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THE CEREAL CHAIN IN ROMANIA – REGIONAL AND LOCAL APPROACHES

ABSTRACT

The paper intends to examine the market structure of the cereal chain in Romania. The general approach is an update of the cereal chain, with regional and local references to agricultural production, trade, processing, consumption and prices. The paper focuses on the agri-food chain of cereals. In the first place, the main characteristics of the agri-food chain are presented, as well as the long-term trends for the selected indicators. The purpose of this paper will be achieved on the basis of the following methods: the first part of the paper, focusing on the descriptive analysis of the main factors/indicators of the cereal market, is based on the long term trends of selected indicators (production, trade, consumption and prices) and the short- term fluctuations. These factors can be considered the main factors in the agri-food chain, and their development can also explain the movements and evolution of farmgate prices, as well as the final consumer prices, in the context of cereal production instability and price volatility.

Key words: agriculture, agri-food chain, cereals, Romania.

JEL Classification: Q01, Q10, Q12, Q13.

1. INTRODUCTION

The assessment of the cereal chain performance in Romania is based on the analysis of the chain of activities implied, from the agricultural sector level, to procurement, transport, warehousing, processing and sale of bakery products up to the distribution sector, i.e. trade and final consumption.

Cereals are in the category of products that cannot be consumed under raw form, compared to other agricultural products, like fruit and vegetables, for instance. Thus, cereals need some transformations in order to be eaten by consumers. The main objectives of the cereal chain are the following: ensuring food safety; rational utilization of agricultural resources; labour productivity increase; increasing the value added; reduction of costs per product unit and of other costs at farm level; increasing profit and return; increasing production and product quality; promoting science achievements and modern technologies, low and clean energy consumers for ensuring people's and animals' health and environmental protection.

2. STATE OF KNOWLEDGE

The first analyses of the chain were made in USA by R.A. Goldberg on soybean and maize and in Florida on citrus (Goldberg, 1968). In France, we can also find analyses of the chain in the studies of certain economists like J. Le Andi and L. Malassis, in the 1960s.

According to R.A. Golberg, "the chain approach" includes "all participants involved in the production, processing and sale of an agricultural product. This includes the farm inputs, farmers, storage contractors, processing, wholesalers and retailers, allowing the raw product to reach consumers' tables. It comprises everything that means institutions, such as: government institutions, markets, commercial associations, which affect and coordinate the successive stages transited by products." (Goldberg, 1968). This definition was not viable. This was largely supported by the systemic approach that was subsequently developed (Rastoin, 1995; Thiel, 1998).

Agriculture has been a favourite field for the analysis of chains. A detailed description of the chain analysis method inspired by the industrial economy and administrative management can be found in the literature. (Lee and Perez,1992 and Montigaud 1992)

The chain concept has a technical basis, but this has sense only with regard to the economic viability. Another definition was proposed, much more synthetic than that of Goldberg: a chain is a set of actors and technological and economic processes, contributing to the development and commercialization of a product or group of products. Thus, two approaches may be adopted:

- Upstream to downstream approach, starting from a raw product and approaches leading to products sold to the final consumer or to other companies. This approach is useful for the producers of raw products, but it must be completed with the next approach;
- Downstream to upstream approach, it starts from the market share (consumption) and comes back where raw products are the basis. For example, sugar is produced from two conventional raw products, sugar cane and sugar beet, and from a more recent source, i.e. maize, these three basic products being in competition on the sweeteners market. This approach seems essential to effect the market demand and to show the competition problems between generic products.

However, the approach is much simplified by comparison to certain situations that are mainly found in the developing countries (the multitude of marketing channels highly specialized on one segment of the sector: wholesale, retail trade, type of product). Therefore, the number of levels in this sector can be bigger than 4. In the developed countries, on the contrary, commercialization is very much simplified, because the large-scale distribution firms integrate the wholesale trade stage into their purchasing system.

The very sophisticated mathematic modelling by some economists would often be relevant starting from the decision-making objective, if these were preceded by legal bases and discussions based on them.

The analysis methods that could be mobilized are numerous. The first ones are derived from the national accounts. The industrial economy methods were subsequently applied. The most recent economic approaches lead to a concept of operations-information-decision, of system analysis and global chain value, but both incorporate more disciplines.

The first structural analyses of the chains were made by the economists in the field of planning, who were interested in the formation of added values and chain margins, starting from the relative price levels, from the exchanges outside the chains, to the production factor productivity, etc. The French agri-food economy school approach made it possible to reveal the dependence and the formation effects in the agro-industrial field and between sectors, as well as the creation and distribution of productivity within the agro-industrial complex.

At present, it is relatively easy (within the limits of available statistics, mainly a set of accountancy data at national level) to analyze the chains with such tools. Coupling the macro-economic analysis resulted from the set of data in the national accountancy with a micro-economic analysis from the company databases, permits a deep understanding of the structure and functioning of the channels. In a first phase, the method consists in the representation under the form of diagram scheme connecting the actors and production counts, stocks and raw materials in the national space between different links in the chain, and inputs or outputs. In general, it is possible to indicate physical quantities (volumes in thousand or million tons depending on chain importance), turnover rate and labour employment.

3. MATERIAL AND METHOD

Data series for 10 years (2007–2016) were used and Cuddy-Della-Valle instability index of cereal agricultural production (wheat and maize) was calculated at county level to identify and analyze production volatility. Production and productivity were correlated with each of the above factors to establish the relevance of each. The Cuddy Della Valle index was also used to calculate price instability.

In the analysis of instability, we used the Cuddy Della Valle instability index (Cuddy and Della Valle, 1978 & Della Valle, 1979) that expresses the variability in the time series with trend, as this uses the R^2 determination coefficient, which has the role to remove the trend from the time series. It is expressed in percentages and varies by instability intervals, as follows: low instability between 0-15, medium instability between 15-30 and high instability over 30.

The index represents a modification of the variation coefficient when the time series are not stationary and have a trend, which is often the case.

$$I_x = CV(x)\sqrt{(1-R^2)}$$

where: R^2 is the determination coefficient.

CV(x) is the variation coefficient

To study price volatility along the chain we used indices with mobile base for consumer prices. Mobile-based indices (current month versus previous month) removing the trend from the data series give us a better picture of price variation, while preserving seasonality.

The data on areas, production, average cereal yields, average consumption per capita, prices in Romania, by regions, were supplied by the National Institute of Statistics and the Ministry of Agriculture and Rural Development and EUROSTAT. International databases were consulted from the United States Department of Agriculture, Foreign Agricultural Service, Office of Global Analysis, General Directorate for Agriculture and Rural Development of the EU (DG AGRI), Farm Accountancy Data Network (FADN), FAO as well as many other sites; the Romanian and Community legislations were studied.

4. RESULTS AND DISCUSSIONS

4.1. AREAS AND YIELDS

In Romania the area cultivated with cereals in the year 2016 totalled 5486.9 thousand hectares, out of which 39% were cultivated with wheat, 47% with maize, 5% with barley, 3% with oats and 5% with other cereals. The areas under cereals remained somehow constant, with small variations after the year 2007, while the average yields had an increasing trend, which was also reflected in total wheat productions. Yield dependence on the weather factors resulted in significant variations of cereal production in the investigated period.

In terms of cereal farm structure by size classes in Romania, we can see a constant land consolidation trend on medium-sized farms (20-99.9 ha) and large-sized farms, over 100 ha. Thus, the number of medium and large-sized wheat farms increased in the period 2003-2013 by 14.5 % and by 56.4% respectively, while the cultivated areas increased by 37.6% in the case of medium-sized farms and by 44.3% in the case of the large-sized farms. At the same time, the number of farms specialized in maize production increased significantly in the period 2007–2013, by 18.8% in the case of medium-sized farms and 60.6% in the case of large-sized farms, while the cultivated areas increased by 82.8% and 100.3% respectively.

It is easy to understand that the average yields per hectare are much higher in the case of consolidated farmland areas, on the farms with large land areas, due to the centralized management, to the employment of specialists, to a better technical endowment than in the case of small farms, these having an easier access to credits

for investments in technological revamping and storage facilities, finally obtaining a higher value added. On the other hand, the pre-accession funds (SAPARD) and subsequently the Rural Development National Program, have facilitated the acquisition of performant agricultural machinery and the know-how transfer, finally leading to land consolidation into large and medium-sized farms.

Table 1
Areas, production and average yields in the wheat crop, 2016

Region	Area		Production		Average yield	
	hectares	% of total area under wheat	tons	% of total production at national level	tons/ha	% of total average yield at national level
NORTH–WEST Region	143778	7	486149	6	3381	86
CENTRE Region	90619	4	343937	4	3795	96
NORTH–EAST Region	167152	8	602385	7	3604	91
SOUTH–EAST Region	475350	22	2001020	24	4210	107
SOUTH – MUNTENIA Region	587677	28	2415738	29	4111	104
BUCHAREST – ILFOV Region	18374	1	76387	1	4157	105
SOUTH–WEST OLTENIA Region	399471	19	1324194	16	3315	84
WEST region	248290	12	1156667	14	4659	118

Source: author's processing based on NIS, Tempo online data, 2017

In the wheat crop (Table 1), by regions, we can notice an uneven distribution of areas, the largest areas cultivated with wheat being found in the regions South-Muntenia, South-East and South-West Oltenia (69% of the total area of 2130 thousand hectares). The average yield per hectare in the regions South-East and South-Muntenia is over the national average by 7% and 4% respectively, these regions together obtaining 53% of the country's wheat production. A higher average yield per hectare is obtained in the West region, by 18% higher than the national average.

The extended farmland areas, in the plain, the warmer weather and land consolidation into medium and large-sized farms, characterized by a more efficient application of technologies specific to this type of crop with performant machinery, lead to high average yields in the wheat crop.

The smallest areas cultivated with wheat are found in the regions North-West, Centre and North-East, summing-up 19% of the total area under wheat; it is here that the lowest average yields per hectare are obtained, the soil and weather conditions being rather favourable for the maize crop.

Table 2
Areas, production and average yields in the maize crop, 2016

Region	Area		Production		Average yield	
	hectares	% of total area under maize	tons	% of total production at national level	tons/ha	% of total average yield at national level
NORTH-WEST Region	279496	11	1191614	11	4263	103
CENTRE Region	158769	6	753792	7	4747	114
NORTH-EAST Region	479687	19	1712010	16	3569	86
SOUTH-EAST Region	475303	18	1883440	18	3939	95
SOUTH - MUNTENIA Region	470770	18	1959367	18	4162	100
BUCHAREST-ILFOV Region	11233	0	48464	0	4314	104
SOUTH -WEST OLTENIA Region	362148	14	1243414	12	3433	83
WEST Region	343569	13	1954286	18	5688	137

Source: author's processing based on NIS, Tempo online data, 2017

For the maize crop (Table 2), by regions, we can notice a balancing of the maize productions in relation to the areas that traditionally produce large quantities of wheat. The greatest productions are found in the regions West, North-West and Centre, with yields above the national average by 37%, 3% and 14% respectively. The regions South-Muntenia and South-East have average yields per hectare that are similar or close to the national average.

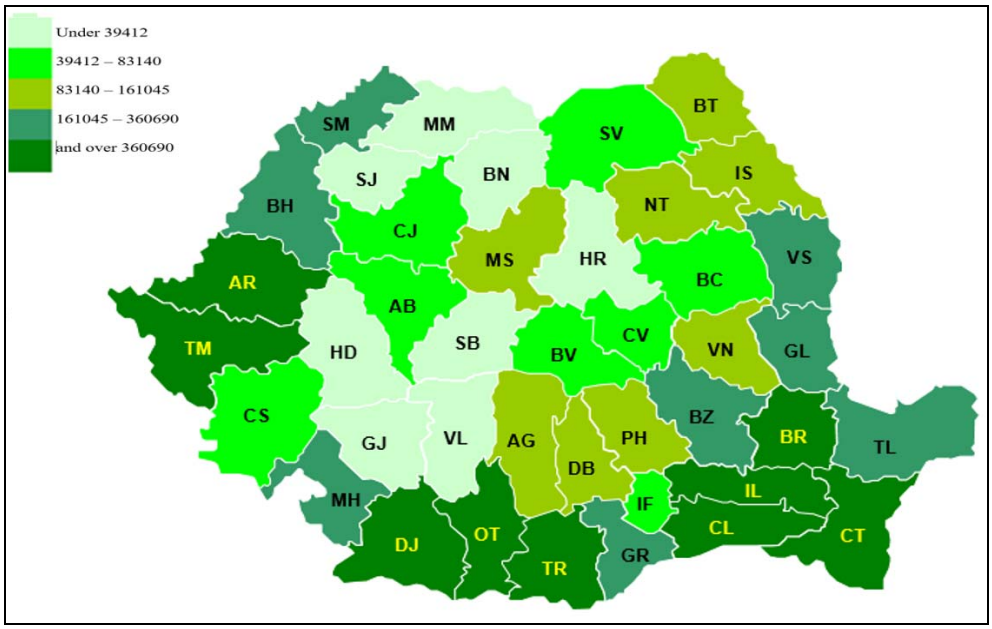
The region South-West Oltenia has a wheat average yield by 16% under the national average and a maize average yield by 17% under the national average, this being mainly caused by the high land fragmentation, 58.3% of the total area under cereals being represented by farms smaller than 9.9 ha.

Regions with more than half of areas under cereals on farms smaller than 9.9 ha are also North-East, with 52% and the region North-West, with 53.6%, in which

the average yields per hectare are lower than the national average, an exception being the region North-West only in the maize crop, the average maize yield in this region being higher by 3% than the national average.

Although land consolidation into large-sized farms is important for obtaining high yields, soil and weather also play an important role, the region North-West having better conditions for maize cultivation. In the case of small farms, the maize crop is more suitable due to the lower mechanization degree and application of fewer treatments than in the case of wheat.

In the case of wheat, we can see that the counties in the south and west of the country have the largest productions, with the counties Constanța, Dolj, Timiş, Călăraşi, Teleorman and Ialomița on the first places, with a cumulated production of 45.1% of total wheat production in Romania. The favourable soil and weather conditions for this type of crop and land consolidation with all its advantages are the determining factors for high wheat yields. Anyhow, except for Timiş county, we can notice a great instability of wheat yields, the Cuddy Della Valle index having values over 30% in these counties for the average yields per hectare. (Fig.1)

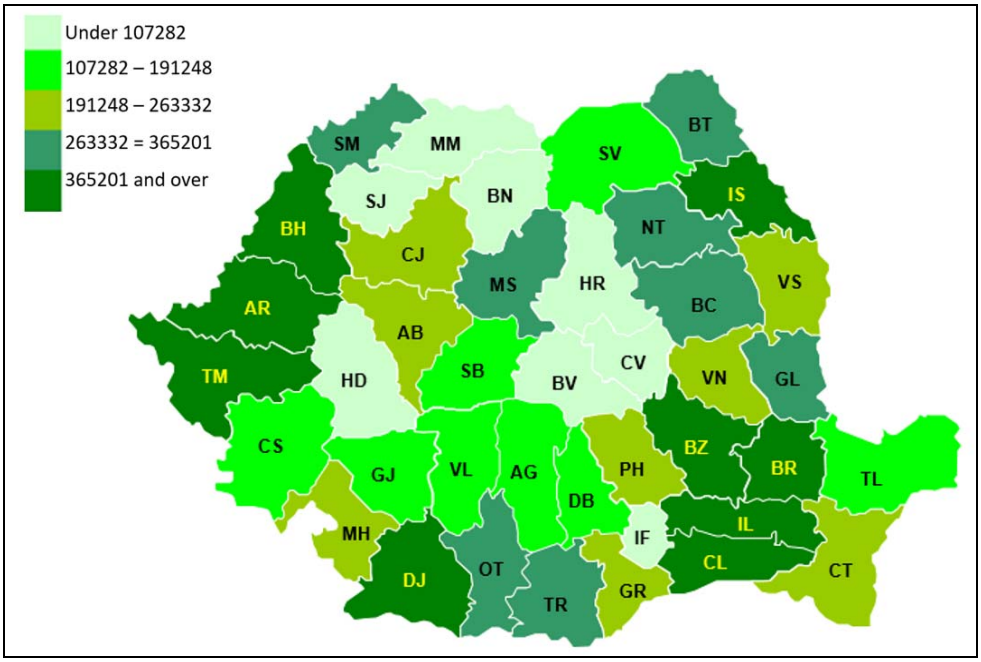


Source: author's processing of NIS data, Tempo online, 2017

Figure 1. Wheat average yields in the year 2016.

Wheat average yields are above the national average in the regions South-East and West; the counties Olt, Dolj and Teleorman, although obtaining big productions in the wheat crop have relatively low yields, below the national average, with high instabilities of wheat productions compared to national average.

The county with the best results in total wheat production and the lowest instability is Brăila, followed by the counties Timiş and Arad. The lowest average wheat yields in 2016 were obtained in the sub-Carpathian area, in the counties Gorj, Argeş, Vâlcea and Dâmbovița, these 3 counties being the most sensitive to the extreme weather conditions, to drought in particular, land equipment with irrigation facilities being a determining factor for the improvement of average yields and instability decrease. In the North-East region, the county Botoşani has the lowest average yield per hectare, while Neamț county is above the national average, with the CDV index below 22% in both situations. Among the counties with the highest instability of wheat yields we can find Cluj, Maramureş, Sălaj, Bistrița Năsăud and Mehedinți, the main cause being represented mainly by the geographical location.



Source: author's processing of NIS data, Tempo online, 2017

Figure 2. Maize yields in the year 2016.

The average yields in maize in the counties from the West Region, i.e. Timiş, Arad, Bihor and Satu Mare are high, over 4.700 kg/ha, yield instability being relatively low, under 22%, except for Bihor county. High yields are also found in the South-East area of the country, with the counties Călăraşi, Ialomița, Brăila, Buzău, where we also find very good average yields, yield instability being relatively high for these, except for Brăila (Fig. 2).

The North-East Region has better results for total production and average yield in maize than in wheat, production instability in this region being under 22%.

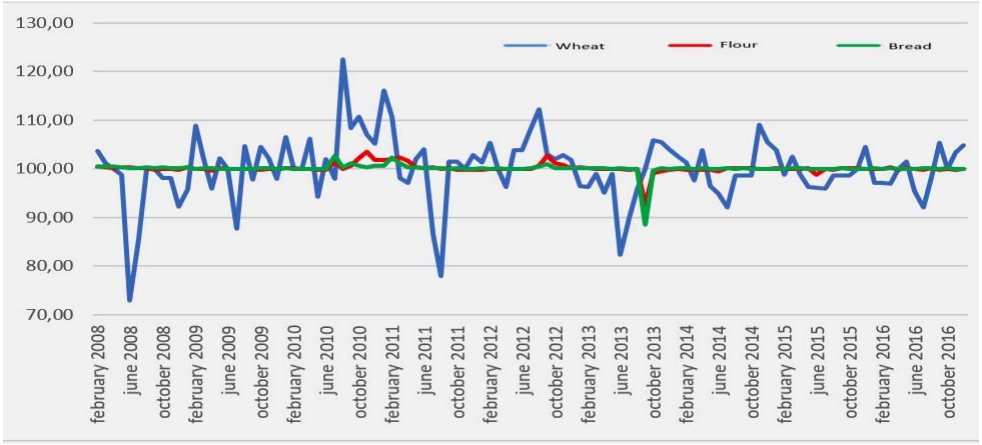
4.2. PRICES

Wheat prices have a seasonal character, being influenced both by the time period from harvesting until the next harvest, by the production obtained in the reference year, by the international stock quotes, by the availability of storage facilities and by the transport costs from the production place/acquisition place to commercialization place/production place or the international transport hubs (Constanța Port). Cereal prices are also influenced by speculative factors, determined either by a low yield or a super yield, prices varying a lot. Thus, yields higher than the average, the absence of storage facilities at reasonable distances from the harvesting place can determine an important price decrease through the practice of oligopsonic prices if the State does not intervene through adequate policies, with regard to the imports and exports regime, either by the procurement of cereals for the strategic reserve, or through direct market intervention, as this is practised at EU level. Last but not least, self-sufficiency plays a leading role in price variation. Self-sufficiency in wheat and maize constantly increased, with maximum values in wheat in the year 2014, i.e. 215% and in maize in the year 2015, of 144%. For the total cereals group the same trend was maintained, with maximum 163% in the year 2014.

In the years when agricultural productions are strongly affected by weather conditions (drought, frost, flood, etc.), the State intervenes through the emergence fund to compensate the losses. Wheat price had an average variability at national level in the period 2008–2016, the Cuddy Della Valle coefficient being 0.204. By regions, the variabilities were different, the lowest being registered in the South-East Region (19.4%) and South-Muntenia (19.7%). The regions with the highest CDV coefficients are North-West Region (24.2%) and Centre (23.1%).

The years 2009, 2010 and 2012 were characterized by low wheat productions, which determined a stronger wheat price increase. Nevertheless, calculating the Pearson correlation coefficient, using as time series the wheat production and price in 2008–2016, we cannot reach the conclusion that there is a direct and strong correlation between these two data series, the only region with a Pearson coefficient higher than 0.5 being Bucharest-Ilfov Region. However, starting with the year 2013, we can notice a constant increase of wheat production, as well as a constant decrease of wheat prices, the Pearson coefficient being -0.97, which reveals a strong negative correlation.

Maize price in 2008-2016 had even a lower variability than in the case of wheat, the CVD coefficient being 18.3%, the smallest variations being noticed in the regions South-Muntenia (15.7%) and West (16.8%), and the highest variations in the regions Centre (23.5%) and South-East (21.9%). Prices were the lowest in the year 2009 in all regions, with three years of increasing prices against the background of great maize production variations, the years 2008, 2009 and 2012 being characterized by small maize productions.



Source: authors' processing based on Tempo online data, NIS, Bucharest, 2017

Figure 3. Variation of price indices in wheat, wheat flour and bread, 2008–2016 (current month as against previous month).

In order to study price volatility along the chain, we used the mobile base indices for consumer prices. The mobile base indices (the current month as against previous month), taking out the trend from the data series, give us a better picture of the price variation degree, while maintaining the seasonal character.

We can notice from Figure 3 that the wheat price varies much more than that of the flour or bread price, the variation coefficient being 44.3%. We can notice the seasonal character of this product through the cyclical decreases of the wheat price in the months previous to harvesting as the storage facilities must permit the storage of the new harvest and also the renewal of the stocks and its increase in the period November-January when the surplus from the period following the harvesting will have finished and the amounts of cereals stored in silos and warehouses begin to be used. We can also notice that in the periods with low yields, like in the year 2012, wheat prices have a maximum level even in the month of August, due to the deficit on the market. The flour and bread price have much lower variations, because these products do not have a seasonal character, bread and consequently flour demand being constant throughout the year. We can notice a more significant fluctuation of consumer price indices for flour and bread in September 2013, as an immediate effect of VAT decrease in flour and bread, as a solution to reduce tax evasion.

4.3. WAREHOUSING

In order to benefit from higher off-harvest prices for their grain production, farmers have built metal silos or granaries. Thus, the farmers who produce more than 8-10 thousand tons of grains prefer to store their production on their own

storage facilities on the farm. These facilities, as a rule, are sized to cover around half of the grain quantity produced. The demand for installing metal silos on the farm grew with their funding from European Funds under the National Rural Development Program 2007–2013.

That is why, at national level, there is a surplus of grain storage facilities compared with the annual production. In the year 2016, this surplus amounted to 21%, so that for a total grain production of 19.3 million tons, the total storage capacity is 23.4 million tons, owned by 4879 authorized economic operators. The grain warehousing capacity in Romania grew by more than 50% as against 1990, from 10.3 million tons to 23.4 million tons at present.

Table 3
The warehousing capacity related to total grain production, 2016

No	Regions	Total cereal production -thou. tons-	Ranking	Total storage capacity -thou. tons	Ranking	storage/ production %
1	Romania	19286		23423		21
2	North-West	1702	6	1520	6	-10
3	Centre	1142	7	682	7	-40
4	North-East	2159	5	2144	4	-1
5	South-East	4016	2	6524	1	62
6	South-Muntenia	5035	1	5995	2	19
7	Bucharest-Ilfov	147	8	201	8	37
8	South-West Oltenia	2524	4	2020	5	-20
9	West	2558	3	4326	3	69

Source: Tempo-online data, NIS 2016 and MARD data, 2016

By regions, the highest surplus of storage facilities is found in South-East and West regions, with 62% and 69% respectively. In terms of warehousing capacity, South-East Region and South-Muntenia Region rank first. Warehousing deficits are found in the regions South-West Oltenia (-20%) and Centre (-40%) (Table 3).

4.4. GRAIN PROCESSING, MILLING AND BAKING SECTOR

About 33% of total cereal consumption availabilities are intended for human consumption. The milling and baking industry is an important sector, the milling and baking enterprises accounting for about 67% of total food industry enterprises. The number of baking enterprises slightly increased in Romania, also in the economic crisis period: 2008–2009, with the highest gross investment value in machinery and equipment in the year 2008 (134.3 million euro). Romania's joining the EU has also had a beneficial effect with regard to the technological revamping of this industry, facilitating the access of economic operators to performant technologies

and equipment. Thus, investments in equipment, on cumulated basis in the period 2008–2015, totalled 822.8 million euro in the baking industry and 315 million euro in the milling industry. Efficiency increase through technological revamping can be noticed through the increasing trend of the output value under the background of constant decrease of the number of employees in the baking industry, by more than 4% in the analyzed period, no correlation existing with the population's migration phenomenon. Also as an effect of the technological revamping, the turnover rate per employee increased constantly, to reach 23.7 thousand euro/employee in the year 2015. The wages fund in the baking industry increased by 16.6% in the period 2008–2015, with a stronger increase starting with the year 2013, by 21.1% in the year 2015 as against the previous year.

In the milling industry, the number of enterprises decreased by 45% in the period 2008–2015, the trend being constant. The number of employees also decreased constantly, as a consequence of the diminution of the number of economic operators in this industry, and also as a result of the revamping of production units. This can be noticed by the constant increase of turnover per employee, with the lowest value in the year 2009 and an increase by more than 72% in the year 2015. This increase is also partially revealed in the wage fund value in the the milling industry, which increased by 16% by the end of the investigated period.

The number of economic operators specialized in bread production increased by 4% nationwide. By regions, the highest increase was noticed in the South-East region, by 13%, and in the North-West region by 10%. Their number decreased in South-Muntenia region, by 3% and West region by 4%. By size classes, in the South-Muntenia region an increase was noticed in the size class 0-9 persons, by 8%, and in the size class 250 persons and over; in Arges county an enterprise in this size class was established.

Across regions, the number of economic operators specialized in manufacturing milling products decreased in each development region, with the highest decrease in the region Centre, in the year 2015, accounting for 38% of their number in the year 2008. A significant decrease was also found in the West region, up to 45%. By size classes, most economic operators that ceased their activity are in the category 0-9 persons (509 units), followed by those in the category 10-49 persons (52 units). This stronger decrease of the milling sector production capacities in the region Centre is also caused by the deficit of cereal storage and warehousing facilities in this region, accounting for 40% of the cereal production in this region.

The number of economic operators specialized in the production of animal feed increased by 7% at national level, the highest increase being noticed in the size class 10-49 persons.

4.5. CONSUMPTION

In the period 2008-2016, the monthly bread and baking products consumption per capita decreased in all macro-regions, the highest decrease being noticed in

Macro-region 4, by 12%, and the smallest decrease in Macro-region 3 (6%). It can be noticed that the consumption trends have slightly changed over time, in the sense of bread consumption decrease, while pasta consumption has been maintained relatively constant, at about 0.3 kg/month/capita. The lowest pasta consumption was found in Macro-region 3, i.e. 0.23 kg/month /capita.

Maize flour consumption also decreased in the period 2008-2016, Macro-region 2 being the region with the highest consumption, i.e. an average consumption of 1.74 kg/month /capita, as the highest maize flour consumption at national level. The average consumption of the other macro-regions is around 0.59 kg/month/capita.

A slight increasing trend can be noticed in the case of wheat flour. The change of food habits determined an increase in the production of bread and flour-based sweets on people's own households, in this case sugar and food additives control being much easier, with the goal to eat healthier food.

4.6. DISTRIBUTION AND COMMERCIALIZATION

As regards the distribution and commercialization of cereals and industrial cereal-based products, there are two main cereal sources: individual farms and commercial farms.

The cereals produced on individual farms are stored either in own barns or granaries or silos owned by third persons, in the case of relatively large amounts of cereals. Consumption is most often under the form of self-consumption, when a large part of cereals is consumed on the household, either under raw form, as human food or for animal feeding, after grinding as wheat or maize flour, also as secondary products, i.e. bran, for animal feed. The surplus is sold on the agri-food markets, the beneficiaries being mainly final consumers.

The chain, in the case of individual farmers is short, growing longer in the case of commercial farms.

The commercial farms, which produce large amounts of cereals, are the base of an extended chain. Part of them have integrated different activities vertically: cereal production, warehousing, milling units and/or units for fodders' production. There is a great diversification of activities, certain economic operators integrating one or more activities or developing business in livestock production, owning livestock farms that benefit from the products manufactured on their own farms, along a short chain from farm to the finished product.

Cereals are stored on own silos or silos of third parties and are destined to different subsequent processing, either for seeds processing and production, or sold wholesale to the economic operators in wholesale cereal trade, or are destined to wholesale trade towards units in the milling industry. Cereals are also sold to feed mills or to companies manufacturing starch or pasta. These distribution networks are also involved in import-export activities.

The milling products are commercialised either directly to bakery units, or through specialized distribution networks, or are purchased wholesale by the large

chain stores or hypermarkets, or are utilized on own units in the baking industry by those economic operators that integrate milling and baking industry activities.

The distributors of milling products sell these products to individual shops (neighbourhood stores, village stores) or to smaller economic units, bakeries or confectionery laboratories. Bread, being a fresh product intended for immediate consumption, is commercialized by bakeries on their own selling shops, or distributed to stores through their own distribution network. The specific technological flow for bread production, the special hygiene requirements during transport and storage, have determined most economic operators to create their own bread distribution networks.

In the case of chain stores and hypermarkets, the milling products are sold to final consumers through own network, either under unprocessed form (different types of wheat and maize flour, etc.), or are utilized on own bakery units for producing bread and various bakery products. These are commercialized on own selling units, under fresh form.

The large producers vertically integrate milling and bread and pasta manufacturing activities, but they also organise distribution chains for these products.

The baking industry products are destined both to consumption on the household and to consumption on specialised food industry units, restaurants, canteens, confectionery shops.

It can be noticed that the cereal chain is very complex and is integrating diverse activities, the products being destined both to human consumption and for consumption on livestock farms or subsistence farms.

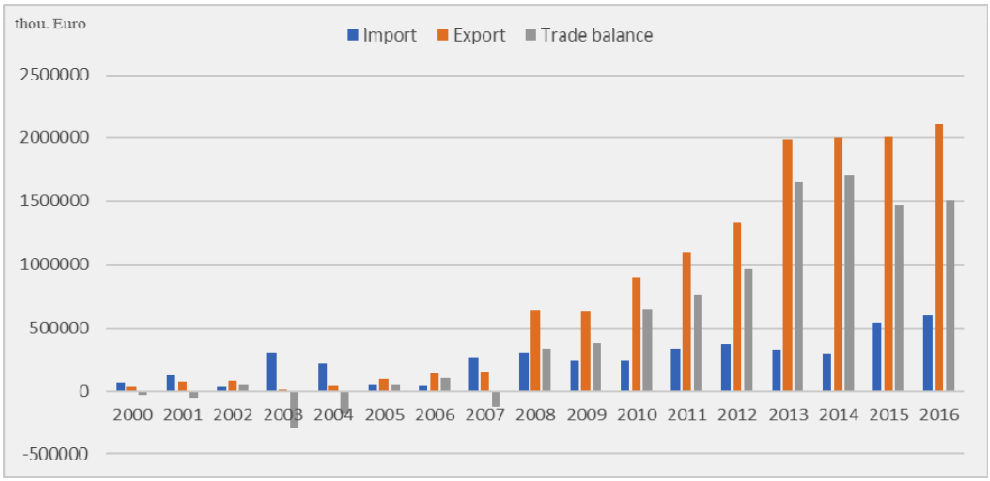
4.7. TRADE

Import and export of cereals. In the period 2000–2007 the balance of trade in cereals fluctuated, with deficits (in the years 2003: -289.6 million euro; in the year 2004: -177.7 million euro and in the year 2007: -118.8 million euro), as a result of the contraction of the domestic supply caused by unfavourable weather conditions, but also with surpluses, with the highest surplus in the year 2006, i.e. 84.2 million euro.

Starting with the year 2008, the balance of trade became positive, shifting from a deficit of 118.8 million euro to a surplus, which increased in the entire investigated period. In the year 2014, the surplus reached 1.7 billion euro.

With the intra-Community market liberalization, the trade flows intensified and their structure changed. Thus, while in the period 2000–2007 the intra-Community imports did not exceed 60%, after 2008 they accounted for about 93%. The exports to the EU also diminished starting with the year 2007, from 62% in 2007 to 34% in 2014, the main export markets for cereals being the extra-Community markets, namely North Africa and Near East. Romania has a competitive advantage in exports to these markets, due to low transport costs.

The trade balances in wheat and maize are positive, with an obvious increasing trend in the period 2008–2015, with 1.5 billion euro surplus in total cereals in the year 2016. Wheat imports from the intra-Community market accounted for 94 % per year on the average in the period 2008–2015, with maximum 97% in the years 2008, 2009 and 2014. In general, we import wheat planting seeds from the intra-Community area. The structure of wheat exports also changed, so that the extra-Community/ intra-Community exports ratio reversed.



Source: author's processing based on COMEXT database, *Code 10: Cereals

Figure 4. Cereal imports, exports and trade balance, 2000-2016.

While in 2000–2007 the exports to the EU accounted for 64%, in the period 2008–2015 they reached only 36%. In value terms, trade significantly increased in the period 2008–2015, with an average annual value of 550.3 million euro, with peak values in the years 2013 and 2014 of 976.9 million euro and 959.3 million euro respectively, as against the period 2000–2007, when the annual average was 33.04 million euro.

5. CONCLUSIONS

In Romania, cereals are the most cultivated crop, the average of the last 25 years indicating that more than 65% of total arable land was cultivated with cereals.

Although the average yields are still well below the yields of the other EU great cereal producing countries, after the year 2007 we can see a constantly increasing trend due to the easier access to technological resources on the community market, and to the land consolidation tendency, so that these advanced technologies can be used more efficiently.

The trend is decreasing in the case of small-sized farms, with the significant increase in the number of medium and large-sized farms. Even in these conditions, the domestic cereal production is relatively strongly influenced by weather factors, mainly drought, which leads us to the conclusion that we must find efficient ways to boost irrigations on larger land areas, taking advantage of the increase in number of the large-sized farms. Labour productivity by economic farm size increased in all the economic size classes, yet by different percentages, with greater increase on the large-sized farms due to a coherent management of crops and technologies used, to the high economic capacity, used in the renewal of the technological fleet and in high-quality genetical material, and through easier access possibility to the EU funds.

By accessing the projects under NRDP, it was intended to attract young farmers in the rural area, as well as to modernize the agricultural holdings and set up producer groups. At the same time, the economic operators who wished to add value to their agricultural and forestry products and the subsistence farms were also among the beneficiaries of these projects.

We can also notice an increase of storage capacities at country level, in the year 2016, which resulted in over 20% surplus compared to the cereal production. This lowers the pressure on producers, as these no longer need to sell their cereal production immediately after harvest, when there is a surplus on all markets and as a result small procurement prices, sometimes under the production price.

The foreign trade with cereals was reshaped in the period 2007–2016, as against the previous period, with the intensification of trade flows, with a positive and increasing trend in the balance of trade starting with the year 2008. Thus, while cereal imports mainly come from the Community market, exports go mainly to countries outside the Community area.

Starting with the year 2005, self-sufficiency reached 100% and has had a constant increasing trend. As a result, the higher dynamics of cereal production and the steadily decreasing trend of cereal consumption led to a self-sufficiency degree of over 100% starting with the year 2008.

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