the p-value >0.05 (5% significance level), we will fail to reject our null hypothesis, so there is no relationship between the two analysed variables. However, in some situations, when controlling by gender, it could be a partial association between two variables, the relationship between the two variables is no longer statistically significant, but a partial association between remains, for those respondents where p-value < 0.05. When controlling respondent' gender, we can resume that it does appear not to have an impact on whenever or not their level will affect (so the first variabe will affect the second one).

The analysis of the variable referring to the terms in which „spending holidays abroad" was analysed by gender and place of residence; finally this has revealed the following: in urban areas for females who „go seldom abroad" for holidays has recorded the highest score, while the lowest score was recorded for the answer "always go abroad for holidays". Respondents coming from the rural areas said that they mostly „never go abroad", and the smallest level was for the responses „always go abroad for holidays". The male category, in both areas, urban and rural, have the highest options for the answers "rarely go abroad" and, as well as for girls and boys, answered that only the least go abroad to spend their holiday. We obtained here though overall, a positive association, so that we can say there is a very strong evidence (agains the null hypothesis) that among respondents gender has two independent variables that is associated in the population (Table 5).

Table 5. Crosstab on residence* var 12 Spending holidays abroad * gender

Crosstab on residence* var 12 Spending holidays abroad * gender							
Gender				**Variable 12**			**Total**
				1	**2**	**3**	
Male	Residence	Urban	Count	24	37	10	71
			Expected Count	30	33.3	7.8	71
			% within Residence	*33.8%*	*52.1%*	*14.1%*	*100.0%*
		Rural	Count	30	23	4	57
			Expected Count	24	26.7	6.2	57
			% within Residence	*52.6%*	*40.4%*	*7.0%*	*100.0%*
Female	Residence	Urban	Count	13	31	2	46
			Expected Count	15.8	28.3	2	46
			% within Residence	*28.3%*	*67.4%*	*4.3%*	*100.0%*
		Rural	Count	11	12	1	24
			Expected Count	8.2	14.7	1	24
			% within Residence	*45.8%*	*50.0%*	*4.2%*	*100.0%*
Total			Count	78	103	17	198
			Expected Count	78	103	17	198
			% within Residence	*39.4%*	*52.0%*	*8.6%*	*100.0%*

Chi-Square Tests				
Gender		**Value**	**df**	**Asymp. Sig. (2-sided)**
Total	Pearson Chi-Square	7.358	2	0.025
	Likelihood Ratio	7.355	2	0.025
	Linear-by-Linear Association	6.589	1	0.01
	N of Valid Cases	198		

Source: own computation, 2017

From the tables presented above, we can conclud that in terms of statistical signification there is one at the level at 5% between the variables associated, so there is a signification between the students' answers to the question on „Spending holidays abroad" and place of residence.

CONCLUSIONS

The first conclusion of the study, regarding the gender was that the highest level of the revenu disponible for holidays, is registered for males, both on urban and rural areas.The analysis of bivariate correlations of variables where there was added place of residence, we obtained results which confirmed that gender differentiation was most relevant in this study. Upon the second analysed variable reffered to the the average amount usually destinated to be spend on holiday, here once again, the male gender seems to spend more money for holidays. Meanwhile, the highest level of the revenu allocated to the holidays, registered very low scores and there are very small differences between the genders and between the urban and the rural areas. From the analysis of bivariate correlations of variables that were added like the residence, we obtained results indicating that gender differentiation was the most relevant in this study. Answers to the question related to the level of the revenue were relevant for respondents in urban areas, and partialy for those from rural areas; then, for the question on the amount that students assign for each stay – the results were relevant for urban respondents. The answers for question related to the persons that accompanies during the holidays the respondent, was relevant for the respondents in rural areas. The other variable analyzed (the average amount usually destinated to be spend on holiday), once again, the male gender tend to allocate more money for holidays. Meanwhile, the highest level of the revenu designated to holidays registered very low scores and there are very small differences between the genders and between the urban and the rural areas. The last computation we have made, was on possibility to spend the holidays abroad; thus, we have got statistical significance (with the value of the coefficient Pearson Chi-Square and its p-value < 0.05) by taking into account the place of residence; so there is a significant difference among the people coming from the different place of residence.

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