Scientific Papers Series Management , Economic Engineering in Agriculture and Rural Development
Vol. 13, Issue 2, 2013
PRINT ISSN 2284-7995, E-ISSN 2285-3952

ANALYSIS OF THE AGRI-FOOD SECTOR OF THE REPUBLIC OF MOLDOVA IN THE EQUATION MODEL OF GROWTH AND DEVELOPMENT OF THE FOREIGN ECONOMIC RELATIONS

Boris CORETCHI[1], Alexandru GRIBINCEA[2]

[1]Agrarian State University of Moldova, Chisinau
42 Mircesti street, MD-4209, Chisinau, Republic of Moldova, Phone: +373 22 432387,
E-mail: coretchi_boris@mail.ru
[2]State University of Moldova, Chisinau
60 Alexei Mateevici street, MD-2009, Chisinau, Republic of Moldova, Phone: +373 22 577691,
E-mail: agribincea@mail.ru

Corresponding author: coretchi_boris@mail.ru

Abstract

Republic of Moldova is a country with favorable conditions for agricultural development. In no other country in the world the chernozems (black soils) occupy up to 80% of the agricultural land. However the performance of the agricultural sector of the Republic of Moldova records a low level compared to other countries. The lack of competitiveness is reflected by low productivity, low economic growth, the fact that agriculture and food industry fail to keep pace with the increasing demand for food, determined by rapid overall economic growth and inability to cope with foreign competition, especially the one from European Union. In order to renovate the agricultural sector and enhance the competitiveness of its products it is necessary to pay special attention to the production of organic agricultural products which recently recorded an increasing demand both nationally and internationally.

Key words: *agricultural sector, agri-food products, barter, economic relations, inputs, international standards, international trade, organic products, quality.*

INTRODUCTION

Currently, both on the national and international level, agricultural development gets a new look. If until now the increasing volume of agricultural production was due to a combination of fertilizers and new highly productive plant varieties, then, at present, this agricultural system does not work so well because the soil is increasingly impoverished while chemical fertilizers and pesticides are harmful to human health. Most countries have tried to promote agricultural development by funding research activities, providing services and other types of support to stimulate production through subsidies. As a result of these activities the volume of agricultural production increased, which generally contributed to society development. Therefore, the promotion of organic products trading will help to increase the efficiency of agricultural sector. For the Republic of Moldova, organically produced agricultural products and their commercialization is a real chance of penetrating targeted international markets that are oversaturated with products from conventional farming and lack organic products. The purpose of our research is to assess the promotion of agricultural products trading in order to increase the efficiency of the agricultural sector.

MATERIALS AND METHODS

In this paper, analysis of the agri-food sector of the Republic of Moldova in the equation model of growth and development of the foreign economic relations, the method of analysis, induction, deduction and synthesis that allowed researching the essence of the topic and drawing some conclusions that we believed would be of interest for economics.
The end result is to develop economic and mathematical methods to quantify the growth and development of agri-food sector, which are scientifically based on the main aspects of

perspective and efficiency of foreign trade in the Republic of Moldova.

RESULTS AND DISCUSSIONS

At present, agriculture remains the major sector of country's economy due to its moderate climate, fertile soils and rich labour resources. However, Moldova's agriculture is characterized by increased economic and social consumption. It should be noted that even the reforms undertaken in order to enhance the efficiency of this sector didn't reach their goal. Thus, the newly formed enterprises use outdated models of management, work, remuneration, technological and sale system of agricultural production. Also, there is no fair competition on the market of agricultural products because of legislative, technical, economic and informational barriers. Both large and small enterprises from this sector are highly leveraged while rural demonetization obstructs the development of agricultural sector. [1]

In order to increase the efficiency of agricultural sector and enhance the competitiveness of agri-food products it is necessary to pay special attention to the production of organic agricultural products which recently recorded an increasing demand both nationally and internationally. Through organic agriculture it is implemented the agricultural production management system that promotes the use of renewable natural resources and recycling. Further we'll present the structure of economic agents by farm categories producing organic agricultural production in the Republic of Moldova. (Fig. 1.)

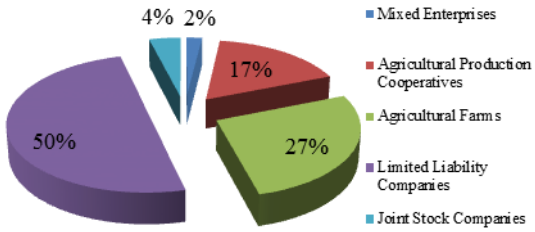

Fig. 1. Structure of the economic agents by farm categories
Source: elaborated by author based on data of the Ministry of Agriculture and Food Industry of the Republic of Moldova, 2012

In our opinion, the reduced share of agriculture could be explained by the fact that processing enterprises purchase agricultural production at low prices that do not cover the consumption incurred by farmers, while the latter are obliged to pay exaggerated prices for fertilizers, agricultural machinery, equipment and so on.

Table 1. Evolutionary aspects of the global plant production in all farm categories of the Republic of Moldova

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Global agricultural production at current prices, million lei	8646	9474	10354	11819	12688	13734	12825	16503	13300	19873	22619	20263
Including:												
Global plant production at current prices, million lei	5727	6298	7086	7900	8449	9079	7941	10600	7861	13616	15751	11346
Global animal production at current prices, million lei	2655	2870	2937	3524	3851	4278	4509	5519	4987	5786	6347	8417
Services at current prices, million lei	264	306	331	395	388	377	375	384	452	471	521	500
Absolute deviation of the global plant production, +,- thousand lei	-	571	788	814	549	630	-1138	2659	-2739	5755	2135	-4405
Index of plant production growth (reduction) at current prices, %	102	110	113	111	107	107	87	133	74	173	116	72
The share of plant production in global agricultural production, %	66,24	66,48	68,44	66,84	66,59	66,11	61,92	64,23	59,11	68,52	69,64	55,99
The share of animal production in global agricultural production, %	30,71	30,29	28,37	29,82	30,35	31,15	35,16	33,44	37,50	29,11	28,06	41,54
The share of services in global agricultural production, %	3,05	3,23	3,20	3,34	3,06	2,75	2,92	2,33	3,40	2,37	2,30	2,47

Source: author's calculations based on data of the National Bureau of Statistics of the Republic of Moldova, 2012. http://www.statistica.md/pageview.php?l=ro&idc=263&id=2193

Taking into consideration Moldova's goals to diversify international economic relations, increase exports, attract foreign investment, increase GDP per capita in rural areas, enhance environmental and social protection, win customer confidence, ensure food safety and traceability of agricultural products, we can mention that they fall in with the purposes of organic agri-food products sector development.

From the point of view of farm structures, Moldova's agriculture is uneven and unstable in terms of forming new production structures designed to meet market demands and use efficiently the human and natural resources in rural areas.

We can assess the volume of agricultural activity in terms of value using the global agricultural production at comparable or current prices, which is an important synthetic indicator that should be analyzed. (Table 1)

Analyzing the data in the table above, we noticed a minimization of 2356 million lei of the global agricultural production in 2012 compared to the previous year and 11617 million lei compared to the year 2001. As a result, there is a minimization of 4405 million lei of the plant production in 2012 compared to 2011 and 5619 million lei compared to the year 2001, and respectively there is a minimization of 2070 million lei of the animal production in 2012 compared to 2011 and 5772 million lei compared to 2001. The same minimization could be noticed in the case of services: in 2012 there is a reduction of 21 million lei compared to 2011 and 236 million lei compared to 2001. An evolutionary aspect of the agricultural production in the Republic of Moldova is shown in figure 2.

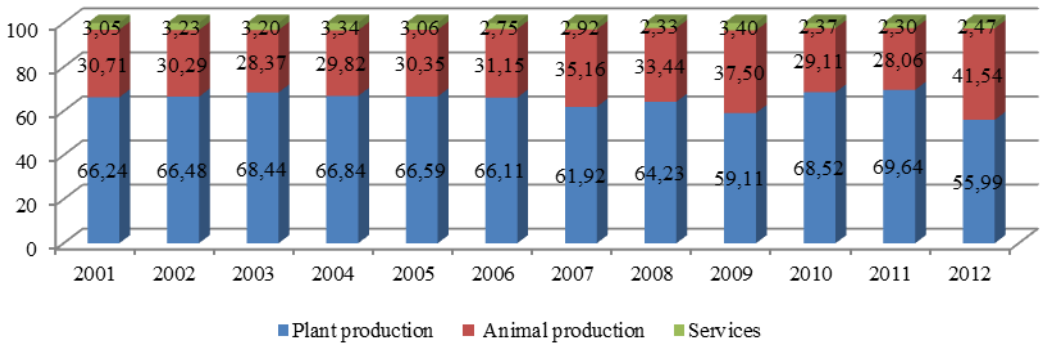

Fig. 2. Structure of agricultural production in the Republic of Moldova in the period 2001-2012
Source: elaborated by author based on data of the National Bureau of Statistics of the Republic of Moldova, 2012
http://www.statistica.md/pageview.php?l=ro&idc=315

Analyzing the evolution structure of global plant production in all farm categories in the Republic of Moldova at current prices, we remarked a considerable upward trend except for the years 2007, 2009 and 2012. Also there is an impressive growth in 2008, 2010 and 2011, recording the indices of 1,33; 1,73; 1,16 for the plant production increase at current prices.

Also, we observed a reduction of 13.65% in relative value and 4405 million lei in absolute value of plant production at current prices in 2012 compared to 2011. An essential increase of 2659 million lei or 33.48% of the plant production was recorded in 2008 compared to 2007. At the same time it should be noted that there is a slow increase of 2070 million lei or approximately 32.61% of the animal production at current prices in 2012 compared to 2011. Also we have to mention that in most analyzed periods there is a fluctuation in plant production at current prices and the influence on these important fluctuations is caused by drought. The highest reduction rate of the global production took place in 2008 compared to 2007 by 28.68% where global plant production at current prices increased by 2659 million lei or 33.48%. Also, another decrease of the global production occurred in 2009 compared to 2008 by 19.40% where global plant production at current prices decreased by 2739 million lei or 25.83% and

the third reduction of 10.42% took place in 2012 compared to 2011, where global plant production at current prices decreased by 4405 million lei in absolute value or 27.97%. Consequently, it was also noted the reduction of plant production share in the global agricultural production in 2007, 2009 and 2012.

However, the comparisons of plant production volume at current prices do not reflect real changes in volume because it does not take into account the inflation.

In order to neutralize the influence of the price factor it was calculated the index of production change at current prices. To find out the average annual increase (decrease) of plant production at current prices (K_m) we'll use the following formula:

$$K_m = \sqrt[n-1]{k_1 \times k_2 \dots k_n}$$

where:

k1, k2 … k – increase (decrease) index compared to the previous year;
n – number of dynamic range.

Following the calculations based on data in the table above, we obtained the average annual increase (decrease) rate of 1,065.

$$K_m = \sqrt[11]{1{,}02 \times 1{,}10 \times 1{,}13 \times 1{,}11 \times 1{,}07 \times 1{,}07 \times 0{,}87 \times 1{,}33 \times 0{,}74 \times 1{,}73 \times 1{,}16 \times 0{,}72} = 1.065$$

The obtained result proves the fact that in the period 2001-2012 global plant production recorded essential modifications in each year, but comparing the year 2012 to 2001 and to 2005 it was of 18,5% and 1,6% respectively.

The modification of plant production's evolutionary aspect also represents a specific feature of the global agricultural production as a whole. Analyzing the indices of global agricultural production by farm categories as presented in figure 3 we observed that, in 2012, global agricultural production at current prices in all farms decreased by 27.4% compared to the previous year.

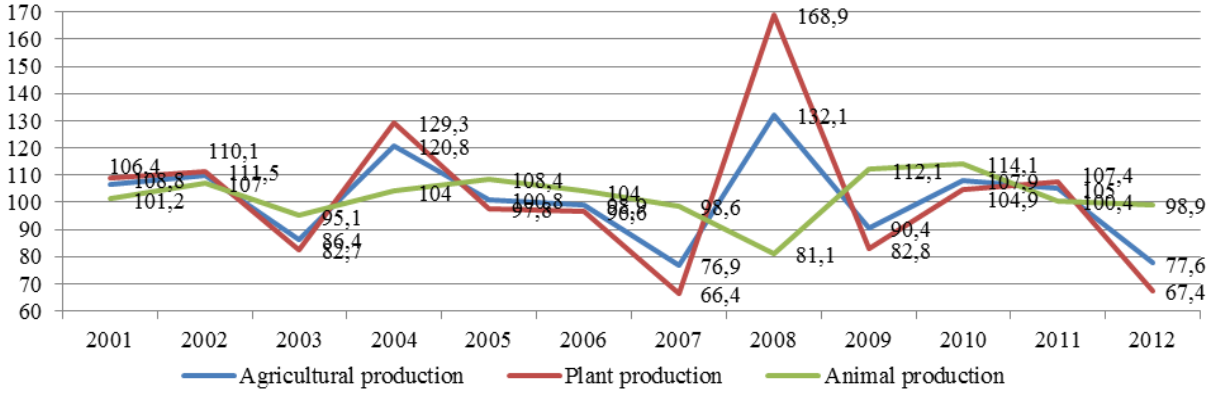

Fig. 3. Dynamics of indices of the agricultural production volume by farm categories, % (the previous year 100%)
Source: elaborated by author based on data of the National Bureau of Statistics of the Republic of Moldova, 2012, http://www.statistica.md/pageview.php?l=ro&idc=263&id=2193

The reduction of global agricultural production in 2007, 2009 and 2012 was caused by long-term drought and consequently crop yields fell by 2-3 times. The decrease of global agricultural production in the agricultural farms has also occurred as a result of reduction of field crops areas by 4.6% in 2003, 1.0% in 2005, 4.6% in 2006, 3.6% in 2007, 3, 5% in 2008, 5,9% in 2009, 6,1% in 2010, 6,9% in 2011% compared to the year 2001. A more detailed explanation is presented in Table 2.

Table 2. Dynamics of crop sown areas by farm categories

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sown areas - total	**1555,1**	**1573,8**	**1484,0**	**1567,5**	**1540,3**	**1483,4**	**1499,2**	**1500,3**	**1464,1**	**1460,3**	**1447,2**
Structure, %	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Cereal crops and leguminous grain crops	1076,5	1071,5	896,6	1077,1	1034,7	917,6	655,4	1005,8	353,2	328,2	301,8
Structure, %	69,2	68,1	60,4	68,7	67,2	61,9	43,7	67,0	24,1	22,5	20,9
Technical crops	301,0	331,0	417,1	344,7	358,0	400,7	368,2	342,1	365,4	388,3	412,4
Structure, %	19,4	21,0	28,1	22,0	23,2	27,0	24,6	22,8	25,0	26,6	28,5
Vegetables and Cucurbitaceous crops	114,2	107,7	89,9	79,1	79,8	87,6	81,5	81,2	76,4	77,1	72,6
Structure, %	7,3	6,8	6,1	5,0	5,2	5,9	5,4	5,4	5,2	5,3	5,0
Forage crops	63,4	63,6	80,4	66,6	67,8	77,5	94,1	71,2	70,7	75,3	68,2
Structure, %	4,1	4,0	5,4	4,2	4,4	5,2	6,3	4,7	4,8	5,2	4,7

http://www.statistica.md/pageview.php?l=ro&idc=263&id=2193

Analyzing the structure of agricultural production by farm categories in 2012, we observed an increase of 0,2% of the global agricultural production in the country; the agricultural farms recorded a decrease of 0,5% while family farms recorded an increase of 0,3% compared to the previous year. (Figure 4.)

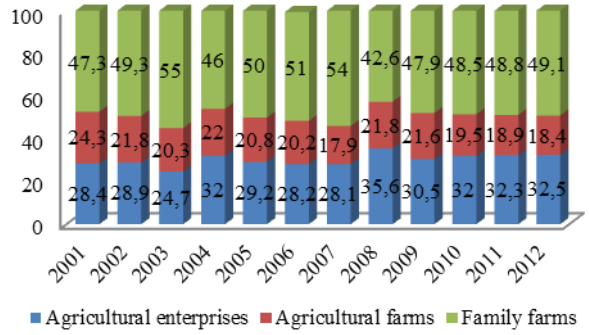

Fig. 4. Structure of agricultural production of the R. Moldova by farm categories (in percentage compared to total production volume)
Source: Elaborated by author based on data of the National Bureau of Statistics of the Republic of Moldova, 2012, http://www.statistica.md/pageview.php?l=ro&idc=263&id=2193

It should be noted that the growth rate of global agricultural production in 2012 compared to 2001 is by 1,34 times higher, compared to 2005 is of 59.6% and compared to the previous year it is of 10,42% respectively. A negative growth rate does not mean that the state or enterprise is less effective, especially if there are some isolated events (drought). The trend of production increase should be evaluated during several years.

The obtained results prove the possibility to achieve maximum allowable production potential by the agricultural farms.

In the table below we'll analyze the production of main plant products in the agricultural farms of the Republic of Moldova.

Table 3. Production dynamics of the main plant products in all categories of agricultural farms of Moldova, thousand tons

Indices	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Cereal crops and leguminous grain crops – total	2628	2587	1613	2993,7	2837,9	2290,2	901,9	3169,5	2176,5	2421,3	2498,2	1204
including:												
wheat	1181	1113	100,6	861	1056,7	691,4	406,5	1286,3	736,7	744,2	794,8	494
barley	230,9	220,5	57	268,3	212	200,1	115,2	353,1	261,4	208,4	194	129,3
- corn for grains	1118	1194	1414	1794,5	1492	1322,2	362,7	1478,6	1141,1	1419,8	1468,3	571
- leguminous grain crops	77,6	48	29,6	50,1	64,5	67,5	14,1	37,1	27,8	35,8	31,8	21,2
Sunflower	254,5	317,5	390	335,2	331,1	379,9	155,5	371,9	284,2	382,3	427,4	295
Soybean	9,5	12,6	19,4	40,2	65,6	79,8	39,8	58,1	49,2	110,6	78,7	49
Sugar beet	1085	1129	656,8	911,3	991,2	1177,3	612,3	960,7	337,4	837,6	588,6	584
Tobacco	16,1	11,8	6,9	7,9	6,7	4,8	3,6	3,9	4,4	7,6	5,4	2,8
Potatoes	384,8	325,2	302,8	317,7	378,2	376,9	199,4	271	260,9	279,6	350,8	182
Vegetables	448,1	396,5	360,8	315,2	389,3	475,2	221,8	376,3	307,9	341,2	361,5	231
Cucurbitaceous crops	38,3	28,4	71,6	56,9	48,3	92	41	69,9	101,9	103,4	84,1	61,83

Source: http://www.statistica.md/pageview.php?l=ro&idc=315

Analyzing the period 2001-2012, we can say that the production of main plant products in the Republic of Moldova was inconstant. Studying the impact of different production types on the physical volume rate of agricultural production in 2012 compared to 2011, we found that the most negative impact was caused by significant decreases in production: cereal crops and leguminous grain crops production by 1294,2 thousand tons, potatoes – by 168,8 thousand tons, vegetables - by 130,5 thousand tons, sunflower seeds - by 132,4 thousand tons, cucurbitaceous crops - by 22,27 thousand tons, which resulted in the reduction of global plant production in relative values, corresponding to 51.81%, 48.12%, 36.10%, 37.74% and 26.48%.

The decrease of plant production in 2012 compared to the previous year was due to lower average yield of all agricultural crops as a consequence of the exceptionally bad weather conditions of the last year. Thus, the average yield per a hectare of corn decreased by 2,6 times, wheat – by 1.6 times, soybean, potato, sunflower - by 1,7 times, barley – by 1.5 times, vegetables – by 1.6 times, cucurbitaceous crops - by 1.4 times and leguminous crops – by 1.5 times.

During the devastating drought of 2012, over 90% of the country's territory and 80% of the rural population depending on agriculture was affected by low yields.

In order to develop the prospects of trade with leguminous crops it is necessary to analyze the dynamics of its production in the Republic of Moldova (Table 4.) using the following indicators [2]:

1. Absolute gain (S_a):
- *fixed:* $S_{ab} = N_i - N_1$;
- *mobile:* $S_{al} = N_i - N_{i-1}$;

2. Rate of growth:
- *fixed:* $R_{cb} = \frac{N_i}{N_1} \times 100\%$;
- *mobile:* $R_{cl} = \frac{N_i}{N_{i-1}} \times 100\%$;

3. Rate of gain:
- *fixed:* $R_{sb} = \frac{S_a}{N_1} \times 100\%$;
- *mobile:* $R_{cl} = \frac{S_a}{N_{i-1}} \times 100\%$;

4. Absolute value of 1% of absolute gain compared to relative gain rate:

$$V_a = \frac{N_{i-1}}{100}$$

5. Absolute average gain:

$$\overline{S_a} = \frac{\sum S_{al}}{n}$$

where:

S_{ab} – *absolute fixed gain;*
S_{al} – *absolute mobile gain;*
R_{cb} – *fixed growth rate;*
R_{cl} – *mobile growth rate;*
R_{sb} – *fixed gain rate;*
R_{sl} – *mobile gain rate;*
V_a – *absolute value of 1% of the absolute gain compared to relative gain rate;*
N_i – *current level;*
N_1 – *first level;*
N_{i-1} *- previous level;*
n – *number of levels of dynamic range.*

Table 4. Dynamics of leguminous grain crops production in the Republic of Moldova

Years	Production of leguminous grain crops, thousand tons	Absolute gain, million lei		Rate of growth, %		Rate of gain, %		Absolute importance of 1% gain, million lei
		fixed	mobile	fixed	mobile	fixed	mobile	
2001	77,6	-	-	-	-	-	-	-
2002	48	-29,60	-29,60	61,86	61,86	-38,14	-38,14	0,78
2003	29,6	-48,00	-18,40	38,14	61,67	-61,86	-38,33	0,48
2004	50,1	-27,50	20,50	64,56	169,26	-35,44	69,26	0,30
2005	64,5	-13,10	14,40	83,12	128,74	-16,88	28,74	0,50
2006	67,5	-10,10	3,00	86,98	104,65	-13,02	4,65	0,65
2007	14,1	-63,50	-53,40	18,17	20,89	-81,83	-79,11	0,68
2008	37,1	-40,50	23,00	47,81	263,12	-52,19	163,12	0,14
2009	27,8	-49,80	-9,30	35,82	74,93	-64,18	-25,07	0,37
2010	35,8	-41,80	8,00	46,13	128,78	-53,87	28,78	0,28
2011	31,8	-45,80	-4,00	40,98	88,83	-59,02	-11,17	0,36
2012	21,2	-56,40	-10,60	27,32	66,67	-72,68	-33,33	0,32

Source: author's calculations based on data of the National Bureau of Statistics of the Republic of Moldova, 2012.
http://www.statistica.md/pageview.php?l=ro&idc=315

According to the obtained results we calculated the absolute average gain of the leguminous crops production in the period 2001-2012, which constitutes 4,70 thousand tons and which is considered a negative one.

$$\bar{S}_a = \frac{(-56,4)}{12} = -4,70$$

Dynamic changes, which represent a characteristic feature of the transition phase to market economy, and new requirements for enterprises imposed by the scientific-technical revolution determined a considerable increase in quality. Humanity has reached a stage when products quality has a strong influence on life conditions. Nowadays, personal security and health are closely dependent on the quality of products. Being analyzed in connection with the objective process of amplification and diversification of international economic exchanges, the quality is also an essential prerequisite for competitiveness and therefore for the participation of any country and any economic unit in the world economic circuit. The factors influencing the quality of agricultural products compared to other sectors of national economy are directly or indirectly determined by natural conditions especially those connected to the soil and climate.

The great variety of factors influencing the choice of production system in phytotechny is also determined by the fact that plant production is placed in different areas or natural economic micro-regions characterized by specific conditions.

Environmental factors vary in space and time. *The first* aspect influences the choice of system and *the second* concerns its functioning within acceptable limits and generally raises the issue of maintaining its balance. The achievement of second aspect requires, in case of disruptive conditions, to allocate different factors having counteractive effects, i.e. to make investments or additional expenses that will influence the costs of production and ultimately the financial results.

The chosen production system should emphasize, through crops structure and other components, the importance of environmental factors, aiming at increasing the productivity of various crops according to their needs, and by correcting their negative influence in order to avoid great variations from one period to another, otherwise it is possible to obtain a deviation of offer over the demand. [3]

Further we'll analyze actual and smoothed data of the leguminous grain crops productivity (table 5.).

Table 5. Actual and smoothed data of the leguminous grain crops productivity in the Republic of Moldova

Years	Productivity of leguminous grain crops q/ha (N)	Conventional time marking, (t)	t^2	N*t	Smoothed volume of productivity per 1 ha of leguminous grain crops, q/ha $\bar{N} = a_0 + a_1 t$
2002	8,4	-5	25	-42	10,4
2003	6,4	-4	16	-25,6	10,5
2004	13,6	-3	9	-40,8	10,5
2005	15,7	-2	4	-31,4	10,6
2006	16,3	-1	1	-16,3	10,6
2007	4	0	0	0	10,7
2008	13,6	1	1	13,6	10,7
2009	8,8	2	4	17,6	10,8
2010	10,7	3	9	32,1	10,8
2011	11,6	4	16	46,4	10,9
2012	8,2	5	25	41	10,9
	$\sum N = 117,3$	$\sum t = 0$	$\sum t^2 = 110$	$\sum Nt = -5,4$	$\sum \bar{N} = 117,3$

Source: author's calculations based on data of the National Bureau of Statistics of the Republic of Moldova, 2012.
http://www.statistica.md/pageview.php?l=ro&idc=315

The calculation of smoothed volume of productivity per 1 ha of leguminous grain crops we'll be done according to the following formula:

$$\bar{N} = a_0 + a_1 t$$

where:

The parameter a_0 of equation is:

117,3 : 11 = 10,7

The parameter a_1 of equation is:

-5,4 : 110 = 0,05

Actual and smoothed data obtained according to calculations are presented in the following graph.

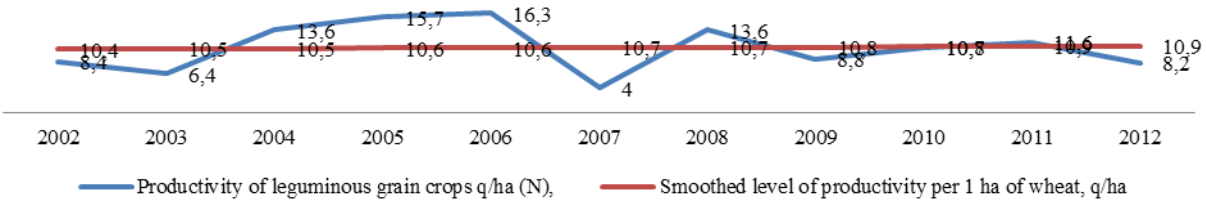

Fig. 5. Dynamics of actual and smoothed data of leguminous grain crops production in the Republic of Moldova
Source: elaborated by author

Using the process of extrapolating, in 2013, the productivity of leguminous grain crops will constitute:

$$\bar{N} = 10,7 + 0,05 \times 6 = 11 \text{ q/ha}$$

In 2014, it will constitute:

$$\bar{N} = 10,7 + 0,05 \times 7 = 11,05 \text{ q/ha}$$

In 2015, it will constitute:

$$\bar{N} = 10,7 + 0,05 \times 8 = 11,1 \text{ q/ha};$$

In 2016, it will constitute:

$$\bar{N} = 10,7 + 0,05 \times 9 = 11,15 \text{ q/ha};$$

In 2017, it will constitute:

$$\bar{N} = 10,7 + 0,05 \times 10 = 11,2 \text{ q/ha};$$

The parameters of re-estimated indices are very optimistic according to performed straight line forecasts. In the following years the index of smoothed level is growing as it has a positive assessment.

Achieving a strong growth of leguminous grain crops productivity would allow a decrease of Moldova's vulnerability and the commercialization of these crops in different countries. Rural space degrades economically, socially and culturally. In this context, for the Republic of Moldova, agri-food products diversification and the process of exchanging leguminous grain crops at constant rate with the economic partners exporting oil resources (for example:

$1kg\ of\ leguminous\ grain\ crops \equiv \alpha\ liters\ of\ oil, \alpha - constant$

) represent some of the possibilities to get out of the economic crisis.

CONCLUSIONS

Captivating into consideration the development of Moldova's agricultural sector and in order to increase the competitiveness of grain legumes, as well as to export them, one should:

At present, agriculture remains the major sector of country's economy due to its moderate climate, fertile soils and rich labour resources.

to diversify and create a system to produce, process and sell organic products designed to meet the needs of both national and international markets;

the diversification of the end product structure is one of the strategic issues of the country with commercial partnerships and different economic policies. Moldova can ensure financial stability only through diversification, thus, it will be able to withstand "attacks" from foreign economic partners, to value the potential of rural production.

During the devastating drought of 2012, over 90% of the country's territory and 80% of the rural population depending on agriculture was affected by low yields.

REFERENCES

[1] Boincean, B., 2004, Deservirea agrochimică şi promovarea agriculturii ecologice în Republica Moldova. În: Serviciul agrochimic în patru decenii de afirmare, Chişinău, p. 78-94.

[2] Ţurcanu, P., Stratan, A., 2006, Organizarea muncii şi a producţiei agricole. UASM. Chişinău, p. 255-256

[3] Iosif, G., 2000, Analiza economico-financiară a firmei în domeniul agroalimentar. Bucureşti: Editura Tribuna Economică, 520 p.