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THE VEGETABLE SECTOR IN ROMANIA – COMPETITIVENESS IN A EUROPEAN CONTEXT

ABSTRACT

In the year 2016, Romania ranked 5th in the European Union as regards the area cultivated with vegetables and 10th in terms of vegetable production, which reflects productivity differences between Romania and the developed countries of the European Union. This paper presents the effects produced by Romania's accession to the European Union on the vegetable sector in Romania, in the period 2007-2016, analyzing the following aspects: evolution of areas cultivated with vegetables, both in the field and in greenhouses and plastic tunnels, of production in physical and value terms, of exports and imports, evolution of the average procurement prices for the main species of vegetables. From the analyses it resulted that the areas cultivated with vegetables in greenhouses and plastic tunnels account for only 1.8% of total areas under vegetables, although these increased by 92% in the year 2016 compared to 2007, mainly due the support measures from European funds for certain species of vegetables. In these conditions, the domestic supply of vegetables does not cover the consumption needs, uniformly throughout the year, having rather a seasonal character.

Key words: areas, production, prices, vegetable supply, consumption.

JEL Classification: Q110, Q13.

1. INTRODUCTION

Among the effects produced by Romania's joining the EU, the absorption of EU funds became a priority for agriculture and rural development programs. Thus, in order to solve the problems at vegetable chain level, an important role was held by NRDP 2007-2013 public funds, funded from the European Agricultural and Rural Development Fund (EAFRD). In the period 2007-2013, the absorption rate of EU funds was about 80% (12.84 billion euro from the European Agricultural Guarantee Fund (EAGF) and the European Agricultural and Rural Development Fund (EAFRD). Having in view the information supplied by MARD, the payments for producer groups amounted to 11.8 million euro, and for producer organizations from the fruit and vegetables sector more than 2 million euro. For the financial exercise 2014-2020, the allocations for Romania are about 19.43 billion euro current prices for direct payments and market related expenses (Pillar 1) and for rural development (Pillar 2).

In September 2007, following the adoption of CAP on Common Market Organization for fruit and vegetables in Romania, the first producer organization was recognized, in conformity with the EU legislation. Although in the year 2012 there were 35 producer groups in the sector of fruit and vegetables, at present there are only 24 producer groups reorganized as producer organizations in conformity with the EU legislation, out of which three operate one operational program each.

The paper presents the evolution of the vegetable sector in Romania in the period 2007-2016 from the perspective of EU membership effects on this sector. The study of the impact of Romania's accession to the EU on the vegetable chain has in view various aspects, among which: the agricultural sectoral policies, general macro-economic framework, fiscal, commercial and social policies, etc.

2. STATE OF KNOWLEDGE

Romania is recognized for its high potential of growing field vegetables, with high soil fertility and diversity of weather conditions. The reorganization of the vegetable production, processing and marketing system would be crucial for putting into value this potential; thus, Romania would be able to cover its consumption needs and would even become competitive on the European vegetable market.

After Romania joined the EU, progress has been made in this sense, yet there are numerous aspects that hinder reaching a high production level in this sector, namely: large number of small-sized farms, low endowment of farms with modern production and harvesting technical means, lack of coherent strategy for land consolidation, high fragmentation of areas under vegetables, low yields per hectare.

The fruit and vegetable market in Romania needs an increased attention also due to its particularities. Among these particularities, we can mention: atomization of supply and demand, homogeneity of products, seasonality of products, zonality and existence of a weakly developed collection system, high perishability level of fruit and vegetables, continuous demand for fruit and vegetables, high consumption of production factors in the production of fruit and vegetables. At the same time, various crises appear on this market, generated by factors such as: extreme weather events, different pests and diseases, failure to plan production according to market requirements, imports from the EU and third countries, poor promotion of fruit and vegetables among consumers as well as of the role and importance of fruit and vegetables for the health of the population. These crises can be avoided by a better knowledge of the specific particularities of the fruit and vegetable market.

At present, the challenge for Romania is to cover the consumption needs by the domestic supply of vegetables. In order to boost the vegetable production in the cold season, a continuity of investments should exist in protected areas, as well as in the modernization of cropping technologies to obtain high quality productions. The food production and consumption models are widely debated in the literature, and there are various studies highlighting their main features. Thus, the French

school used for the first time the “food consumption model” concept; consumption is defined as a complex process that involves a succession of stages, such as: way and place of food product purchasing, product preparation, way and place of consumption, as well as waste disposal modalities (Padilla and Thiombiano 1996).

Considering the evolution of the society and the economy, a succession of food consumption models has emerged, from the traditional model (poverty model) to the agro-industrial model (which presupposes the replacement of richer proteins of animal origin by poor proteins of vegetable origin) and the satiety model (Malassis and Allaya 1996; Padilla and Thiombiano 1996). The three models are presented in the literature as a succession of stages that finally converge into an advanced model. The convergence can be justified on the basis of the biological characteristics of food consumption (about 2500–3000 calories/person), or if we consider that as incomes increase, food expenditures tend to have a lower share in total income and get stabilized at about 15-20% of total expenditures (Blandford 1984; Connor, 1994). Convergence, from the social phenomenon perspective, indicate the tendency towards homogenization of consumption styles, as not only what we eat is important, but also the way we eat (Fanfani and Salluce 1997; Gatti and Migani 1997).

An important problem of Romanian vegetable growers is to get adapted to the new production and commercialization standards. In this respect, as evidenced by the literature, there are various studies that highlight the advantages of different producer cooperation forms. Through these cooperation forms, the producers want to reach the following objectives: defending farmers’ interests, joint performance of technical and economic functions (production planning, procurement of production means, joint sales, etc.) and local development (Garoyan, 1983).

3. MATERIAL AND METHOD

The objective of the paper is to evaluate the vegetable chain potential after Romania’s accession to the European Union. For this purpose, the indicators at the level of primary production, foreign trade and consumer were analyzed. After the evaluation of the general situation of vegetable market in Romania, the results were compared to those of the developed countries from the European Union.

In order to reach this objective, the following indicators were analyzed:

- Areas cultivated with vegetables, production and yields per hectare;
- Volatility of average procurement prices for different species of vegetables;
- Consumption of fresh and preserved vegetables in Romania and self-supply level
- Import and export of vegetables.

A comparative analysis of certain sets of indicators with those of the EU member states was also made. In order to determine price volatility in the period

2007–2016, annual time series were used, calculating the standard deviation and average. The variation coefficient was calculated as ratio of standard deviation and 2007–2016 average. A low variation coefficient indicates a better grouping around the average value, while a high variation coefficient indicates a much larger spread around the average value, which means an increase in volatility. The self-supply, expressed as percentage, indicates to what extent the domestic production of vegetables covers the domestic consumption needs, and is calculated by relating the domestic production to supply availability. For the documentation and synthesis of main ideas, the national and international literature on the evolution of the European vegetable market was consulted. For the analysis, the databases of the National Institute of Statistics – Tempo online, the food balance sheets and the Eurostat databases were used. The information available on MARD website was also used.

4. RESULTS AND DISCUSSIONS

4.1. EUROPEAN CONTEXT

In the year 2016, the value of vegetable production at EU level was 32,143 million euro, while in Romania it reached 1,997 million euro, which represents only 3.6% of the EU value. In the year 2015, the total area cultivated with vegetables in Romania was over 149 thousand hectares, accounting for 7.2% of the area cultivated with vegetables in the EU. As regards the total production of vegetables, melons inclusively, Spain ranked 1st, with over 28% of the EU's total production of vegetables, followed by France with 10%, the Netherlands with 9.9% and Poland with 9.7%. In the year 2015, Romania's production of vegetables and melons totaled 2,468 thousand tons, representing about 5% of the EU's total vegetable production.

Table 1

Romania's ranking in the European context by area and production of vegetables, in the year 2016

Country	Production		Area	
	Share (%)	Rank	Share (%)	Rank
Spain	23.9	1	17.5	2
Italy	17.6	2	20.2	1
Poland	9.0	3	9.0	4
France	8.7	4	11.7	3
Netherlands	7.7	5	4.1	9
Romania	3.6	10	6.6	5

Source: Eurostat.

Table 1 presents the main 5 countries that together produced 67% of the production of vegetables and had 65% of the area cultivated with vegetables in the

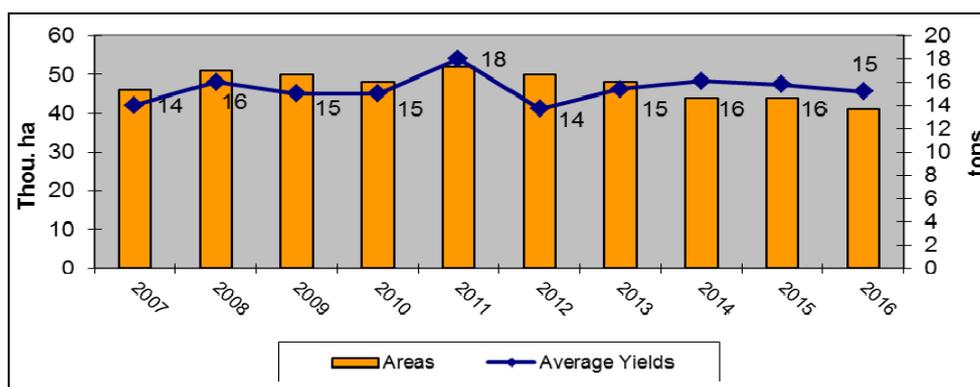
EU in the year 2016. The table below presents the first 5 countries that had 64% of the vegetable production value in the EU in 2015. Romania ranked 7th, with only 6%, yet up by 6.4% compared to the year 2007.

Table 2
Value of total vegetable production, basic prices (mil. euro) in the year 2015

Country/2015	Share (%)	Rank
Spain	21	1
Italy	19	2
Netherlands	9	3
France	9	4
Germany	7	5
Romania	6	7

Source: Eurostat.

In the year 2015, the most cultivated vegetables in the European Union were tomatoes, carrots and onions. The tomato production totalled 17.6 million tons, Italy and Spain being the main tomato producers in the European Union (about 64%). The carrot production totalled 5.1 million tons in the EU, with the highest values in Poland (14.4%) and United Kingdom (13.3%). The onion production totalled 6.1 million tons, with the Netherlands and Spain together accounting for over 45% of the onion production in EU-28. In the year 2015, Romania ranked 3rd (9.6%) in the EU in terms of area cultivated with tomatoes, but it ranked 8th in EU-28 with 2.6% of the total tomato production of the EU. The average yield per hectare in tomatoes was 15,857 kg/ha, down by 2% from the previous year. Although in the recent years the areas cultivated with tomatoes under greenhouses and plastic tunnels has increased, the domestic production does not cover the consumption needs, and the tomato imports are still significant.



Source: NIS – tempo online, 2017

Figure 1. Evolution of cultivated areas and average yields in tomatoes in the period 2007–2016.

4.2. AREAS CULTIVATED WITH VEGETABLES, TOTAL VEGETABLE PRODUCTION AND AVERAGE YIELDS

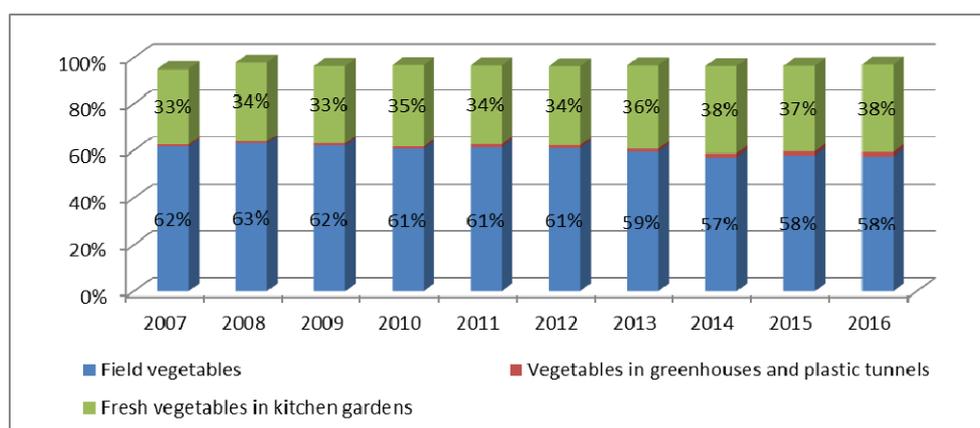
In the year 2016, in Romania, the area cultivated with vegetables totaled 228 thousand hectares, out of which 18% areas cultivated with tomatoes, 13% areas cultivated with onions, 20% areas cultivated with white cabbages and 8% areas under peppers. Although in recent years the areas cultivated with vegetables under greenhouses and plastic tunnels have increased, in the year 2016 there were only 4,155 ha of areas cultivated under greenhouses and plastic tunnels, accounting for 1.8% of the total area cultivated with vegetables. The field vegetables account for 57.5% of total area cultivated with vegetables, and the fresh vegetables from kitchen gardens represent about 38% of total area cultivated with vegetables. In the year 2015, the cabbage production had the highest share in the total production of vegetables (34.1%), followed by tomato production (22.3%). We can notice from Table 3 that the areas under field vegetables decreased by 16% in 2016 compared to 2007, while the areas under vegetables cultivated in greenhouses and plastic tunnels increased by 91%.

Table 3

Variation of areas cultivated with vegetables by categories in the year 2016 as against 2007 and 2013

	2016/ 2007 variation	2016/ 2013 variation
Vegetables – total	-10%	-12%
Field vegetables	-16%	-15%
Vegetables in greenhouses and plastic tunnels	91%	21%
Fresh vegetables in kitchen gardens	4%	-8%

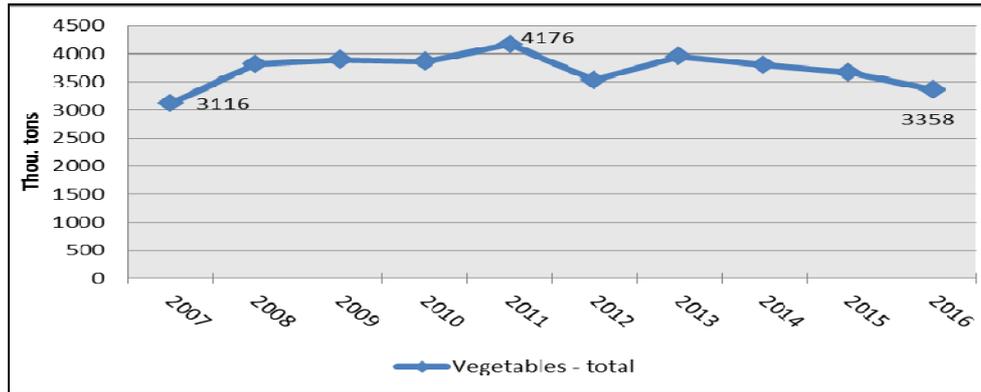
Source: author's calculations based on Tempo online data, NIS, 2017



Source: NIS – Tempo online, 2017

Figure 2. Evolution of areas cultivated with vegetables by categories, in the period 2007-2016.

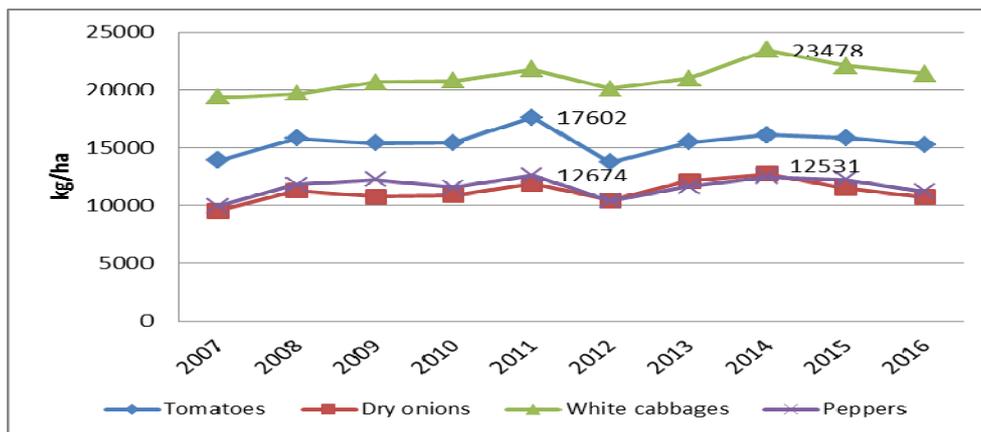
In the period 2007–2016, the area cultivated with vegetables had a high variability, reaching a maximum of 268 thousand hectares in 2008 and a minimum of 228 thousand hectares in 2015. This variability is determined by the weather conditions, as well as by the sale of production. In the period 2007–2016, the total production of vegetables followed an upward trend, with a maximum of 4,176 thousand tons in 2011 and a minimum value in the year 2007.



Source: NIS, Tempo online, 2017

Figure 3. Evolution of vegetable production in the period 2007–2016, (thou. tons).

As regards the average yields in vegetables, in terms of weather conditions, the droughty years determine lower yields. The rehabilitation of the irrigation system would be a solution to solve this problem. We can notice from Figure 4 a decrease of yields in the main types of vegetables in the years 2007 and 2012, which are considered droughty years.



Source: NIS, Tempo online, 2017

Figure 4. Evolution of yields in the main types of vegetables.

The main vegetables cultivated in Romania in the year 2016 were white cabbages and tomatoes. The white cabbage production accounted for 30% of the total production of vegetables, while the tomato production only 19%. The highest average yield value in white cabbages was in the year 2014 (23478 kg/ha), while in tomatoes in the year 2011 (17602 kg/ha).

Table 4
Variation of yields in the main types of vegetables

	2016/2007
Tomatoes	10%
Dry onions	13%
White cabbages	11%
Peppers	13%

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

4.3. AVERAGE PRICES FOR THE MAIN VEGETABLE SPECIES

Tomatoes and winter white cabbages had the highest price volatility, while carrots and onions had lower volatility coefficients also due to better conditioning and storage possibilities.

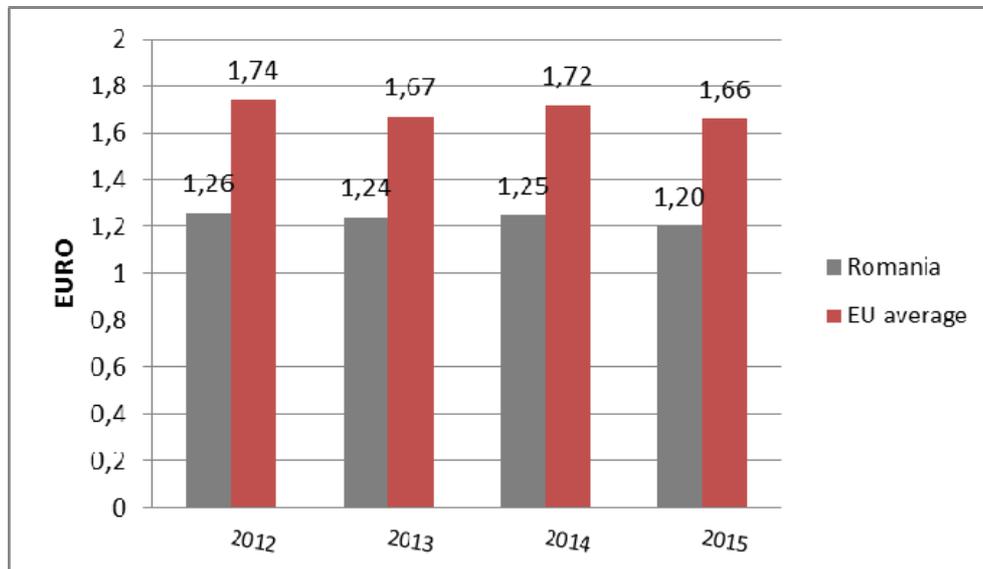
Table 5
Standard deviation, mean, coefficient of variation (CV) of average prices for the main types of vegetables, 2007-2016.

	Standard deviation	Mean	CV%
Winter white cabbages	0.254	1.292	19.66
Field tomatoes	0.472	2.66	17.74
Field cucumbers	0.204	2.12	9.61
Carrots	0.167	2.29	7.28
Dry onions	0.158	2.019	7.85

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

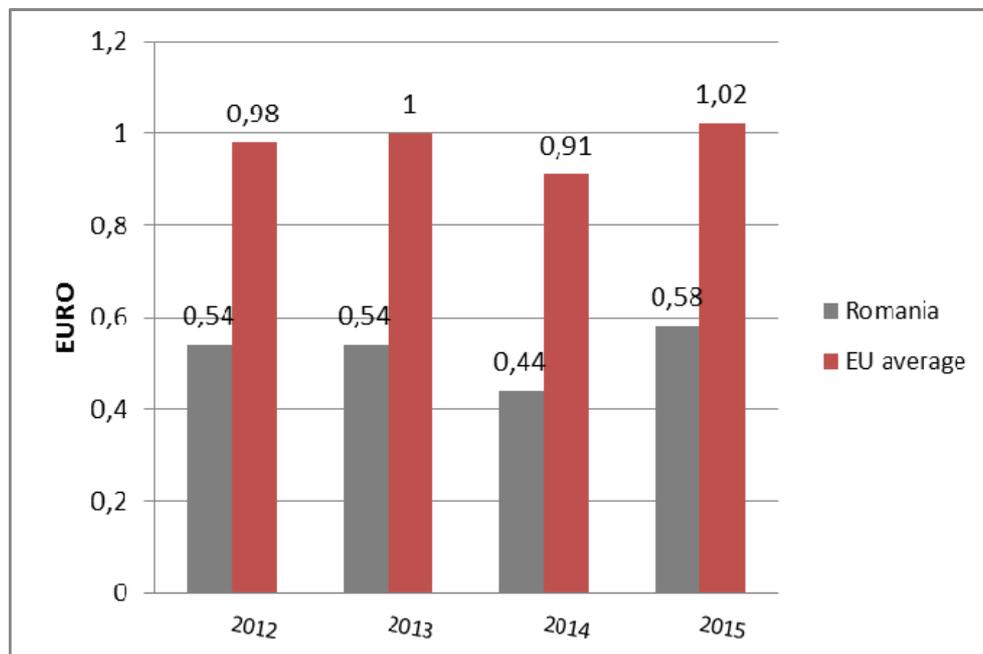
In the investigated period, it was noticed that due to production volatility in the main types of vegetables cultivated in Romania, there is also a strong volatility of the prices of these vegetables.

As regards the average price of vegetables, in the period 2012-2015, we note that Romania has the lowest average price in carrots and tomatoes, as compared to the EU average.



Source: Eurostat [prc_dap]

Figure 5. Evolution of average prices for tomatoes.

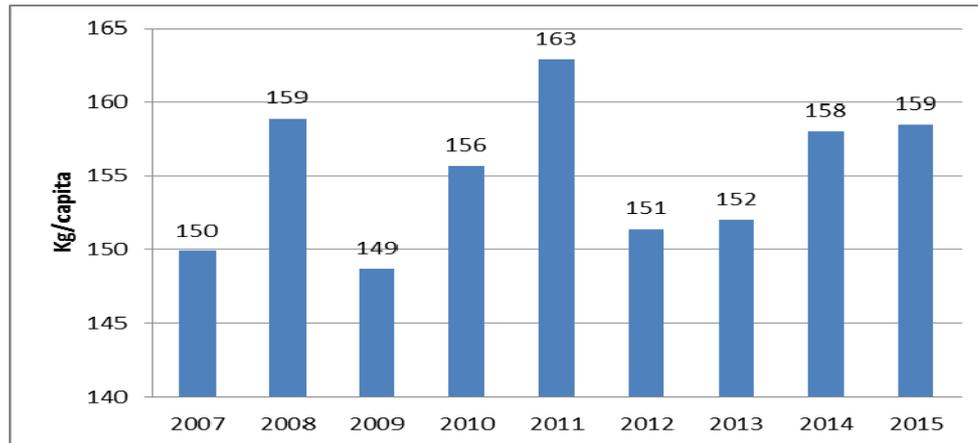


Source: Eurostat [prc_dap]

Figure 6. Evolution of average prices for carrots.

4.4. CONSUMPTION AND SELF-SUPPLY OF VEGETABLES

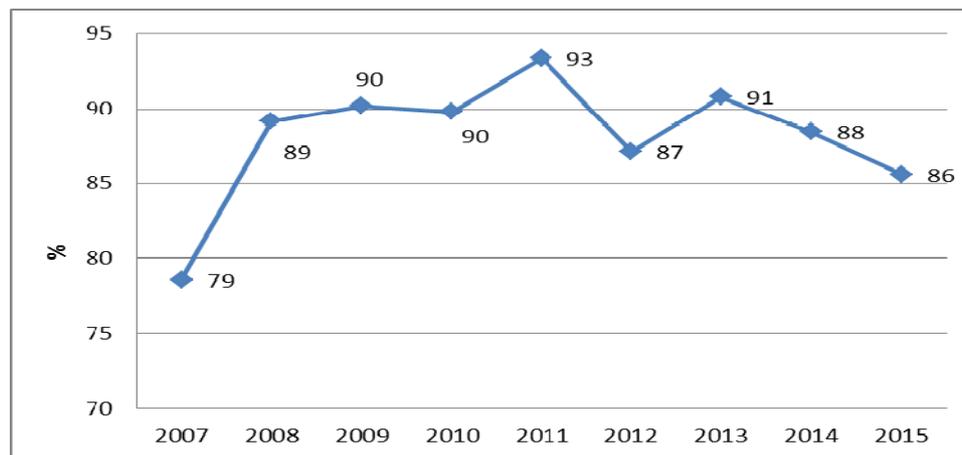
In the period 2007–2015, the consumption of vegetables had an increasing trend. Thus, the average consumption of vegetables reached a maximum of 162.9 kg/capita in the year 2011 and a minimum of 148.7 kg/capita in 2009.



Source: Tempo online, NIS, 2017

Figure 7. Average consumption of fresh vegetables, 2007–2015.

We can notice from Figure 8 that self-supply had an increasing trend in the period 2007–2015, with a maximum in the year 2011. However, the consumption needs were not fully covered, as there is a very high seasonality of vegetables in our country. In Romania there is no harvest scheduling like in other EU member states.

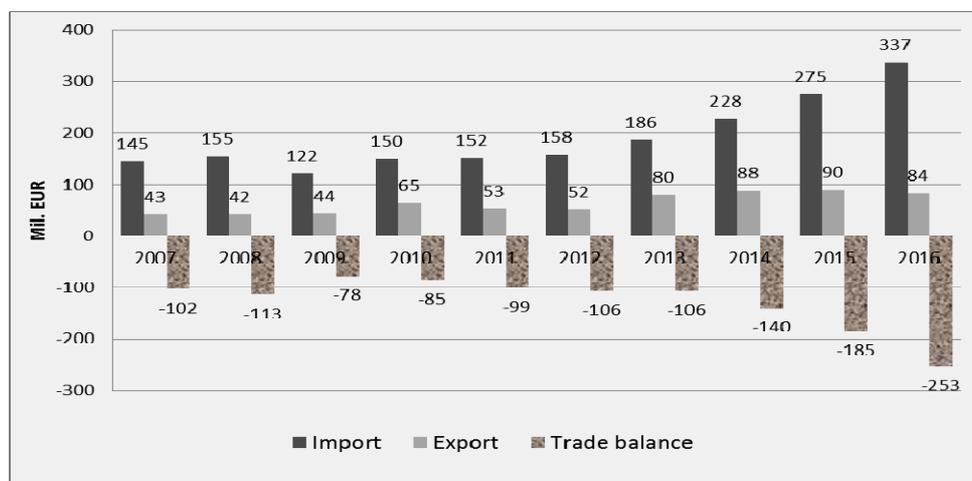


Source: NIS, Food Balance Sheets

Figure 8. Evolution of self-supply in fresh vegetables, 2007–2015.

4.5. FOREIGN TRADE IN VEGETABLES

In the vegetable sector from Romania, the low yields and the poor organization of the chain are also reflected in the balance of trade. At present, the exports of vegetables are low, Romania being a great importer of fresh vegetables from countries like Turkey, Greece, Spain, Italy and the Netherlands. As it can be seen from Figure 9, the balance of trade was negative in the period 2007–2016, due to imports that far exceeded the exports of vegetables. In Romania the vegetable supply is mostly seasonal, while the demand is continuous.



Source: NIS, Tempo online 2017

Figure 9. Balance of trade in the group Vegetables, plants, edible roots and tubers.

Romania's export of vegetables has had an oscillating trend since 2007 up to the present moment, with a minimum level of 21 thousand tons in 2007 and a maximum level of 95 thousand tons in the year 2016. Romania could not fully cover the consumption needs in vegetables from domestic production, and imports had still a high level. In the year 2016, Romania imported over 525 thousand tons of vegetables. Romania exports fresh vegetables, and in the recent period the exports of tomatoes and onions have increased. In the year 2016, the imports of vegetables and preserved vegetables was 5.5 times higher than exports.

5. CONCLUSIONS

In the year 2016, Romania's vegetable production accounted for 3.6% of EU's vegetable production, Romania ranking 10th in EU-28, next to Italy, Spain and France. In the year 2015, Romania was the 8th largest producer of vegetables

and melons in the European Union and ranked 3rd in terms of area cultivated with tomatoes in the EU. By comparison, in the year 2007, Romania ranked 9th as regards the production of fresh vegetables (melons inclusively) in the European Union, with a production value of 1,908 million euro and was on the 6th place in the EU in tomato production.

Although in recent years the areas cultivated with vegetables under greenhouses and plastic tunnels have increased, the obtained yields reflect the gap between Romania and the main producers of vegetables in the European Union. Among the main causes of this problem we can mention: limited access to modern production and harvesting techniques, increase of the frequency of extreme weather events, seasonality, zonality of vegetables and a weakly organized marketing system.

As regards the average price of vegetables, in the period 2012-2015, Romania had the lowest average price both for carrots and tomatoes, compared to other EU member states.

Although the share of vegetables grown under protected areas has increased and producer groups have been established, Romania is not able to cover the consumption needs from the domestic production of vegetables.

There are significant gaps in the vegetable sector between Romania and the European Union. Among the main causes we can list: high fragmentation of the sector, inadequate use of production factors, inefficient institutional framework and logistic system, poor organization of producers. After 11 years of EU membership, the Romanian vegetable sector still needs significant investments to increase its productivity and to recover the gaps with the European Union.

An increase of vegetable areas under greenhouses and plastic tunnels can be noticed, by 92% in the year 2016 compared to 2007, as well as of vegetable productions; however, the productivity gaps between Romania and the EU countries have been maintained. The increase of the production of vegetables grown in greenhouses and plastic tunnels reveals the growth and development potential along the entire chain.

In Romania's vegetable sector, the low yields and the lack of organization along the chain also impact the balance of trade. At present, the exports of vegetables are low, Romania being a great importer of fresh vegetables from countries like Turkey, Greece, Spain, Italy and the Netherlands. Romania cannot cover the population's consumption needs from domestic production. In 2016, Romania imported more than 572 thousand tons of vegetables. Romania exports fresh vegetables, and in the recent period the tomato and onion exports have increased.

REFERENCES

1. Dries, L., Reardon, T., Swinnen, J.F.M., (2004), *The Rapid Rise of Supermarkets in Central and Eastern Europe: Implications for the Agri-Food Sector and Rural Development*, Development Policy Review, 22 (5), pp. 525–556.
2. Fonte, M, (2014), *Food Systems, Consumption Models and Risk Perception In Late Modernity*, available at: https://www.researchgate.net/publication/267231199_Food_systems_and_risk_perception.

3. Fox, Karl A., Kumar, T. Krishna, (1994), HLPE, 2011. Price volatility and food security. A report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome 2011.
4. Mazzarol, T., Rebound, S. et al., (2014), Research Handbook on Sustainable Co-Operative Enterprise, Case Studies of Organisational Resilience in the Co-operative Business Model, 2014, published by Edward Elgar Publishing UK & USA.
5. Strategia națională pentru programele operaționale în sectorul de fructe și legume, Perioada 2018-2010, MADR/Direcția Generală Politici Agricole și Strategii, august 2017.
6. Strategia pentru dezvoltarea sectorului agroalimentar pe termen mediu și lung orizont 2020-2030, MADR, 2015.
7. www.eurostat.com.
8. www.madr.ro.
9. www.statistici.insse.ro.
10. *** Agriculture, forestry and fishery statistics, Agriculture and fisheries Collection: Statistical books, European Union, 2016.
11. *** Fresh Fruit and Vegetables in Europe, CBI Trends, 2016.
12. *** The fruit and vegetable sector in the EU - a statistical overview, available at: http://ec.europa.eu/eurostat/statisticsexplained/index.php/The_fruit_and_vegetable_sector_in_the_EU_a_statistical_overview.