SOYBEAN MARKET DEVELOPMENT IN ROMANIA IN THE PERIOD 2007-2017

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Abstract. *The paper aimed to analyze the trends and changes in soybean market in Romania in the interval 2007-2017 based on the statistical data for the cultivated area, yield, production, export, import and trade balance. The results emphasized that in 2017, Romania cultivated 165 thousand ha with soybean, produced 2,390 soybeans per ha in average and obtained 393 thousand tons beans. In 2017 versus 2007, the cropped area was by 23.9% higher, yield was by 134% higher and production by 188.7% higher. Both export and import have quantitatively increased, but imports are higher than exports. For this reason the trade balance was mainly a negative one during the studied period, except the years 2010-2012. However, in 2017, the negative value of the trade balance was - Euro 9,431.3 thousands, by about 50% smaller than in 2007, which is a positive aspect. Romania has to continue to extend the cultivated area with soybean and increase production to cover better the domestic market and stimulate exports.*

Keywords: soybean**,** cultivated area, yield, production, trade, Romania

1. Introduction

Soybean (*Glycine max*, L.) is considered the "golden plant of mankind" and "the plant of the future" because has an economic importance being an oleaginous plant largely cultivated by many farmers in the world and occupying the top position in the world oilseeds production (BASF, 2018) [1].

It has the capacity to make a symbiotic relationship with the bacteria fixing nitrogen into the soil and in this way it contributes to the improvement of soil fertility leaving about 80-120 kg nitrogen per ha. For this reason it is considered a valuable precursory crop for most of the agricultural plants, being included in crop rotation. Taking into account that it is a lack of fertilizers which are imported at high prices, the extend of the cultivated area with soybean could have a positive impact in reducing production cost with fertilization (Bîlteanu and Bîrnaure, 1989) [2].

Soybean has a lot of uses for humans, animals and industry.

It is a magnificent plant using as human food because a large range of food products are obtained from soybean due to its chemical content rich in protein, such as: vegetal milk, tofu cheese, coffee, chocolate, sweets, cakes, biscuits,

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pastas, vegetal meat etc. Also, the soybean oil is used for producing margarine, canned vegetables, soaps, plastic materials, varnishes and paints (Muntean, 1997, and Mogârzan et al., 2004) [7, 8].

Nowadays, soybean plays an important role as raw material for producing renewable energy, mainly for biofuels (biodiesel) which are environmentally friendly diminishing pollution (Popescu, 2012a) [10].

After the oil extraction, the cakes or meslins are successfully used as animal feed. Also, the green soybean plant in combination with Sudan grass is used to produce silage for dairy cows.

At the world level, soybean production was estimated in the year 2017/2018 at 346 million metric tons. Soybean is the top oilseeds crop worldwide, having a production 4.9 times higher than rape seeds output and 6.1 times higher than sunflower seeds. The main producing countries worldwide are USA, Brazil, Argentina, China, India and Canada (Soybean Meal Info Center, 2018) [12].

The EU-28 produced about 18.5 million tons soybeans, the main producing countries in the decreasing order being: France, Germany, Poland, Czechia, Hungary and Romania (EU, Crop Market Observatory, 2018) [5].

Romania has a high potential for producing soybean, which justify its sixth position among the EU-28 top producing member states (Dima, 2015 and Surca, 2019) [4, 13].

Among the oil seeds plants cultivated in Romania, soybean comes on the rd postion as importance after sunflower and rape (Popescu, 2012b) [11].

The most suitable areas for soybean cropping in Romania are South, South East, West, North West, North East Moldova and West and South West Transilvania (Brătulescu, 2018) [3].

The purpose of the research was the analysis of soybean market in Romania in the interval 2007-2017 regarding cultivated area, production, yield, and trade in order to identify the main trends and changes.

2. Materials and Methods

2.1. Data collection

The statistical data concerning cultivated area, average production per surface unit, total output, average acquisition price, exported and imported amounts, the value of export and import were provided by the National Institute of Statistics and Ministry of Agriculture and Rural Development.

2.2. Methodological aspects

The main methods and procedures to process tha data have been:

-*Fixed basis Index*, $I_{FB\%}$, whose formula is: $I_{FB\%} = (X_n/X_0)*100$. It was used to assess the time evolution of each analyzed indicator mentioned above.

-*The average annual growth rate*, $\bar{\Delta}$, whose formula is: $\bar{\Delta} = (y_n - y_0)/(n - 1)$, where y_n is the variable value in the year n (1,2,..11) and y_0 is the variable value in the 1st year.

-*Descritptive statistics* regarding: mean, standard deviation and variation coefficient.

-*Trade balance (TB)* was determined with the formula: TB = E - I, where E is export value and I is import value.

The results were exposed in tables and graphics being commented and correspondingly interpreted. The main ideas resulting from this research were presented in conclusions.

3. Results and discussions

In the studied period 2007-2017, ***the cultivated surface*** with soybean raised by 23.96% from 133.2 thousand ha in 2007 to 165.1 thousand ha in 2017. After a period of deep decline in 2008-2014, since 2015 the cultivated land with soybean exceeded 100 thousand ha and it is expected to be expanded in the coming years as Romania has a high potential for producing soybean even on 500 thousand ha and even 1 million ha.

In 2017, Romania cultivated 1,766.34 thousand ha with oilseeds crops, of which soybean occupied 165.1 thousand ha (9.34%), coming on the 3td position after sunflower and rape.

The largest surfaces cultivated with soybean are in North Eat (21.77%), West (20.21%), South (19.77%), South East (19.61%), and North West (11.52%) Romania (MARD, 2018) [6].

Soybean yield increased by 134% in the studied interval from 1,021 kg/ha in 2007 to 2,390 kg/ha in 2017 as farmers have been more and more interested in this crop during the last decade. The highest performance in soybean yield was achieved in South East, 3,197 kg/ha, South area 3,173 kg/ha, North West 2,377 kg/ha and in South West Oltenia 2,075 kg/ha.

Soybean production was 2.88 times higher in 2017 compared to 2007. In 2017, Romania achieved 393 thousand tons soybeans, the highest performance, compared to 136.1 thousand tons in 2007. The share of soybean production in Romania's oilseeds production achieved in 2017 is 7.89%.

In the territory of Romania, the competitiveness among the eight regions of development is very high regarding soybean production. The contribution of the main producing micro regions of development to the national soybean production in 2017 was the following one: South 26.32%, South East 26.31%, North East 16.36 %, West 13.63% and North West 11.49. The other micro regions had smaller contributions.

Average acquisition price was Lei 1.34/kg in 2017 by 71.7% higher than Lei 0.78 per ha in 2007. Its substantial growth rate was justify by the high interest of the EU for extending the cultivated surfaces and raise production of soybean, a reason which was sustained by various types of subsidies (Table 1).

Table 1. Dynamics of soybean cultivated area, yield, production and average acquisition price

	Cultivated area (Thousand ha)	Yield (kg/ha)	Production (thousand tons)	Average acquisition price (Lei/kg)
2007	133.2	1,021	136.1	0.78
2008	49.9	1,817	90.6	0.97
2009	48.8	1,726	84.3	0.96
2010	63.9	2,345	149.9	1.23
2011	**72.1**	1,980	142.6	1.30
2012	**79.8**	1,308	104.3	1.71
2013	67.7	2,216	149.9	1.83
2014	79.9	2,539	202.9	1.43
2015	128.2	2,045	262.1	1.33
2016	127.3	2,067	263.4	1.39
2017	165.1	2,390	393.0	1.34
2017/2007 %	123.9	234.0	288.7	171.7
$\overline{\Delta}$	3.19	136.9	15.26	0.056
Mean	92.35	1,859.4	179.91	1.29
St. Dev.	39.12	789.11	93.59	0.31
Variation coefficient %	42.36	42.43	52.02	24.03

Source: Own calculation based on the data from NIS, MARD, 2018 [6, 9].

In the studied interval, these four indicators registered the following mean and standard deviation: cultivated area 92.35 ± 39.12 thousand ha, yield 1,859 ± 789.11 kg/ha, production 179.91 ± 93.59 thousand tons and average acquisition price Lei 0.056 ± 0.31 per kg.

The value of the variation coefficient had higher values over 20% in case of cultivated surface, yield and production, reflecting that the variables have heterogeneous values and that the means are not representative. In case of average price, the value of the coefficient of variation was over 20% reflecting that the

variable levels are relatively heterogeneous and that the mean is less representative.

Exported and imported quantities had different levels, in fact imported amounts were higher than the exported ones in almost all the analyzed years. The general trend is an increasing one both in case of export and import

The imported amount of soybean increased 1.95 times, while the exported quantity increased 12.40 times in the analyzed interval. In 2017, Romania exported 273.9 thousand tons compared to 22 thousand tons in 2007. Also, in 2017, the country imported 133.7 thousand tons compared to 68.5 thousand tons in 2007 (Fig. 1).
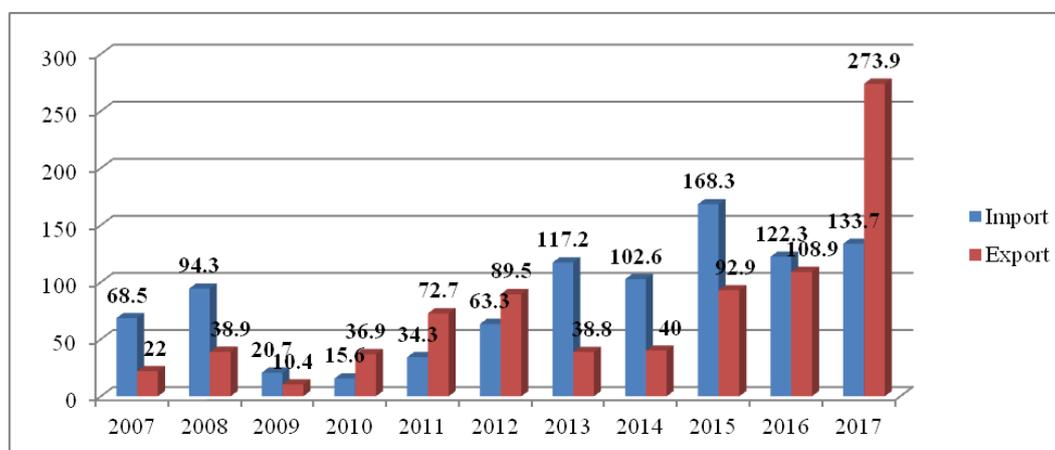

Fig. 1. Dynamics of the exported and imported soybeans, 2007-2017 (Thousand tons)
Source: Own design based on the data from NIS, MARD, 2018 [6, 9].

Fig. 1 illustrates that the exported amount was more than double than the imported amount of soybean seeds.

Trade balance was either negative or positive depending on from the difference between the value of exports and imports of soybean seeds.

The export value increased 21.58 times from Euro 4,705.1 thousand in 2007 to Euro 101,548.1 thousand in 2017. *The import value* also raised 2.3 times from Euro 23,770.3 thousand in 2007 to Euro 54,689.9 thousand in 2017.

In consequence, soybean *trade balance* was positive only in the years 2010, 2011 and 2012, and also in 2017. In the other years, it had negative values. In 2017, soybean trade balance was Euro 46,858.2 thousand compared to Euro -19,065.2 thousand in 2007 (Table 2).

Analysing the average price received per ton of exported and imported soybean seeds, we may find out that in 2017, the average export price FOB was Euro

370.6 per ton compared to Euro 212.9 per ton, meaning + 74.1% higher, while the import price CIS was Euro 408.8 per ton in 2017 compared to Euro 346.7 in the year 2007, meaning by 17.9.8% higher (Table 3).

Table 2. Dynamics of the value of soybean seeds export and import values and trade balance (Euro Million)

	Export value	Import value	Trade balance
2007	4.7	23.7	-19.1
2008	13.5	38.0	-24.5
2009	3.0	7.9	-4.9
2010	13.2	5.9	+7.3
2011	28.4	12.9	15.5
2012	41.8	29.8	+12
2013	21.9	53.7	-31.8
2014	21.4	41.9	-20.5
2015	40.4	65.9	-25.5
2016	43.1	52.5	-9.4
2017	101.5	54.7	+46.8
2017/2007 %	2,159.5	230.8	245.0
$\bar{\Delta}$	9.68	3.10	6.59
Mean	30.26	35.17	-4.91
St. Dev.	27.56	20.68	23.49
Variation coefficient %	91.07	58.80	-

Source: Own calculations based on the data from NIS, MARD, 2018 [6, 9].

Table 3.Dynamics of the average soybean seeds export and import price (Euro/ton)

	Average export price	Average import price	Difference AEP-AIP
2007	212.9	346.7	-133.8
2008	346.4	402.7	-56.3
2009	291.0	380.5	-89.5
2010	358.0	383.2	-25.2
2011	390.6	376.6	+14.0
2012	467.0	471.1	-4.1
2013	564.1	458.0	+106.1
2014	534.0	408.0	+126.0
2015	434.4	391.2	+43.2
2016	395.2	429.2	-34
2017	370.6	408.8	-38.2
2017/2007 %	174.1	117.9	-

Source: Own calculations.

Comparing the average export price with the average import price, we may find out that in the period 2007-2010, in the year 2012, 2017 and 2017, the export price FOB was smaller than the import price CIS, and this resulted in a negative influence on the trade balance. In the years 2011 and 2013-2015, the average export price exceeded the import price having a positive impact on the trade balance (Table 3).

Conclusions

(1). Soybean surface, yield and production have substantially grown in the analyzed period, reflecting that this crop could give a high performance in the conditions of Romania and that soybean is an important source of food, feed and raw materials for manufacturing industries.

(2). Both exports and imports had an ascending evolution, both from a quantitative and value point of view.

(3). The trade balance with a variation of its value from negative to positive and the reverse reflects an instability of Romania's commercial transactions on the EU and other markets.

(4). Taking into account the high potential of Romania to produce more soybean, farmers have to extend the cultivated surface, to apply the modern technologies for getting a better yield and production performance. The price on the domestic market is more attractive than the cereals price, and on the external market as well.

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