BARLEY MARKET DEVELOPMENT IN ROMANIA IN THE PERIOD 2007-2017

Agatha POPESCU[1]

Abstract. *The paper aimed tan analyze the trends and changes in one row and two row barley in Romania during the period 2007-2017 using the empirical data for the cultivated area, yield, production, export, import and trade balance as well as acquisition price and FOB and CIS price to assess the efficiency in barley external trade. The results pointed out an increase of cultivated area by 25%, by 186.5% in yield and by +258.8% in output in 2017 versus 2007. In 2017, Romania cropped 455 thousand ha with barley, from which it produced 1,906.7 Thousand tons, meaning an yield performance of 4,186 kg/ha. Also, in 2017 compared to 2007, export value was 8.1 times higher, import value was 6.6 times higher and finally trade balance was 9.1 times higher. In 2017, Romania's barley trade balance accounted for Euro 148,750.2 thousand. As final conclusion, the higher and higher production performance stimulated external trade with barley, and Romania proved to be not only one of the main producing country of the EU-28 and also an important exporting country. Besides maize, barley is one of the agricultural commodities having a positive trade balance, Romania being a net exporting country.*

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

1. Introduction

Barley *(Hordeum vulgare L.)* comes on the 5th position worldwide as importance among grains crops taking into account its economic, social, and environmentally friendly features.

Firstly, barley is cultivated for producing feedstuffs of high nutritive and energetic value for animal growing and fattening. In many countries like France, United Kingdom, Netherlands, Germany and Romania, concentrated food of barley is successfully used for growing pigs, poultry and horses. In a mix between barley and peas, it is obtained a high value meslin. The barley straw are also used as animal feed having a higher nutritive value than wheat straw.

Secondly, barley is a raw material for processing industry. In many countries, two row barley grains are used to produce beer like in Germany, Austria, Denmark, Poland, Netherlands, and Romania. Also, from barley it is produced: alcohol, glucose, dextrin, starch, pearl barley and roosted coffee substitutes, syrup, flakes, sweets.

[1]Prof., Ph.D., University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania, Full Member of the Academy of Romanian Scientists, Corresponding Member of the Academy of Agricultural and Forestry Sciences "Gheorghe Ionescu-Şişeşti", Bucharest, Romania, (e-mail: agatha_popescu@yahoo.com).

Thirdly, barley has an agro-technical importance, being a precursory plant for other crops.

In Romania, one row barley is largely cultivated in almost all the regions where it finds favourable soil and climate conditions. Barley is successfully cultivated in the Southern and Eastern Romania, and also in the West area. In Dobrogea, Muntenia, Moldova and Transilvania the conditions for this crop are less favourable. Two row barley is suitable to be cropped in Transilvania, Timis, Bihor, Suceava areas and less suitable in Dobrogea and South Moldova (Balteanu, 1989) and Sima (2009) [1, 17].

To increase production performance, barley responds very well to fertilization and sowing density. Experiments in Romania proved for Prestige and Jersey varieties that fertilization based on poultry wastes is very efficient as well as N40P40 and N80P80 levels, while N120P120 levl has no a positive impact on production (Ifrim, 2010) [3].

Regarding the influence of the sowing period, it was found that dry matter content increased when barley was sown in late April and not in October and early March, and also that the higher the plant density, the lower the nitrogen (Kirby, 2008) [4]. Other authors found that "increasing sowing density, root length density increases in the topsoil as well as specific root length with importance for nutrient and water acquisition, and for the metabolic efficiency of the root system. Sowing density influenced individual plant size and relative biomass allocation to different plant organs." (Hecht el al., 2016) [2].

Romania is an important producing and exporting country in the EU-28, its production and trade being intensified mainly after the Country accession into the EU on January 1st 2007.

The objective of this study was to analyze the dynamics of the cultivated area, production, yield, and trade of barley in Romania in order to identify the main trends and changes in the period 2007-2017.

2. Materials and Methods

2.1. Data collection

The analysis is based on the following specific system of indicators for a market study: cultivated area, average production per surface unit, total output, average acquisition price, exported and imported amounts, the value of export, import and trade balance and export and import price.

For this purpose, the data were collected from the data base on the National Institute of Statistics and Ministry of Agriculture and Rural Development for the period of reference 2007-2017.

2.2. Methodological aspects

Fixed basis Index having the formula: $I_{FB\%} = (X_n/X_0)*100$ was utilized to characterize the dynamics of each analyzed indicator mentioned above.
The average annual growth rate, $\bar{\Delta} = (y_n - y_0)/(n - 1)$, where y_n is the level of the indicator in the year n (1,2,..11) and y_0 is the valeu of the indicator in the 1st year.
Descritptive statistics in terms of mean, standard deviation and variation coefficient was also determined using Excel facilities.
Trade balance (TB) was calculated as difference between export value (E) and import value (I), according to the formula: TB = E - I.
The results were presented in tables and specific comments and interpretations accompanied them. In conclusions, there were included the main ideas resulting from this research and also a few recommendations for farmers to improve barley production.

3. Results and discussions

In the period 2007-2017, ***the cultivated surface*** with barley increased by 25.06% from 363.8 thousand ha in 2007 to 455 thousand ha in 2017. The highest cropped area was 517.5 thousand ha in 2009 and the minimum area in 2007 as mentioned before. The largest surfaces cultivated with barley and other cereals like maize and wheat are in the South, South East, South West and West Romania (Popescu, 2015a, 2015b) [10, 11]. The surface increased due to the need on the domestic and external market and due to the incentives given to farmers offered by the EU Commission and the Government (MARD, 2018) [5].

Average production registered a high growth rate +186.5% in 2017 compared to 2007. If in the first year of the analysis Romania obtained the lowest productivity per ha, 1,461 kg/ha, in 2017, it carried out the highest performance, accounting for 4,186 kg/ha. This was determined by the implementation of the new technologies involving high potential cultivars and hybrids adapted to the local conditions, resistant to diseases and pests, by the modernization of the equipment for tillage and sowing till harvesting, by the application of a suitable fertilization level. However, in the year 2009, 2010 and mainly in 2012, a severe and long drought affected grains yield whose performance was lower than in the other years.

Barley production was 3.58 times higher in 2017 compared to 2007. In 2017, Romania achieved 1,906.7 thousand tons, the highest performance, compared to only 531.4 thousand tons in the year 2007. In 2012, production had the lowest level, only 986.4 thousand tons due to the climate change. Barley looks to be cultivated in a more intensive system than maize as proved by yield and production level (Popescu, 2017a) [13].

In the territory of Romania, the competitiveness among the eight regions of development is very high regarding cereal production. For barley, as well as for the other cereals like maize and wheat, South-Muntenia, South- East, South West Oltenia and West are the most competitive areas. However, in Romania production performance depends not only by the technological factors which are enough well managed by producers, but also on the climate change regarding especially the extreme phenomena like: high temperatures, long period of severe drought, huge rainfalls etc. Also, the lack of irrigation systems have to be mentioned as a restraining factor of production performance (Voicilas, 2014) [18].

Average acquisition price was Lei 0.6/kg in 2017 by 1.6% higher than in 2007, when it accounted for Lei 0.59. The highest price was Lei 0.86 per kg at the farm gate in the year 2012, when production was very small due to the drought. This prove the price elasticity in connection with production a feature characterizing cereal production in Romania (Popescu, 2015c) [12]. (Table 1).

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

	Cultivated area (Thousand ha)	Yield (kg/ha)	Production (thousand tons)	Average acquisition price (Lei/kg)
2007	363.8	1,461	531.4	0.59
2008	394.0	3,069	1,209.4	0.67
2009	517.5	2,284	1,182.1	0.44
2010	515.8	2,542	1,311.0	0.41
2011	419.5	3,170	1,329.7	0.73
2012	424.2	2,325	986.4	0.86
2013	495.7	3,111	1,542.2	0.79
2014	516.0	3,319	1,712.5	0.62
2015	468.5	3,461	1,623.2	0.66
2016	481.6	3,773	1,817.3	0.57
2017	455.0	4,186	1,906.7	0.60
2017/2007 %	125.06	286.50	358.80	101.6
$\bar{\Delta}$	9.12	272.5	137.53	0.001
Mean	459.23	2,972.81	1,377.44	0.63
St. Dev.	52.83	768.29	401.89	0.13
Variation coefficient %	11.50	25.84	29.17	20.63

Source: Own calculation based on the data from NIS, MARD, 2018 [5, 6].

In the studied interval, these four indicators registered the following mean and standard deviation: cultivated area 459.23 ± 52.83 thousand ha, average production 2,972.81 ± 768.29 kg/ha, grains production 1,377.44 ± 401.89 thousand tons and average acquisition price Lei 0.001 ± 0.13 per kg.

The value of the variation coefficient reflected that in case of the surface, the data were homogenous and the mean is representative as 10% < CV% < 20%, while in case of yield, production and producer's average price, the values of the indicators were relatively heterogeneous and the means are not representatives.

Exported and imported quantities had a various evolution from a year to another, but the general trend is an increasing one in the both cases. Romania is not only an important producer of barley, but also an exporting and importing country.

The exported amount of barley increased 10.3 times from 139.8 thousand tons in 2007 to 1,442.7 thousand tons in 2017. Also, the imported quantities registered an increasing trend accounting for 467.9 thousand tons in 2017 compared to 46.1 thousand tons in 2007, therefore being 10.1 times higher in the last year of the analyzed interval (Fig. 1).

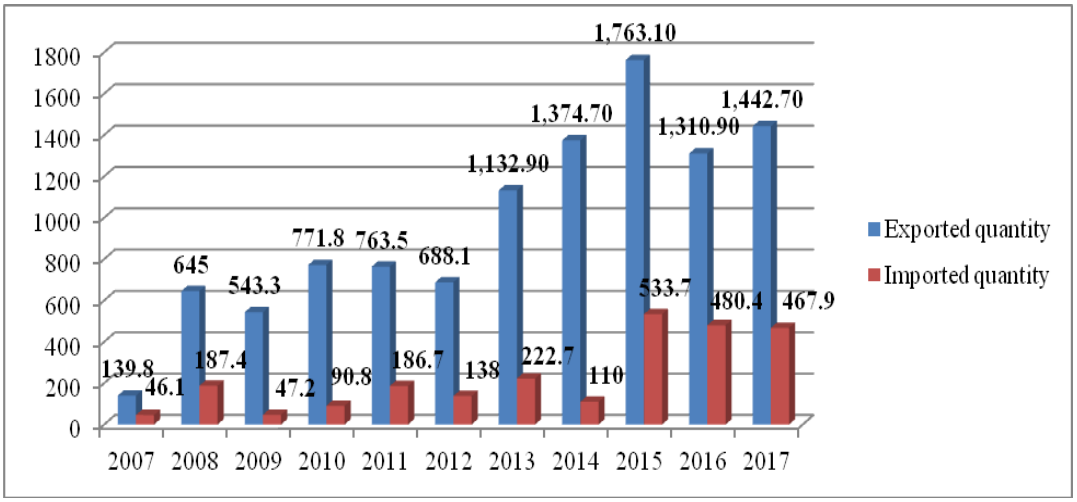

Fig. 1. Dynamics of the exported and imported barley grains, 2007-2017 (Million tons)
Source: Own design based on the data from NIS, MARD, 2018 [5, 6].

Fig. 1 illustrates that the exported quantities were much higher than the imported amounts in each year of the researched interval.

Trade balance resulted from the difference between the value of exports and imports of barley grains.

The export value increased 8.1 times from Euro 26.5 million in 2007 to Euro 215 million in 2017. *The import value* also raised 6.5 times from Euro 10.1 million in 2007 to Euro 66.3 million in 2017. As a consequence, barley *trade balance* had a positive and ascending tendency. In 2017, barley trade balance was Euro 148.7 million, 9.1 times higher compared to Euro 16.3 million in 2007.

Therefore, barley is among the agricultural products with a positive trade balance. This good situation was determined, on one side, by the higher and higher exported quantities of grains compared to the lower increasing rate of the imported quantities, and, on the other side by the level of the export and import price (Popescu, 2017b) [14].

Analysing the average price received per ton of exported and imported barley grains, we may easily observe a variation from a year to another across the studied interval depending on the international market circumstances. However, in 2017, the average export price FOB was Euro 149.1 per ton compared to Euro 189.5 per ton, i.e. lower by 21.45, while the import price CIS was Euro 141.7 per ton in 2017 compared to Euro 220.7 in the year 2007, meaning by 35.8% smaller. Based on these data, we may say that both the export and import price registered a decreasing trend in the analyzed period (Table 2).

Table 2. Dynamics of the value of barley grains export and import, and trade balance (Euro Million)

	Export value	Import value	Trade balance
2007	26.5	10.2	16.3
2008	110.2	32.8	77.4
2009	60.2	5.2	55.0
2010	94.9	14.3	80.6
2011	145.4	34.5	110.9
2012	154.0	32.1	121.9
2013	223.6	44.4	179.2
2014	228.0	17.2	210.8
2015	229.1	83.1	216.0
2016	171.8	70.3	101.5
2017	215.1	66.3	148.8
2017/2007 %	811.3	651.7	910.8
$\bar{\Delta}$	18.86	5.61	13.25
Mean	150.8	37.3	119.8
St. Dev.	71.0	26.1	63.6
Variation coefficient %	47.1	69.9	53.1

Source: Own calculations based on the data from NIS, MARD, 2018 [5, 6].

Comparing the average export price with the average import price, we may find out that in 2009, 2011, 2014, 2015 and 2017, the export price FOB exceeded the import price CIS, having a positive influence on the trade balance. In the years 2007, 2008, 2010, 2012 and 2013, the average import price was higher than the average export price and this had a negative impact on the trade balance, Romania recording losses due to this difference between the two prices (Table 3).

The biggest customers of Romania's exports of barley grains are Saudi Arabia, Iran, Spain and in a smaller measure other beneficiaries. The greatest amount of grains is shipped on the Black Sea through the port of Constanta which is the main trading hub for agricultural products.

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

	Average export price	Average import price	Difference AEP-AIP
2007	189.5	220.7	-31.5
2008	170.9	175.0	-4.1
2009	110.7	110.1	+0.6
2010	122.9	157.5	-34.6
2011	190.4	184.8	+5.6
2012	223.8	232.8	-9.0
2013	197.3	199.5	-2.2
2014	165.8	156.1	+9.7
2015	169.6	155.6	+14.0
2016	146.3	146.3	0
2017	149.1	141.7	+7.4
2017/2007 %	78.60	64.20	-

Source: Own calculations.

In Romania's cereals export value in 2017, barley occupied the 3rd position with a share of 9.15%, after wheat 55.35 and maize 34.4%. In the same year, the share of barley in the import value was 11.95, after wheat 56.9% and maize 24.9% (Popescu, 2012, 2014, 2018) [8, 9, 15].

The coverage index Import/Export, ICD, accounted for 2.7 in case of barley in 2017 being by 8% higher than in 2007. For ICD level, barley came on the 3rd position after maize ICD 4.9 and wheat ICD 3.4 (Popescu, 2010) [7].

Romania is ranked the 3rd in the EU-28 for barley export, with a similar position for wheat export, and on the 1st position for maize export (Popescu et al., 2018) [16].

Conclusions

(1). The development of barley market and of cereals market in general in Romania represents an important factor for rural development, for assuring incomes for producers, whose job is a noble one, as they provide food and life for population.

(2). In Romania, barley is a cereal situated on the 3rd position after maize and wheat regarding the cultivated area and production.

(3). Both the increased cultivated area and mainly the growth of the yield have contributed to the continuous higher performance in grains output.

(4). Grace to the high production able to cover the requirements of the domestic market, but also to valorise the surplus on the external market, Romania's international trade with barley has been intensified and assured a positive trade balance, making the country a net exporter.

(5). Romania's foreign trade with cereals has a positive balance with a good impact on the payment balance and the economy in general.

(6). Romania's producers have to intensify their efforts to produce more barley using new technologies adapted to the climate change in order to export more grains and bring foreign currency in the country improving the efficiency of external trade.

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