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THE EVOLUTION OF THE ROMANIAN VEGETABLE INDUSTRY AND SOME PROSPECTS FOR THE FUTURE

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Abstract

The purpose of this paper is to analyse the evolution of the fruit and vegetable processing industry in Romania, using several specific indicators that allowed placing the Romanian industry in a European context based on Eurostat data. Based on these developments, another important indicator was calculated with the help of which the degree of food security can be appreciated, namely the degree of self-sufficiency for the main group of vegetables, and forecasts were made regarding its evolution in the medium and long term. The results show that the prognosis remains pessimistic in the sense that Romania will not be able to attain self-sufficiency in the short and medium term, unless the sector is prioritised for important investments in vegetable processing and sector organisation, although some signs of growth opportunities were identified in the analysis.

Key words**:** *self-sufficiency, vegetable production, short- and medium-term prognosis*

INTRODUCTION

This study investigates the potential of the vegetable and fruit processing industry to contribute to the development of the local economy based on some economic indicators, which at the same time allow the positioning of the Romanian vegetable processing industry in the European context. In this sense, it was tailored a conceptual analytical model which is based on Porter's diamond used for evaluating and ranking companies, to position the Romanian vegetable processing industry in a national and European context, with the aim of observing the best development prospects of this sector but also making some comparisons with the main competitors in the EU. The main indicators considered in this study were: number of employees, turnover, degree of industry concentration, production value, gross value added, gross investment in tangible goods and investment rate. With the help of these indicators, a comparative analysis was also carried out with Poland, Hungary, Italy and France for the period 2011-2020, in order to position the Romanian processing industry in a European competitive context.
A synthetic picture of the main problems faced by the Romanian fruit and vegetable sector through the lens of trade deficit and dependence on imports is presented. Based on these developments, in the paper another important indicator was calculated with the help of which the degree of food security can be appreciated, namely the degree of self-sufficiency for total vegetables (fresh vegetables equivalent), and forecasts were made regarding its evolution in the medium and long term.

MATERIALS AND METHODS

The creation of added value for agricultural products is known as one of the most important activities that can contribute to sustainable rural and local economic development. This is why, it is important for the local agricultural products to generate added value in order to attain the objectives of rural economic development by creating a solid foundation for new job creation and local economy (Barbier, 2007) [2]. Among the most representative and successful impacts of sustainable local economic development could be named: 1) ensuring food security, 2) increasing the contribution of exports to GDP, and 3) improving sustainable job creation) [13]. It is worth noting that the development of agro-

industries is known as one of the most important means of local economic development. Consequently, the creation of added value can effectively help sustainable development in economic and social dimensions.

The specialised literature shows, for example, that Spain holds a significant share of the international saffron market through the development of the domestic packaging industry for this product [9]. Another example is the case of Germany, which is a major exporter of natural extracts from horticultural crops through the development of processing industries. However, this country produces no more than about 0.27% of the world's horticultural crops domestically. These economic achievements resulted from the development of local processing industries for local production of raw materials.

The work is based on several data sources from Eurostat, the National Institute of Statistics, but also on the conclusions of several research companies from Romania and EU [13]. The main indicators used are the production value, number of enterprises, average number of employees per enterprise, gross added value per employee, gross operating surplus, apparent labour productivity, gross investments in tangible goods. These indicators were calculated to see where Romania's processing industry is positioned in relation to several other EU member states that represent an important competition for the national vegetable and fruit processing industry. Data from the period 2011-2021 were used to calculate these indicators. Some prognosis regarding the production, imports and exports and self-sufficiency were calculated on short and long term.

RESULTS AND DISCUSSIONS

Local processing can represent an important source of income and development for the local community and this can be achieved by investing in local processing. In addition, the lack or insufficiency of modern processing and packaging facilities limits the potential for value added creation to vegetable production in the already established vegetable basins. Some of the barriers that prevent local economic development in the fruit and vegetable processing sector in Romania include: 1) insufficient infrastructure and supply chain contracting; 2) insufficient investment in the processing industry to create added value and 3) low development of the necessary infrastructures for export.

To solve these problems, many countries have developed medium and long-term initiatives for financing, establishing the necessary infrastructures for industrial development, creating jobs, expanding exports, reducing taxes and building educational infrastructures, most of which have focused on developing agricultural product processing industries [3].

The value of EU processed fruit and vegetables represents almost 51 billion euros, i.e. 6.5% of total production value of the food industry. In the EU, fruit and vegetables are processed in all countries, but five Member States were accountable for over two-thirds (69.1 %) of the total production value in 2021; these were Italy (22.3%), Spain (15.1%), Germany (11.8%), France (10.2%) and the United Kingdom (9.8%), showing quite a high concentration percent.

In addition to being consumed directly and traded as raw commodities, fruit and vegetables are also processed into a large variety of processed food. These can be grouped into frozen, dried and preserved fruit and vegetables (vegetable preserves, jams, marmalades and dried fruits) (72.5% of the sold production), juices (19.6%), tomato ketchup (3.2 %), preparations (4.1 %) and the grouping of dried fruits and homogenised vegetables and fruits (1.3 %) [12].

As regards Romania, according to an analysis carried out by KeysFin [6] in 2020, the turnover of the fruit and vegetable processing industry increased by 17.4% compared to 2019 and reached the highest level in history of about 24 billion RON. Looking at sub-sectors, trade recorded the highest growing rate of 19%, with a turnover of about 21 billion RON, while the processing activity enlarged by 12% achieving a turnover of 1.4 billion RON), and the turnover of fruit and vegetable producers increased by 5% compared to 2019 reaching almost 2.1 billion RON in 2020.

For the following years, the above-mentioned study estimated the continuation of the growth tendency which started in 2014 and it was forecasted to attain a record level of 28 billion RON in 2022 and almost 30 billion in 2023 as a result of increased consumption, but also inflationary pressures of approximately 10% in 2020 and 2021.

Production value

The production value of the fruit and vegetable processing industry had an increasing evolution from the year 2011 to 2020, with a growth rate of +37% compared to 2011 and annual growth rates of approximately +4% compared to 2015. Compared to the other countries with which the comparison was made, however, Romania had the lowest production value, i.e. half of the level of Hungary and 10 times lower than the production value recorded by fruit and vegetable processing factories in Poland.

Table 1. Production value in the fruit and vegetable industry 2011-2020 and comparison with other EU member states, million euros

	2011	**2015**	**2020**	**Dynamics** 2020/2011	**Dynamics** 2020/2015
Italy	9,928	10,529	12,579	27	20
Hungary	713	750	921	29	23
Poland	3,468	3,980	4,598	33	16
Romania	**333**	**437**	**455**	**+37**	**+4**
France	7,076	7,188	7,928	12	10

Source: personal computation based on data extracted from Eurostat [4].

The vertical integration might be another measure with direct impact on the output and productivity of the processing company that initiates vertical contracting and of its suppliers involved in vertical coordination schemes. Supplying farmers have experienced beneficial effects on output, productivity, and product quality – and ultimately on incomes – through better access to inputs, timely payments, and improved productivity with new investments [11].

According to Eurostat data, in 2021 there were 818 enterprises registered with 1,794 employees, obtaining a profit of 16.7 million euros.

This places Romania at half the number of enterprises registered in Italy, Poland and France, but above that registered in Hungary.

The evolution of the number of fruit and vegetable enterprises is presented in Table 2.

Table 2. Number of enterprises in the fruit and vegetable processing industry

	2011	2015	2020	**Dynamics** 2020/2011	**Dynamics** 2020/2015
Italy	1,788	1,726	1,749	-2.2	1.3
Hungary	534	544	537	0.6	-1.3
Poland	952	1,085	1,416	48.7	30.5
Romania	249	365	818	**228.5**	**124.1**
France	1,176	1,282	1,689	43.6	31.7

Source: personal computation based on data extracted from Eurostat [4].

The first five enterprises accumulated 40% of the sub-sector's turnover and held a share of 32% of the employed staff, making 52% of the profit. In other words, the first five enterprises covered almost half of the fruit and vegetable processing sector.

The division of the supply chain by sub-sectors confirms a fairly balanced market: accordingly, 43% of the companies were involved in trade and in primary production, while the rest were involved in fruit and vegetable processing. The number of enterprises in the fruit and vegetable processing and preservation has increased every year in the analysed period, including units that manufacture perishable food from fruit and vegetables (such as salads, cleaned or cut vegetables). On the other hand, the average number of employees per enterprise has decreased, suggesting that many of the newly established enterprises are smaller in size.

In 2020, compared to the analysed countries, Romania had the lowest number of employees, 7.5 employees per enterprise, a downward trend compared to 2011 (-67%), as shown in Table 3.

Table 3. Number of employees per processing company

	2011	**2015**	**2020**	**Dynamics 2020/2011**	**Dynamics 2020/2015**
Italy	16.5	17.3	20.8	26.1	20.2
Hungary	14.6	15	15.7	7.5	4.7
Poland	34.3	30.3	28.2	-17.8	-6.9
Romania	22.7	15.8	7.5	**-67**	**-52.5**
France	21.4	19.7	16.6	-22.4	-15.7

Source: personal computation based on data extracted from Eurostat [4].

The number of employees per enterprise in the vegetable and fruit processing industry registered a negative trend in the period 2011-2020, recording the largest decrease compared to the other analysed countries (-67% compared to 2011 and -52% compared to 2015). The processing industry in Romania also has the lowest number of employees per enterprise, which indicates that most of these enterprises are small in size according to the number of employees.

The added value per employee

Tomato sauces, vegetable pots, vegetables for soups and frozen vegetables hold the most important share in the processed vegetables.

Romania is a net importer of processed products, and the Romanian processing plants only partially cover their need for raw materials from domestic production. In 2019, the processing and preservation of vegetables and fruit represented a small percentage of the added value of the food sector, approximately 3%, next to sectors such as meat and the manufacture of meat, flour and dairy products. The distribution of fruit and vegetables also represents a very small percentage of the added value of the food sector, namely 5%. Consumer services account for around 1%. This denotes a sector where the formation of added value on the food chain is very low and unbalanced, which highlights the need to reorganise the chain. Therefore, the supply of fresh and processed fruit and vegetables has a rather low added value, mainly due to the poor organisation of producers (below 1% degree of association, compared to the EU average of 45%, or over 100% in the Netherlands, which have producer organizations, associations of producer organizations and cross-border cooperatives). On the other hand, Poland annually produces more than 4.1 million tonnes of vegetables and 4.6 million tonnes of fruit, out of which only 15% of vegetables and 50% of fruit are used for processing. Concomitantly, in the last years processors tried to influence the growing consumers preferences for vegetables which are processed freshly, respectively already cleaned, precut, packed or presented in the form of a meal ready to eat or cook [10]. There has been a consumer trend towards a healthy lifestyle for many years. Consumers are buying food products more consciously by reading product labels and are increasingly choosing natural foods. In the study conducted by Kuboń et al. (2019) [7], about 50% of a group of 100 people preferred lightly processed foods without artificial colour additives and preservatives.

Table 4. The gross added value per employee in the fruit and vegetable processing industry, thousand euros

	2011	2015	2020	Dynamics 2020/11	Dynamics 2020/15
Italy	59.6	62.5	63.9	7.2	2.2
Hungary	20.2	20.8	29	43.6	39.4
Poland	23.7	27.6	34	43.5	23.2
Romania	13.1	14.3	18.3	**39.7**	**28**
France	58	65.7	69.6	20	5.9

Source: personal computation based on data extracted from Eurostat [4].

By sub-sectors, the net profit of fruit and vegetable processors increased by almost 33%, while that of traders grew by 42%; at the same time, the primary production sector increased by 50% in 2020 compared to the years before the close down pandemic.

On the other hand, although the sector has apparently registered significant increases in the last 5-6 years, the labour productivity in the fruit and vegetable processing industry is three times lower in Romania than in France and almost two times lower than in Poland, but the gross investments have similar values or even higher, which shows the willingness of the industry to make investments.

Table 5. Gross investments in tangible goods, million euros

	2011	2015	2020	2020/ 2011 growth	2020/ 2015 growth
Italy	435.0	407.8	490.1	12.7	20.2
Hungary	32.5	47.8	70.5	116.9	47.5
Poland	166.3	223.1	279.5	68.1	25.3
Romania	**26.6**	**19.8**	**52.0**	**95.5**	**162.6**
France	392.4	367.6	425.7	8.5	15.8

Source: author's calculations based on Eurostat, 2022 [4].

Gross investments in tangible goods had a positive dynamic, Romanian companies registering the highest growth rate in the period 2020/2015 (+162%), approaching the level of

investments made in Hungary, but still remain at the lowest level compared to the other states, which proves that it is still necessary to re-engineer their business and increase their level of investment.

The degree of self-sufficiency (fresh vegetables equivalent)

The self-sufficiency indicator shows the level of food security for this sector. The degree of self-sufficiency in vegetables (fresh vegetables equivalent) in 2021 was calculated at 82%, down from 2015 when it reached 88%, and the proposed short-term target, the horizon of the 2030s, is 87% (Table 6).

Table 6. Forecasts regarding the degree of self-sufficiency in vegetables (fresh vegetable equivalent)

	UM	Base year (2021)	Short term	Medium term	Long term
Production used	Thou. tonnes	3,669	3,797	3,910	4,023
Import	Thou. tonnes	954	698	642	612
Export	Thou. tonnes	109	123	172	198
Consumption availability	Thou. tonnes	4,474	4,372	4,380	4,437
Self-sufficiency	%	82%	87%	89%	91%

Source: author's calculations and forecasts based on Population Consumption Availabilities, NIS, 2022 [8].

Thus, the results forecast that the production of vegetables will increase, the import will decrease, and the export will register an increase. Also the results show that the degree of self-sufficiency will continue to increase in the medium and long term as a result of the increase in productions obtained in greenhouses and plastic tunnels, better organisation of the supply chain and adaptation to consumer demands. The assumptions considered for setting the targets are based on the following aspects observed: the continuation of the increase in the areas cultivated in greenhouses and plastic tunnels (+220% compared to 2007), the growth in investments in logistics as a result of the measures supported by the National Strategic Plan and the Sectoral Operational Programs, the rise in population's consumption due to higher incomes and the importance given to health and food diet [1]. At the same time, it is forecasted an increase of the coverage degree for the raw production needs of processing factories as a positive effect of the coupled support for certain types of vegetables.

Better policies should also target the small farmers involved in the vegetable cultivation so that to increase their role in the supply chain [5]

In order to achieve these targets, the policy of this sector must respond to market demands by reducing price fluctuations and the imbalance between supply and demand and encourage the consumption of fruit and vegetables, while ensuring a high rate of investments in the sector.

CONCLUSIONS

The gross added value per employee in the fruit and vegetable processing industry records relatively good growth rates in relation to the countries with which the comparison was made (Italy and France) but slightly below that recorded in Hungary.

Also, the investment rate has recorded significant increases in recent years, which shows the industry's potential for growth and adaptation to the market.

However, the production value remains at a low level compared to all the other four countries analysed, with values up to 10 times lower in 2020 compared, for example, to Poland. This denotes the need to improve the marketing of production in Romania and the use of the growth potential offered both by the production of raw materials and by the growing demand of the population.

To address these challenges, a number of policies and measures are needed to support the cultivation and processing of fruit and vegetables. These include providing subsidies to farmers, investing in modern processing and packaging facilities, and promoting processed products in local and international markets.

In conclusion, in order to achieve the objective of this industry contributing to local development and for a better exploitation of local raw materials, important investments are needed. The National Strategic Plan (NSP) offers such opportunities, and investments in the conditioning, storage and processing of agricultural and fruit products outside the farm

is one of the measures of the NSP, which will contribute to the consolidation of enterprises in the food industry, by providing non-reimbursable public support for projects to support investments in modernisation of up to 3 million euros per project (a value that can increase up to 7 million euros for projects establishing processing enterprises and even 10 million euros for new investments in the processing of fruit and vegetables. Thus, the NSP provides an amount of 101 million euros for investments in the vegetable and/or potato sector, respectively 1.7% of the total financial allocation of the Programme. This adds to investments for the processing and marketing of agricultural products in order to obtain food products and processed products, other than those provided for in Annex 1 of the Treaty on the Functioning of the EU, for which 164.9 million euros, respectively 2.8%, were allocated, part of which could also be accessed by the vegetable processing industry if the measure sheet will prioritize this sector.

The new regulation of the Common Agricultural Policy (CAP) will bring higher direct payments per hectare for Romania. Coupled aid from Pillar I (direct payments) will keep the current list of products benefiting from coupled support: potatoes, vegetables grown in greenhouses and plastic tunnels, field tomatoes and cucumbers for industrialisation, plums, apples, apricots. All these measures will allow both the development of the short supply chain and the greater processing capacities. Overall, better targeted measures can contribute to the creation of added value and local development.

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