# ROMANIA'S CEREAL EXTERNAL TRADE  BETWEEN 2014 AND 2016

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*Abstract*

*Through the content, the paper aims to highlight Romania's main export-import items from the cereal group for the period 2014-2016. In this respect, the situation for wheat, rice, barley, oats, maize, rye and sorghum is presented, both in terms of exports and imports. The value of foreign trade (thousands USD - FOB for export, thousands USD - CIF for import) is presented both structurally and in terms of the evolution over time, based on the consideration that Romania is an important cereal producer, at least, at regional level. The dynamic series is also completed by presenting the average of the period.  The export activity predominates compared to imports (2,390,399.33 versus 546,557.33 thousand $), which leads to the recording of a surplus trade balance for the Romanian external trade with cereals. This situation is present for most of the products marketed, except for rice and rye, for which the trade balance is deficient.*

*Key words*: *trade balance, grain, dynamic, export, import, structure*

## INTRODUCTION

Foreign trade exerts an important influence on economic growth [4]. In this context, we considered it necessary to review the foreign trade operations of Romania with cereals, given that Romania is - at least at European level - an important producer in the field.
The export represents all the transactions of selling or investing abroad of some goods or values, the import is a commercial transaction for the purchase of goods and/or services from abroad and involves the passage by them the customs frontier of the importing State [8].
The trade balance is a component of the balance of current transactions. The state of trade balance will have an impact on the balance of payments, to a greater or lesser extent, depending on the share of trade operations in relation to other country's exchange operations [2]. The foreign trade balance or, more simply, the trade balance represents a statistic-economic picture in which, according to established order, all the foreign trade operations performed by a country are reflected in a given period [5].

Each country must aim at achieving a balanced external trade. A passive, unbalanced trade balance due to export surpluses by imports may result in a decrease in currency earnings. The more foreign country's dependence on foreign trade is, the more imperative the desire to balance its trade balance [6]. Over-the-counter trade balance has its limits, because no one wants to export as much as possible and import as little as possible [11].
Cereals have been a commodity since ancient times, and trade cereals have been confirmed since 6000-5500 BC [7]. Cereal grains are currently an important international trade item. Over the past decade, an average of about 100 million tons of wheat, 100 million tons of corn, up to 25 million tons of rice, 16 million tons of barley and 6 million tons of sorghum have been sold annually [10].
Corn is an important cereal for Romania with export potential. Corn crop in Romania also suffers from specific climatic conditions but also from pests [9]. Maize occupies the highest share in the cultivated area with cereals, 48%, taking into account the

importance of the maize grains for human and animal consumption, and for industry. Also, maize has an important share in the cultivated area of Romania, being about 32 % [12].

It is worth noting that the 2014-2016 period differs from the previous situations. From 1990 until 1995, Romania's trade balance for cereals was deficient; an offensive of grain exports, especially wheat exports, began in 1995, which lasted until 1999; two years (2000 and 2001) with exports below the level of cereal imports followed by a new trend towards the recovery of the trade balance for cereals; in the agricultural year 2003-2004, the balance of cereals is imbalanced as a result of the increase in wheat imports of more than 1.5 million tons [13]. In 2008, due to the favorable world situation Romania became a net export country of wheat [14]. Romania will in the future become a major wheat exporting country, thus contributing to balancing the trade balance of foreign payments [3].

## MATERIALS AND METHODS

For the elaboration of the paper, the database of the National Institute of Statistics was consulted, from where were extracted the data related to the value of exports and imports of Romanian cereal products. As indicators were used the value of exports and the value of imports, as well as the level of trade balance (difference between imports value and value of exports), expressed in thousand $.

As a method of analysis, the comparison was used. The comparison method appreciates the results obtained and reports them to some bases of reference. Comparisons are done in time, space, and mixed [1].

The paper used indices analysis, comparison over time being highlighted through the mobile base index, calculated by formula: $I_{vb} = (y_n/y_{n-1})100$, in which: $y_n$- the level of indicator for each component of the dynamic series; $y_{n-1}$- the level of temporal sequence indicator considered as a basis for comparison or reference period .

At the same time, to highlight the importance of each traded product, the annual and multiannual export and import structures made by Romania (by calculating the structural indices) were used, considering the traded products: wheat, rice, barley, oats, corn, rye and sorghum.

In order to determine export and import dependence, the correlation coefficient r was calculated according to the formula:

$$Correl(X,Y) = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

where $\bar{x}$ and $\bar{y}$ - are the averages for samples, average (matrix1) and average (matrix2).

## RESULTS AND DISCUSSIONS

The information used, refers to the evolution of the export value level [15] and is presented in Table 1.

For the year 2014, the highest value of exports was of 161,287,349 thousand $ for wheat (48.957% of the total) followed by: corn with 1,013,648 thousand $ (38.548%), barley 305,992 thousand $ (11.636%), rice 16,110 thousand $ (0.613%), sorghum 5,794 thousand $ (0.220%), oat 611 thousand $ (0.023%) and rye 67 thousand $ (0.003%). The sequential values determined a level of $ 2,629,571 thousand $ for the total Romanian export of cereals.

In the case of 2015, a total export value of 2,221,541 thousand $ was established, which consisted of: 19 thousand $ rye (0.001%), 365 thousand $ oats (0.016%), 4,180 thousand $ sorghum (0.188%), 11,555 thousand $ rice (0.520%), 334,437 thousand $ barley (15.054%), 778,659 thousand $ wheat (35.051%), 1,092,326 thousand $ corn (49.170%).

At the level of 2016, export variation limits were 73 thousand $ for rye (0.003%) and 1,248,059 thousand $ for wheat (55.346%) respectively.

The rest of the products have levels of: 802,319 thousand $ corn (34.581%), 215,416 thousand $ barley (9.285%), 14,216 thousand $ rice (0.613%), 2,728 thousand $ sorghum (0.118%), 1,275 thousand $ oats (0.054%). The overall export level reached 2,320,086 thousand $.

Table 1. Export of grain (2014–2016)

| Specification | 2014 | | 2015 | | | 2016 | | | Average [**] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Th. $[*] | Str. %[**] | Th. $[*] | Str. %[**] | 2015/ 2014[**] | Th. $[*] | Str. %[**] | 2016/ 2015[**] | Th. $ | Str. % | Average/ 2016 |
| Wheat | 1,287,349 | 48.957 | 778,659 | 35.051 | 60.48 | 1,284,059 | 55.346 | 164.91 | 1,116,689.00 | 46.716 | 86.97 |
| Rice | 16,110 | 0.613 | 11,555 | 0.520 | 71.72 | 14,216 | 0.613 | 123.03 | 13,960.33 | 0.584 | 98.20 |
| Barley | 305,992 | 11.636 | 334,437 | 15.054 | 109.29 | 215,416 | 9.285 | 64.41 | 285,281.67 | 11.934 | 132.43 |
| Oat | 611 | 0.023 | 365 | 0.016 | 59.74 | 1,275 | 0.054 | 349.32 | 750.33 | 0.031 | 58.85 |
| Maize | 1,013,648 | 38.548 | 1,092,326 | 49.170 | 107.76 | 802,319 | 34.581 | 73.45 | 969,431.00 | 40.556 | 120.83 |
| Rye | 67 | 0.003 | 19 | 0.001 | 28.36 | 73 | 0.003 | 384.21 | 53.00 | 0.002 | 72.60 |
| Sorghum | 5,794 | 0.220 | 4,180 | 0.188 | 72.14 | 2,728 | 0.118 | 65.26 | 4,234.00 | 0.177 | 155.21 |
| Total | 2,629,571 | 100 | 2,221,541 | 100 | 84.48 | 2,320,086 | 100 | 104.43 | 2,390,399.33 | 100 | 103.03 |

[*]http://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=EXP101F (05.09.2017)
[**]own calculation

The average of the analyzed period shows a total value of exports of 2,390,399.33 thousand $, in which the export items contributed as follows: 53 thousand $ rye (0.002%), 753.33 thousand $ oats (0.031%), 4,234 thousand $ sorghum (0.177%), 13.960.33 thousand $ rice (0.584%), 285.281.67 thousand $ barley (11.934%), 969.431 thousand $ corn (40.556%), 1.116.689 thousand $ wheat (46.716%) - Figure 1.
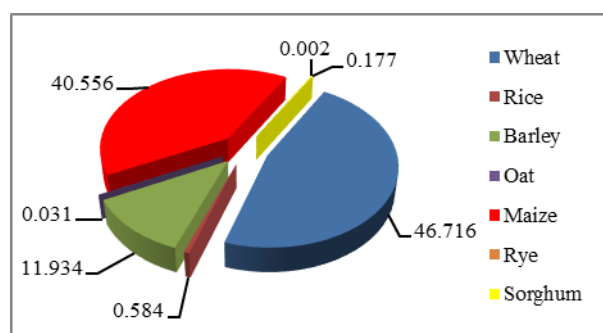


Fig. 1. Export of grain - structure (%), period average (2014-2016)

For wheat, the indicator dynamics was fluctuating, characterized by year-to-year declines and increases (-39.52% in 2015 compared to 2014, +64.91% in 2016 compared to 2015). The same situation is also characteristic for rice (-28.28 and +23.03%), oats (-40.26 and 249.32%, respectively) and rye (-71.64 and +284.21%). In the case of barley, 2015 exceeds 1.09 times the specific situation in 2014, and in 2016 there is a decrease in exports by 35.59%.

For maize, the evolution is somewhat similar to the one presented above (+7.76 and -26.55%). Sorghum shows a strictly downward trend of exports (annual successive declines of 27.86 and 34.74% in 2015 and 2016 respectively compared to the terms of comparison). Overall, there is a 15.52% decrease in 2015 and a 4.43% increase in 2016.

Table 2, presents data on cereal imports made by Romania [15].

At the level of 2014, the highest import value was 165,949 thousand $ for maize (42.52% of the total), followed by wheat by 159,042 thousand $ (40.75%), rice 37,612 thousand $ (9.52% %), barley 26,196 thousand $ (6.71%), sorghum 1.357 thousand $ (0.35%), oats 410 thousand $ (0.11%) and rye 172 thousand $ (0.04%).

These values led to a total of 390,288 thousand dollars for the total Romanian grain imports.

The specific situation for the year 2015 is characterized by a total import value of 593,108 thousand $, which consisted of: 180 thousand $ rye (0.03%), 359 thousand $ oats (0.06%), 1,176 thousand $ sorghum (0.20%), 34,629 thousand $ rice (5.85%), 92,776 thousand $ barley (15.64%), 133,703 thousand $ wheat (22.54%), 330,222 thousand $ corn (55.68%).

Table 2. Import of grain (2014–2016)

| Specification | 2014 | | 2015 | | | 2016 | | | Average[**] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Th. $[*] | Str. %[**] | Th. $[*] | Str. %[**] | 2015/ 2014[**] | Th. $[*] | Str. %[**] | 2016/ 2015[**] | Th. $[*] | Str. % | Average/ 2016 |
| Wheat | 159,042 | 40.75 | 133,703 | 22.54 | 84.07 | 375,131 | 57.16 | 280.57 | 222,625.33 | 40.73 | 59.35 |
| Rice | 37,162 | 9.52 | 34,692 | 5.85 | 93.35 | 33,912 | 5.16 | 97.75 | 35,255.33 | 6.45 | 103.96 |
| Barley | 26,196 | 6.71 | 92,776 | 15.64 | 354.16 | 80,509 | 12.27 | 86.78 | 66,493.67 | 12.17 | 82.59 |
| Oat | 410 | 0.11 | 359 | 0.06 | 87.56 | 401 | 0.06 | 111.70 | 390.00 | 0.07 | 97.26 |
| Maize | 165,949 | 42.52 | 330,222 | 55.68 | 198.99 | 164,635 | 25.09 | 49.86 | 220,268.67 | 40.30 | 133.79 |
| Rye | 172 | 0.04 | 180 | 0.03 | 104.65 | 248 | 0.04 | 137.78 | 200.00 | 0.04 | 80.64 |
| Sorghum | 1,357 | 0.35 | 1,176 | 0.20 | 86.66 | 1,440 | 0.22 | 122.45 | 1,324.33 | 0.24 | 91.97 |
| Total | 390,288 | 100 | 593,108 | 100 | 151.97 | 656,276 | 100 | 110.65 | 546,557.33 | 100 | 83.28 |

[*]http://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=EXP102F  (05.09.2017)
[**]own calculation

In the case of 2016, the import variation limits were 248 thousand $ for rye (0.04%) and 375,131 thousand $ for wheat (57.16%) respectively. The rest of the products were placed at: 164,635 thousand $ corn (25.09%), 80,509 thousand $ barley (12.27%), 33,912 thousand $ rice (5.16%), 1,440 thousand $ sorghum (0.22%), 401 thousand $ oats (0.06%) and 248 thousand $ rye (0.04%). The total annual imports reached 656,276 thousand $.

The average of the analyzed period is characterized by a total import value of 546,557.33 thousand USD, which consisted of the following: 200 thousand $ for rye (0.04%), 390 thousand $ oats, 0.07%, 1,324.33 thousand $ sorghum (0.24%), 35,255.33 thousand $ rice (6.45%), 66.493,67 thousand $ for barley (12.17%), corn 220.268,67 thousand $ (40.30%), 222.625,33 thousand $ wheat (40.73%) - Figure 2.

Imports of rice are characterized by a strictly downward trend (-6.65 and -2.25% in 2015 and 2016 respectively compared to baselines). At the level of reed, we are talking about a strict ascending trend (annual successive overruns of 1.04 and 1.37 of the terms of reference). For the rest of the products, the trend was fluctuating: increases in 2015 and declines in 2016 for barley and maize; decreases in 2015 and increases in 2016 for wheat, barley and sorghum respectively. On a general level, we are talking about a strictly

upward trend of the indicator (1.51 and 1.10 times the baseline for 2015 and 2016.
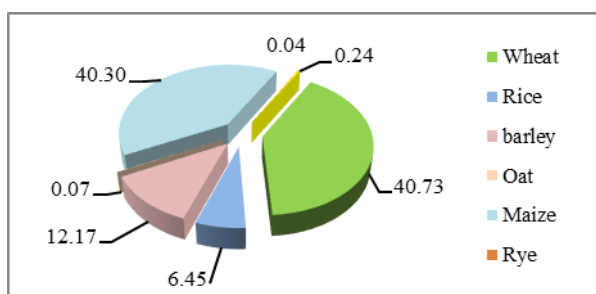


Fig. 2. Import of grain – structure (%), period average (2014-2016)
Source: Own design based on [15].

In 2014, the balance of trade balance is surplus. There is a surplus of +2,239,283 thousand USD, which is based on surpluses specific to the vast majority of crops (+201, +4,437, +279,796, +847,699 and +1,128,307 thousand $ for oats, sorghum, barley, corn and wheat). Deficits only appear for rye and rice (-105 and -21,052 thousand $).

The year 2015 is also characterized by a surplus of the trade balance (1,628,433 thousand $), perpetuating the state of things specific to 2014 (deficits are found only for rice and rye: -23,137 and -161 thousand dollars). There is, however, a decrease in surpluses for the rest of the products (from +6 thousand $ for oats to +762,104 thousand $ for maize).

At the level of 2016, the same trend of the trade balance is maintained (+1,663,810

thousand $ - general level), a trend dictated by crops of wheat, corn, barley, sorghum and oats (+908,928, +637,684, +134,907, +2,480 and +874 thousand $ respectively).

If we analyze the share of cereal products exported by Romania in the context of total Romanian exports and exports of vegetal.

Table 3. Balance of foreign trade in cereals - thousands $ (2014–2016) [*]

| Specification | 2014 | 2015 | 2016 | Average |
|---|---|---|---|---|
| Wheat | +1,128,307 | +644,956 | +908,928 | +894,063.67 |
| Rice | -21,052 | -23,137 | -19,696 | -21,295.00 |
| Barley | +279,796 | +241,661 | +134,907 | +218,788.00 |
| Oats | +201 | +6 | +874 | +360.33 |
| Maize | +847,699 | +762,104 | +637,684 | +749,162.33 |
| Rye | -105 | -161 | -175 | -147.00 |
| Sorghum | +4,437 | +3,004 | +2,480 | +2,909.67 |
| Total | +2,239,283 | +1,628,433 | +1,663,810 | +1,843,842.00 |

[*] own calculation.

The average of the period shows a surplus balance for Romania's international grain trade (+1,843,842 thousand $). Figure 3 shows the specific situation for each product.
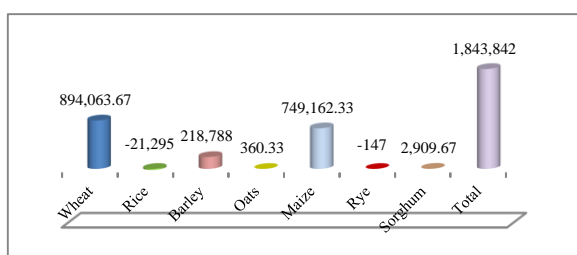


Fig. 3. The trade balance of foreign trade (thousands $), period average (2014-2016)
Source: Own calculation and design.

## CONCLUSIONS

In Romania's external cereal trade, the main items are wheat and maize, with over 40% weight for both exports and imports. The rest of the products, except for barley, account for less than 10% (some even have very low weights - rye, oats, sorghum and rice in exports, rye, oats and sorghum in the case of imports - weighing less than 1%);

The evolution of exports is - in general - fluctuating, except for sorghum (downward trend).

The trends in imports are rising, with different trends for rice (descending trend), respectively for wheat, barley, oats, maize and

sorghum (non-uniform trend). Only for rye, the evolution is similar to that recorded at the general level.

products (multi annual averages, 2014-2016, which were 64,690,295 and 3,764,189 thousand $), it is found that this represented 3.70 and 63.50%, it is confirmed the character of the exporting country of cereals for Romania.

In the case of imports, all wheat and maize (40.73 and 40.30%) are predominantly followed, at appreciable distances of barley and rice. The rest of the products hold weights below 0.25%.

The trend of total imports is an upward trend, a situation that also occurs for rye. With the exception of rice (downward trend), the rest of the products show a fluctuating variation.

If we analyze the share of cereal products imported by Romania in the context of total imports and imports of vegetal products (multi annual averages, 2014-2016, which were 74,121,167.33 and respectively 2,284,017 thousand $), it is found that they represented 0.74 and 23.93%, it is noted that for Romania the cereals are not an exponential export item.

The balance of trade balance is in surplus, which emphasizes the Romanian producers orientation towards cereal crops, which find favorable growth and development conditions in Romania (except for rice).

The correlation between exports and imports, determined by the value of the correlation coefficient r (-0.89471), is hardly inversely proportional (Fig. 4).
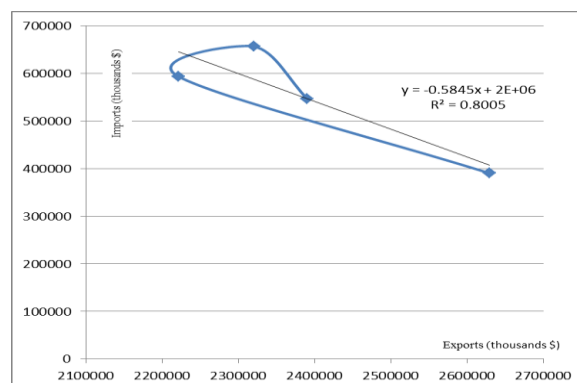


Fig. 4. Regression function between exports and imports (thousands $), period average (2014-2016)
Source: Own calculations and design.

It is worth mentioning that Romania suffers from the external market's point of view.
Import is often aimed at covering the need for seeds (the vast majority of situations), but also for filling the food needs of the population (rice) or for covering the forage needs.

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