Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 18, Issue 4, 2018
PRINT ISSN 2284-7995, E-ISSN 2285-3952

ROMANIA'S SUNFLOWER SEEDS PRODUCTION, EXPORT AND IMPORT- ANALYSIS OF THE 2007-2017 PERIOD AND FORECAST FOR 2018-2022 HORIZON

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Abstract

The paper analyzed sunflower seeds sector in Romania in terms of production, exported and imported quantities, export and import value, trade balance and export and import prices in the period 2007-2017 and set up the forecast for the horizon 2018-2022 using the extrapolation method. Romania has a good performance in production and export of sunflower seeds, being ranked on the top position in the EU-28. The volume and quality of sunflower seeds has continuously grown, and the exported amount as well. The imported amount is 6 times lower than import, which favours the trade balance. The export was higher and higher and covered the import value resulting a positive trade balance. But, import price is higher than export price having a negative impact on the trade efficiency. For this reason, imported quantities should be kept at a low level. In the year 2022, it is expected as the seeds production. export and import to increase, as well as the trade balance to preserve its positive value. Farmers should pay attention to use high value cultivars and hybrids, to apply modern technologies, and improve the product market chain. The high demand for sunflower seeds for producing oil and biodiesel mainly in the EU and in other external markets is a chance for Romania to intensify its export.

Key words**:** *analysis, forecast, sunflower seeds, production, export, import, Romania*

INTRODUCTION

Oil seeds crops are of a large variety of species including soybeans, groundnuts, castor bean, linseed, mustard, rapeseed, sesame, sunflower, coconuts, olives and oil palms [5].

They are important in human diet, but also in industry due to their rich content in oil, protein, vitamins, fiber etc. Oils seeds are also used as fertilizers for land rejuvenation, the fiber is utilized in industry of textiles and plastics, also the cakes which remain from seeds procession are important in animal feeding. Oil seeds are efficiently used for producing renewable energy in terms of biodiesel.

The world oil seeds production reached 573 Million tonnes in 2017, of which sunflower seeds accounted for 50 Million tonnes (8.7 %). The main producers are Ukraine, Russia, EU-28, Argentina and China.

Oilseeds are object of international trade being a good deal for exporters. The export and import price depends on demand/supply ratio [11,13,19].

Sunflower (*Helianthus annuus L.)* is cultivated in many countries of the world due to its high capacity of adaptation, high degree of high mechanization, and low labor needs. However, its production could be deeply affected by droughts and in summer season it needs important rainfalls. In addition, it could be damaged by diseases and birds.

Sunflower is one of the most important oilseeds crops in the world as the content of its kernel in oil is about 50 %, of which 30% is the essential linoleic acid. Sunflower oil is rich in non saturated fatty acids compared to other oil types. At present, sunflower supplies 11% of the crude vegetable oil production [9].

Its oil is good for human consumption as it has a pleasant taste and flavor and it is rich in A, D, E. The hull is about 20-30% and contains mainly crude fibers. Also, it has 20 % protein. [1, 12, 20].

Argentina, Ukraine and Russia are the world leaders in producing and trading sunflower

seeds. They are responsible of about 52 % of the world sunflower production and 40 % of the world export. In 2050, it is expected as the world sunflower seeds production to reach 60 Million tonnes.

The EU-28 is the main beneficiary of the sunflower seeds sold by Ukraine and Argentina. Other importing countries are Turkey, Egypt and China who need to cover the demand of the domestic market.

In the Eastern Europe, Romania, Bulgaria, Turkey, Moldova and Serbia are the principal producers of sunflower. The world trade with sunflower oil accounts for 30 % of total consumption. [8].

In Romania, the main oilseeds crops are sunflower, rape and soybean which are successfully used in human diet and in animal feeding. Sunflower oil together with soybean fat are successfully utilized mainly in pig and poultry fattening assuring a high daily gain [14, 15].

Also, it is a good raw material for industry. The industrial processing is based on their high content in vegetal fat: sunflower 50%, rape 34 % and soybean 20% which is extracted and utilized as oil, bio fuel. It is also a very good plant in crop rotation with maize and wheat. Romania exports not only sunflower seeds, but also crude oil and meal [7, 16].

Sunflower oil is an important source of energy being well appreciated in producing biofuel, especially bio diesel [17].

In the EU, Romania is on the 1st position both for the cultivated area and the production of sunflower seeds. In 2016, the cultivated area with sunflower reached over 1.01 million ha and production recorded 1.95 Million tonnes. In the future, it is expected an increase of the cultivated area, production and export [18].

In this context, the paper aimed to study the situation of sunflower seeds production, export, import and trade balance during the period 2007-2017 and to forecast the expected performance in the sunflower sector of Romania for the 2018-2022 horizon.

MATERIALS AND METHODS

The analysis of sunflower sector is based on the following indicators: production of sunflower seeds and its share in oilseeds production, exported and imported amounts of sunflower seeds, the share of exported amounts in sunflower production, exported and imported quantities ratio, sunflower seeds export value, import value and trade balance, sunflower export price (FOB) and import price (CIF).

These indicators were studied using the data for the period 2000-2017 taken from N.I.S. Tempo online Data Base, and from FAOSTAT Data base [6, 10].

The analysis of the indicators characterizing sunflower sector was supported by the use of the following methods:

Index Method, of which it was utilized *Fixed basis Index,* having the formula $I_{FB}= (y_n/y_0)100$.

Average growth rate, $\bar{R}$, was determined according to the formula:

$\bar{R}_a = (\sqrt[n-1]{\frac{y_n}{y_0}} - 1)100$, where y_n is the n value and y_0 is the first value of the chronological series.

Absolute differences, $\Delta = y_n - y_{n-1}$

Mean, $\bar{X} = \frac{\sum_1^n x_i}{n}$

Graphical Method in order to display the trend and variations of each indicators during the analyzed period.

Linear regression function, Y= bx + a was used to analyze the relationship between sunflower seeds production, X, the independent variable, and oil seeds production, Y, the dependent variable. Also, it was used to analyze the connection between the exported quantity, the dependent variable and the sunflower seeds production, the independent factor.

Correlation coefficient and coefficient of determination were also determined to offer a more comprehensive image of the existing relationships between the indicators mentioned above.

Linear Extrapolation Method. The forecast for 2018-2022 horizon of production, exported and imported quantities, export and import price, export and import values and trade balance were determined taking into

account the level of each indicator achieved in 2017 and the average growth rate, $\bar{R}$, in the analyzed period and the average annual growth in absolute value $\overline{\Delta y}$ in the period 2007-2017.

The formula used to forecast these indicators belongs to Extrapolation Method based on the chronological series of data and was the following one:

$y_t = y_o + n_0 \times \overline{\Delta y}$

where:

y_t is the extrapolated indicator for the time horizon t;

y_o is the value of the indicator in the first year of the analysis, considered the base value;

n_0 is the number of years between the base value and the value at the t horizon;

$\overline{\Delta y}$ is the average annual growth in absolute value [2].

The most of results were graphically presented, and also tabled, being interpreted and commented. Finally, the conclusions were drawn reflecting the main ideas resulted from this research.

RESULTS AND DISCUSSIONS

Sunflower Production.

Oil seeds production is an important vegetal sector in Romania assuring both the internal market needs and also a substantial amount for export.

Oil seeds production has continuously increased from 1.04 Million tonnes in 2007 to 4.98 Million in 2017, being 4.76 times higher than in the 1st year of the study.

Sunflower is the main oil seeds crop, which is proved by the dynamics of its performance in production. In 2007, Romania achieved 0.54 Million tonnes sunflower seeds and in 2017, it produced 5.32 times more, i.e. 2.91 Million tonnes. However, the production was diminished in 2015 due to the unfavorable weather conditions. The average production of sunflower seeds in the interval 2007-2017 was 1,666.12 thousand tonnes. (Fig.1.).

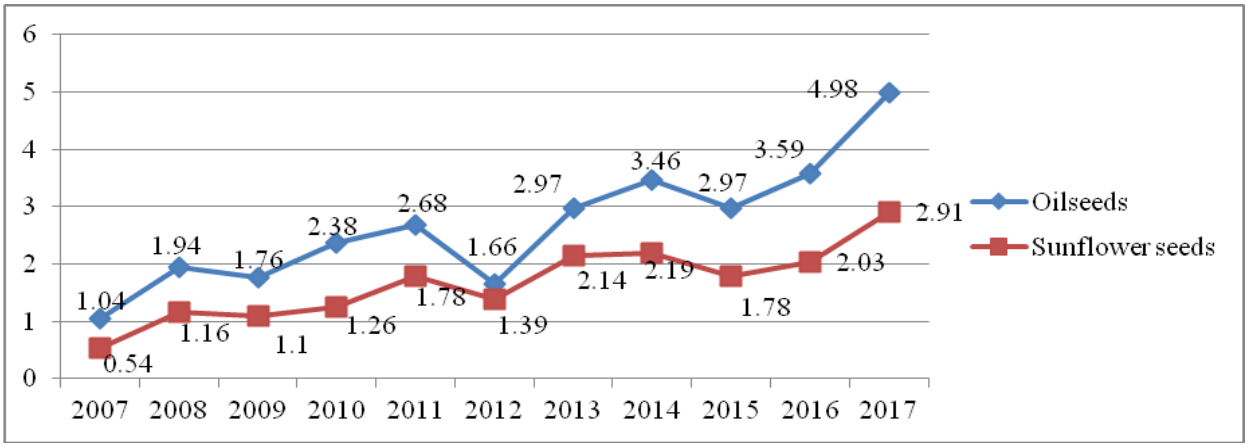

Fig.1. Sunflower seeds production in the period 2007-2017, Romania (Million tonnes)
Source: Own design based on the data from [6, 10].

The data shown in Fig.1. reflect that sunflower seeds production has been more dynamic compared to the oil seeds production.

Sunflower plays an important role among the oil seeds crops, so that its production represents 62.5 % in average of the oilseeds output. This share varied from 52.2 %, the minimum value registered in the year 2007 to 83.8 % in the year 2012. In 2017, the share has diminished to 58.4%, but it is higher than in 2007.

In the year 2017, Romania came on the 1st position in the EU for 1.95 Million tonnes sunflower seeds, meaning 23.04 % market share in the EU-28 production which accounted for 8.46 Million tonnes.

Romania is followed by other important sunflower seeds producers such as: Hungary (22.3 %), Bulgaria (21.27%), France (12.76%) and Spain (8.39 %) [11]

At the world level, Romania occupies the 5th rank contributing by 4.29 % to the world production which reached 47.34 Million tonnes in 2016. The top producers worldwide are: Ukraine (28.7 %), Russia (23.25%), Argentina (6.33%0, China (5.46 %) and Romania (4.29%) [4].

Regression of oil seeds production depending on sunflower seeds production is presented in Fig.2. The regression function y = 1.6121x - 0.0036 reflects the relationship between the two variables. Also, the coefficient of correlation is r = 0.959, a very strong and positive value and the coefficient of determination, R^2, shows that 92.09 % of oil seeds production variation is determined by sunflower seeds production. The significant F = 0.2495 is higher than the tabled values and confirms the strong relationship between the two indicators for P=0.05 % (Fig.2.).

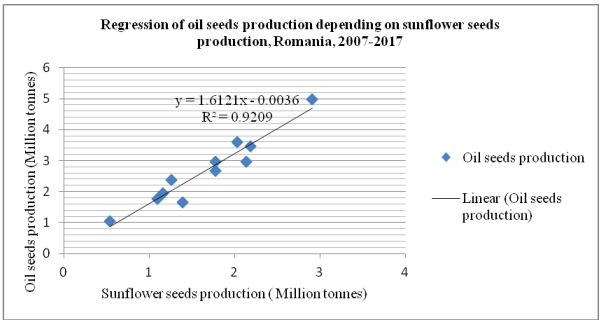

Fig.2. Regression of Sunflower seeds production oil seeds production depending on sunflower seeds production, Romania, 2007-2017
Source: Own design based on the data from [6, 10].

Exported and imported quantities of sunflower seeds.

The exported amount of sunflower seeds increased from 0.38 Million tonnes in 2007 to 1.18 Million tonnes in 2016, being 3.09 times higher than in the first year of the interval (Fig.3.)

Romania is the largest exporting country of sunflower seeds in Europe, with a contribution of 38 % to the 3 Million tonnes exported by Europe in 2016.

Since 2012, Romania occupies the top position in Europe's export. The growth rate of the export volume was +16 % and 9.3 % growth rate was recorded for export value.

Of the production of sunflower seeds, Romania exports about 60 % and the remained 40 % is destined to cover the needs of the domestic processors such as Bunge, Expur, Prutul and others. [3].

About 76 % of the imported sunflower seeds in Europe is assured by the intra-EU trade. In 2016, Europe imported 3.2 Million tonnes of sunflowers seeds. Romania is the main supplier having 27 % market share, being followed by Bulgaria (13%), Hungary (11%) and France (8.5 %).[3].

The main importing countries of sunflower seeds from Romania and other suppliers are the Netherlands, France, Germany, Spain and Italy.

The imported amount of sunflower seeds is about 6 times smaller than the exported quantity. In the analyzed period, the imports increased from 0.07 Million tonnes in 2007 to 0.20 Million tonnes in 2016, meaning +185.7 % compared to the 1st year of the study (Fig.3.)

The main suppliers of sunflower seeds for Romania are Republic of Moldova, France, Bulgaria, Hungary and Turkey.

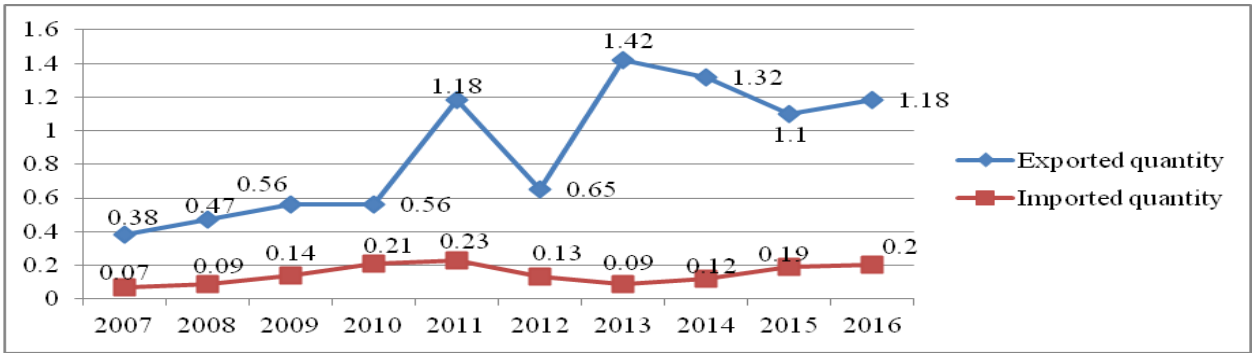

Fig.3. Sunflower seeds exported and imported amounts in the period 2007-2017, Romania (Million tonnes)
Source: Own design based on the data from [6]

Regression of exported quantity depending on sunflower seeds production is presented in Fig.4.

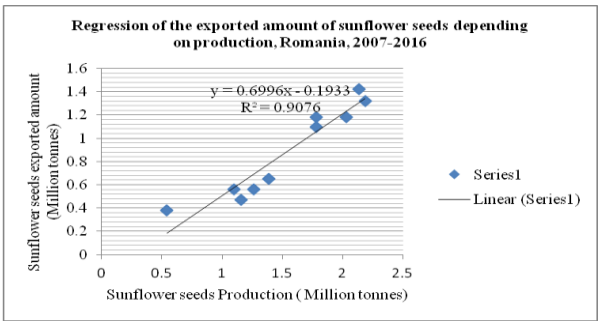

Fig.4. Regression of Sunflower seeds exported quantity depending on production, Romania, 2007-2017
Source: Own design based on the data from [6]

The regression function y = 0.6996x - 0.1933 shows that the relationship between the two variables is linear and strong. This aspect is attested by the correlation coefficient r = 0.952, a positive value and the determination coefficient, R^2, which reflects that 90.76 % of oil seeds export is determined by production. The significant F = 0.2067 is higher than the tabled values and confirms the strong link between the two variables for P=0.05 %.

The share of export in production. Taking into account the high production of seeds, the contribution of sunflower to the exported quantity is very high. The export/production ratio had values ranging between 0.69, the maximum level recorded in 2007 and 0.58 in the year 2016. The average level of this ratio was 0.56 in the analyzed interval (Fig.5.)

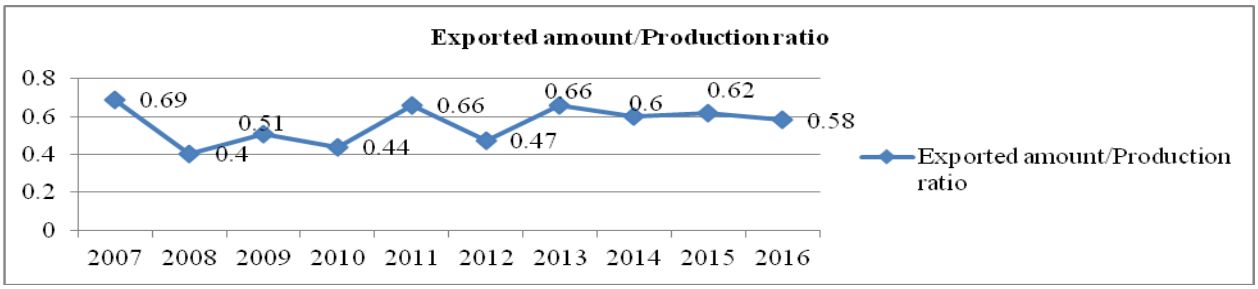

Fig.5. The ratio between the exported amount and production of sunflower seeds, Romania, 2007-2017
Source: Own design based on the data from [6]

Export value, import value and trade balance.

The export value recorded an ascending trend from USD 144.3Million in 2007 to USD 542.1 Million in 2016, meaning + 275.6% compared to the 2007 level.

The import value increased 3.44 times in the studied period from USD 44.5 Million in 2007 to USD 153.2 Million in 2016.

The trade balance of sunflower seeds had a positive value in all the years as a consequence of the higher value of export compared to import value. In 2016, it accounted for USD 388.9 Million, being 3.89 times higher than in 2007 (Fig.6).

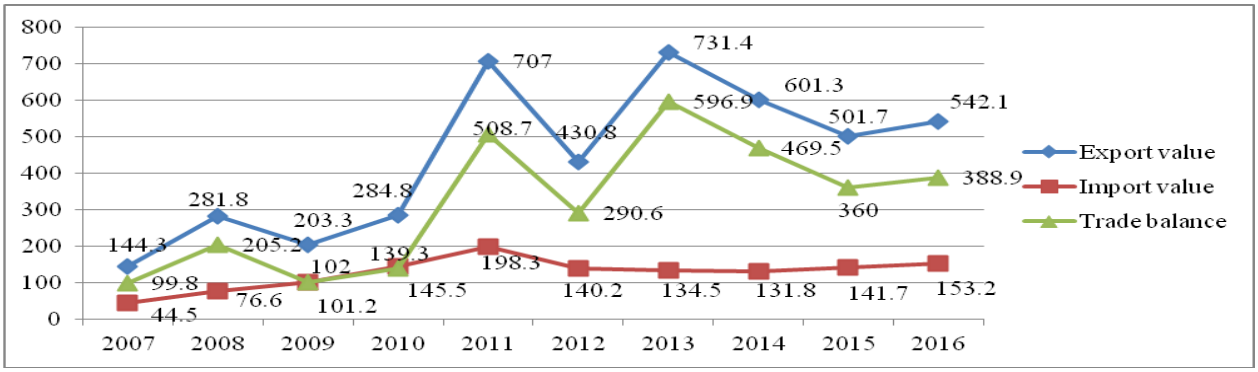

Fig.6. Sunflower seeds export value, import value and trade balance, Romania, 2007-2017 (USD Million)
Source: Own design based on the data from [6]

The key factors with a positive impact on the trade balance have been: the high production of sunflower seeds, the export price on special market segments and the low imports. But, Romania has still a low yield of sunflower seeds and in this respect farmers must do more to improve the performance.

Average export and import price of sunflower seeds.

The average export price (FOB) raised by 21.4 % from USD 377 per tonnes in 2007 to USD 457.9 in 2016. However, the highest export price was in 2012 when a tonne of sunflower seeds was sold for USD 659.4.

The average import price (CIF) varied from USD 668.6 per tonne in 2007 to USD 776.9 in 2016, reflecting a growth rate of 16.19 % in the whole analyzed interval.(Fig.7.).

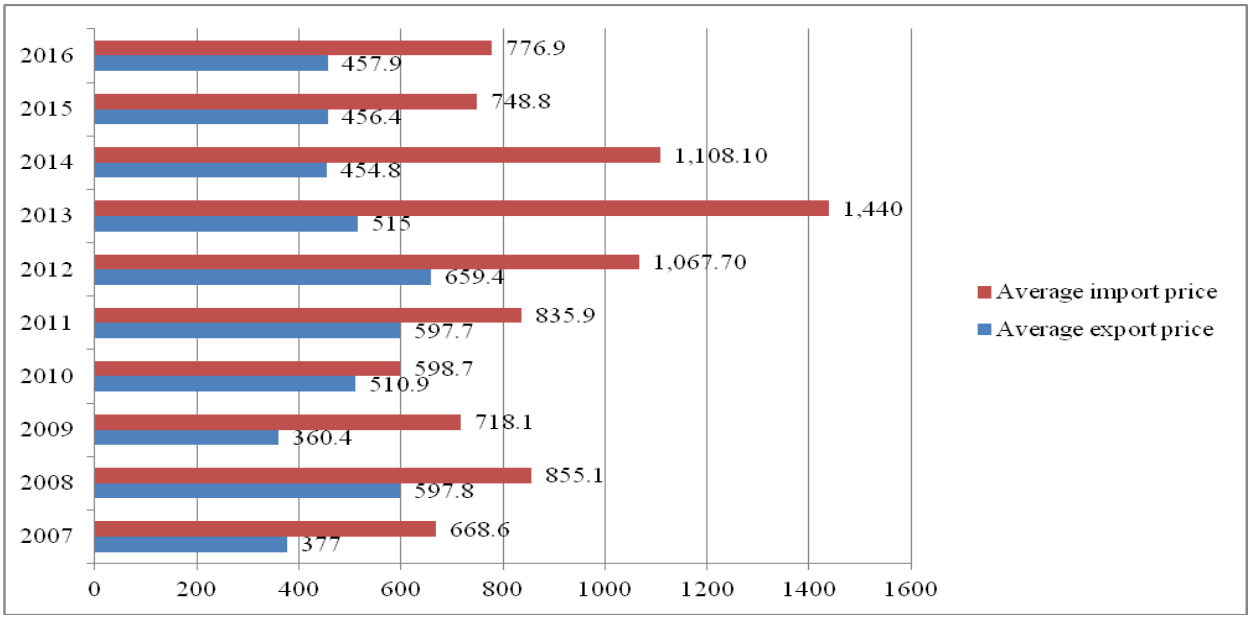

Fig.7. Sunflower seeds export and import price, Romania, 2007-2017 (USD/Tonne)
Source: Own calculation and design based on the data from [6]

The ratio between the export price and import price ranged between 0.56 in 2007 and 0.59 in 2016, as a consequence of the levels of prices. The highest ratio was 0.73 registered in 2010, and the smallest one was 0.41 recorded in 2014.

This ratio reflects that import price is not in favor of Romania as it has a negative influence on sunflower seeds trade balance.

Therefore, the positive trade balance is due mainly to the high quantity of exported sunflower seeds and to the smaller imported amounts.(Fig.8).

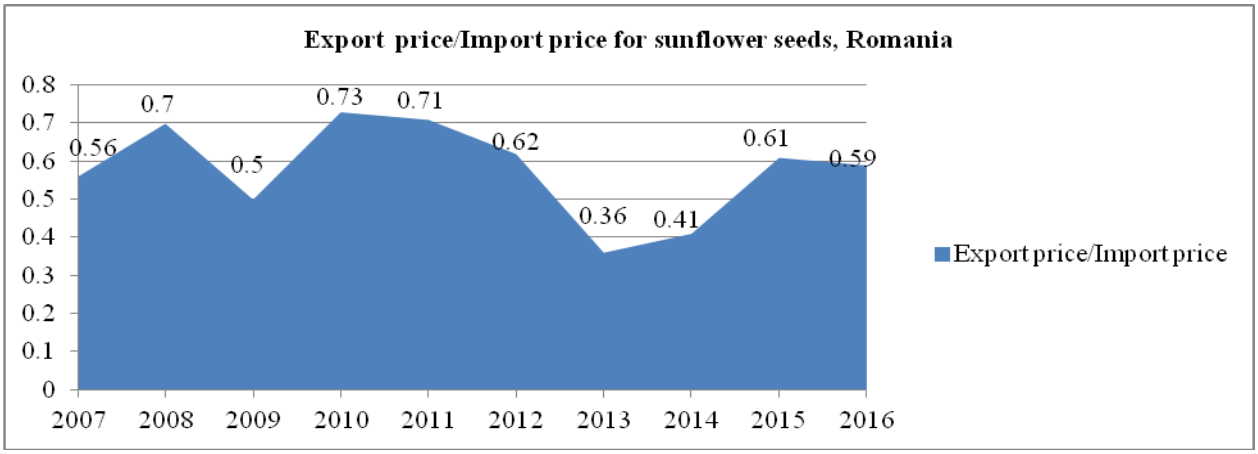

Fig.8. Sunflower seeds Export price/Import price ratio, Romania, 2007-2017
Source: Own determination and design.

Forecast of sunflower seeds production, export, import, trade balance for 2018-2022 horizon.

Production forecast started from the production level recorded in 2017, meaning 2,912.7 thousand tonnes and taking into account the average annual gain in production in the period 2007-2017, 236.58 thousand tonnes, it was estimated that Romania will produce 4,095.3 thousand tonnes or 4.1 million tonnes sunflowers seeds in the year 2022.

The exported quantity was estimated for 2,014.7 thousand tonnes in 2022, taking into consideration that in 2017 it was exported 1,322.2 thousand tonnes and the average yearly gain in the analyzed period was 138.5 thousand tonnes.

The imported quantity of sunflower seeds will increase in the forecast horizon from 211.7 thousand tonnes in 2017 to 284.2 thousand tonnes in 2022., meaning by +33%.

The average export price of sunflower seeds is estimated to reach USD 706.3 per tonne in the year 2022, when it is expected to be by 41.4 % higher than in 2017.

The average import price is expected to reach USD 1,031.3 per tonne in 2022, being by 25.8 % higher than in 2017.

Table 1. The estimates for production, exported and imported quantities, export and import price, export value, import value and trade balance in Romania for the 2018-2022 forecast horizon

	Production Million tonnes	Exported quantity Million tonnes	Imported quantity Million tonnes	Export price USD/tonne	Import price USD/tonne	Export value USD Million	Import value USD Million	Trade balance USD Million
2017	2.91	1.32	0.21	499.3	819.3	660.16	173.44	486.72
2018	3.14	1.46	0.23	540.7	861.7	789.80	194.91	594.89
2019	3.38	1.60	0.24	582.1	904.1	930.89	217.81	713.28
2020	3.62	1.73	0.25	623.5	946.5	1,083.45	241.54	841.91
2021	3.85	1.88	0.27	664.9	988.9	1,247.48	266.70	980.78
2022	4.10	2.01	0.28	706.3	1,031.3	1,422.98	293.09	1,129.89
2022/2017 %	140.8	152.2	134.2	141.4	125.8	215.5	168.9	232.1

Source: own determination.

The estimates for export value, import value and trade balance for the year 2022 are the following ones: USD 1,422.98 Million in case of export value, USD 293.09 Million in case of import value and USD 1,129.83 Million for trade balance. Therefore, it is expected as in 2022, the export value to be by 115.5 % higher, import value by 68.9 % higher and trade balance by 132.1 % higher than in 2017 (Table 1).

This forecast is available if the conditions will remain unchanged. In general, the cultivated surface with sunflower exceeds 1 million ha, but it is possible to increase this area in the future to balance the deficit which could be caused by unfavorable factors. For example, in 2018, the months with high humidity determined a delay of sowing and this affected production performance, Also, possible droughts could continue in the next years and could diminish yield and total production.

In the EU, other countries like Spain and Hungary have also extended the cultivated surface with sunflower, while other member states like Italy, Bulgaria and France have reduced it, which could be an advantage for Romania.

CONCLUSIONS

Based on this research it was found that Romania is the main EU producer and exporter of sunflower seeds, but also of oil and meal. The production of sunflower seeds has continuously increased both as volume and quality, and after covering the internal needs on the domestic market, over 60 % is exported. The amount of exported sunflower seeds has increased and also the import, but the last is 6 times smaller than export.

The export value has grown fast during the analyzed period and covers very well the import value leading to a positive trade balance.

Taking into account that the import price is higher than the export price, it is obviously clear that the main factors determining the positive trade balance are: the high quantity of exported sunflower seeds and the low imported amount.

Romania has a good position among the sunflower seeds producers and exporters in the world and has to continue to make efforts to preserve this rank. In this respect, farmers should use high value hybrids and varieties, to apply modern technologies, to increase production quality and improve distribution along the product chain. Export must remain an important tool for bringing foreign currency in the country as long as the demand of sunflower seeds is very high both for oil for human consumption, but also for meals used in animal feeding and for producing biodiesel. The import should remain at a low level for keeping a positive trade balance.

Investments in processing industry are required in order to produce and export more products with high value added, and not only raw agricultural products.

The expectations for the sunflower sector in the horizon 2018-2022 are following ones: in 2022, compared to 2017, it is expected as production to increase by 140.8 %, the exported amount by 52.2 %, the imported amount by 34.2 %, the export price by 41.4 %, the import price by 25.8 %, the export value by 115.5 %, the import value by 68.9 % and the trade balance by 132.1 %.

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