

The 5th International Conference on Economics and Social Sciences
Fostering recovery through metaverse business modelling
June 16-17, 2022
Bucharest University of Economic Studies, Romania

Trends of Vegetables Market in Romania

Andreea Daniela GIUCĂ^{1*}, Laurențiu Ionuț PETRE²

DOI: 10.24789788367405072-005

Abstract

The paper presented the main directions and trends that are manifested on the Romanian vegetable market in order to identify the market perspectives in the context of a sustainable development of the agri-food market. The agri-food sector is currently facing a reduction in the pressure on resources by reducing meat consumption and increasing the consumption of vegetables and fruits, which is one of the global directions that should be followed. In Romania, the vegetable market is a dynamic, characterized by a specific behavior resulting from the following characteristics: seasonality of products, high degree of perishability, specific areas of production, and automatic demand and supply. The paper begins with a brief review of the data on the Romanian market of vegetable products. From the statistical data published by the National Institute of Statistics in Food Balances from 2015-2020, it was found that both the demand and the supply increased at these times; however, it was found that the supply is higher reduced face. This is why it is necessary to carry out imports of vegetable products.

Keywords: vegetables, demand, supply, trade balance, Romania.

JEL Classification: Q13.

1. Introduction

In Romania, the vegetable market has certain peculiarities that differentiate it from the markets of other agricultural products, among which the most important are the following: atomization of supply and demand, seasonality of vegetable products, vegetable zoning, and the existence of a poorly developed marketing system. On the other hand, the demand for vegetable products is continuous,

¹ Bucharest University of Economic Studies, Bucharest, Romania, andreeagiuca@yahoo.com, Research Institute for Agricultural Economics and Rural Development, Bucharest, Romania, giuca.daniela@iceadr.ro.

² Bucharest University of Economic Studies, Bucharest, Romania, laurentiu.petre@eam.ase.ro, Research Institute for Agricultural Economics and Rural Development, Bucharest, Romania, petre.ionut@iceadr.ro.

* Corresponding author.

while the supply is seasonal. This generates increased price volatility in these product categories.

Romania ranks 5th in the top countries producing fruits and vegetables in Europe, after countries such as Spain, Italy, Poland, and Greece. Surprisingly, despite this excellent position, the country still has to import more than 65% of the fruits and 40% of the vegetables consumed (Best food importers, 2017).

Romania exported in 2020 a quantity of vegetables of approx. 35,320 metric tons. In 2019, Romania sold approximately 61,368 tons of vegetables. Only for 2019, the Romanian vegetable market increased, the change being 26.085% compared to 2018. Between 2017 and 2019, vegetable exports decreased by -5.7%. Regarding the value of exports, in 2019 Romania sold vegetables worth 179.41 million USD, registering a decrease of -20.66% compared to the total export of vegetables in 2018, respectively, 226.136 million USD. Romania's most popular vegetable destinations are Armenia, Hungary, Italy, Greece, and the United Kingdom (UK) (Selina Wamucii, 2022).

Market prices for vegetables have fallen. Before 2019, a kilogram of vegetables for export cost USD 2.87 in 2017 and USD 4.65 in 2018. Starting in 2019, the export price decreased to USD 2.92 per kilogram, by -37.076% more reduced. Currently, the price range for Romanian vegetables is between 2.92 USD and 4.65 USD per kilogram, in the national currency being 11.91 lei per kg. The average price per ton is 2923.48 USD in Iasi and Bucharest (Selina Wamucii, 2022).

2. Problem Statement

According to the Food and Agriculture Organization (FAO), it is recommended to eat different types of vegetables depending on the age group. For consumers over 12 years of age, vegetables in a quantity of 350g / day are recommended. This consumption leads to an average annual consumption of 120 kg of vegetables. However, at the national level, the consumption of vegetables is lower than the recommendations of nutritionists, although their consumption brings many health benefits (Soare et al., 2017).

The United Nations report states that only high-middle-income countries have enough fruits and vegetables available to consumers, so that the 400 g per day recommendations can be met globally, so low-income countries rely on cereals. To ensure the food security of the population, the food pattern being transferred to a secondary plan (Lădaru et al., 2020).

According to a study conducted at the the European Union (EU) level in 2014, it was found that Romania is on the last place in the ranking in terms of consumption of fruits and vegetables. The first places in the ranking are occupied by countries such as: Greece, Croatia, and Slovenia (Soare et al., 2016).

The research conducted by Constantin et al., 2022, specifies that the diet of Romanians is quite diverse and ensures nutritional security, although low income levels have been observed in some regions of the country, which influences the buying behavior of food.

At the market level, demand is a deciding factor. It decides how much to produce for that market. Potential demand is heavily influenced by consumption patterns and physiological needs, while actual demand is influenced by consumer purchasing power. The supply of vegetables should meet the demand. This being quantitatively influenced by the cultivated area and qualitatively by the yields obtained (Turek et al., 2008).

Previous research (Ion et al., 2015) shows that domestic vegetable production does not cover domestic consumption, the main reasons being the specific demand and supply of agricultural products and the high losses in this sector. The latter are largely recorded in the field, during transport, due to its poor transport and poor storage, due to the lack of shelters to ensure optimal climatic conditions for storing vegetables.

Romania has a high production potential, being able to produce a wide variety of vegetable varieties throughout the year due to its climate and soil conditions that give them a special taste. Vegetable production is seasonal, which means that it cannot meet the needs of the market at all times of the year (Popescu, 2013).

Vegetable production requires a very high consumption of factors of production, especially labor. The assortments of vegetables on the market are varied, and the production of vegetables has different destinations, such as: for fresh consumption, processing, and export that requires the organization of distribution channels to consumers (Ion & Dobre, 2015).

3. Research Questions / Aims of the Research

This research aims to analyze the market with the general objective of identifying the main trends of the Romanian vegetable market. The paper aims to answer one of the most important questions for those working in this market, namely: "What are the trends in the Romanian vegetable market?" Also, another question that underlies the research refers to the supply of the necessary vegetables, namely: "If the demand is greater than the supply?"

The results of the research will help farmers, processors and retailers in their efforts to make investments in certain branches of this industry and to better understand the factors that have a direct impact on the consumption and production of vegetables in Romania.

4. Research Methods

The paper is based on statistical data provided by the National Institute of Statistics, on food balances in 2015-2020, from which data were collected on resources, its components (usable production and imports) and uses with its components (export, domestic availability for consumption, intermediate consumption, total losses, stock change, and availability for human consumption).

The research method used in conducting the study consisted of quantitative and qualitative analysis of data, in order to highlight the trend of evolution of the statistical indicators analyzed. The demand of the vegetable market was

substantially supported (in time), being taken into account several time series, in order to be able to identify the trends and changes on the market, respectively, on the demand and supply of vegetables.

5. Findings

In a statistical approach, the nutritional balances were analyzed for the main vegetables obtained in Romania, respectively: legumes, vegetables and vegetable products, tomatoes, dried onions, cabbage, and edible roots, the data being expressed in tons of fresh vegetables.

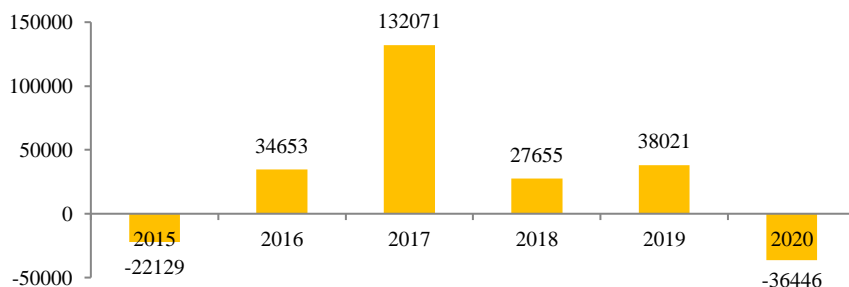
Table 1. Nutrition balance for pulses at the levels of the period 2015-2020

GRAIN LEGUMES	Years						
	2015	2016	2017	2018	2019	2020	2020/2015
	tons	tons	tons	tons	tons	tons	%
A. RESOURCES	101440	127682	366646	232820	275274	163737	161,41
1. Usable production	75757	99312	301680	191475	236423	121679	160,62
2. Import	25683	28370	64966	41345	38851	42058	163,76
B. USES	101440	127682	366646	232820	275274	163737	161,41
3. Export	3554	63023	197037	69000	76872	5612	157,91
4. Internal availability for consumption	97886	64659	169609	163820	198402	158125	161,54
5. Intermediate consumption	32355	31654	104212	81335	113456	91949	284,19
5.1 Seed consumption	11679	12815	32807	36660	42980	34580	296,09
5.2 Feed consumption	20676	18839	71405	44675	70476	57369	277,47
5.3 Industrial processing	-	-	-	-	-	-	-
5.4 Industrial transformation	-	-	-	-	-	-	-
6. Total losses	446	206	1391	476	785	254	56,95
7. Stock change (±)	2619	-8023	16994	2952	5848	-2934	-112,03
8. Available for human consumption	62466	40822	47012	79057	78313	68856	110,23

Source: Food balances 2015-2020, INS.

The total resources of legume grains decreased in 2020, by 111.5 thousand tons, compared to the previous year, mainly due to the decrease in production. Imports increased by approx. 163.76% in 2020 (42.058 tons) compared to 2015 when 25,683 tons were registered (Table 1).

Figure 1. Dynamics of trade balance for pulses (tons)



Source: processing data from the 2015-2020 food balances, INS.

Analyzing the dynamics of the trade balance in the analyzed period, a variation of it was noticed in the legume grains. In 2015, the trade balance registered a deficit of 22.129 tons. After a relatively stable period with positive values, the trade balance reached a deficit of 36.446 tons in 2020 (Figure 1).

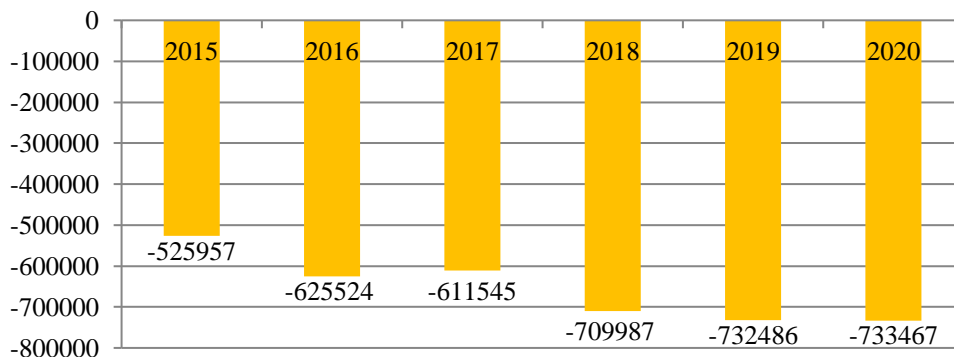
Table 2. Food balance for vegetables and vegetable products for the period 2015-2020

VEGETABLES AND VEGETABLE PRODUCTS	Years						
	2015	2016	2017	2018	2019	2020	2020/2015
	tons	tons	tons	tons	tons	tons	%
A. RESOURCES	3709369	3550011	3751276	3985390	3800291	3784193	102,02
1. Usable production	3123575	2880833	3084932	3213561	3010704	2970641	95,10
2. Import	585794	669178	666344	771829	789587	813552	138,88
B. USES	3709369	3550011	3751276	3985390	3800291	3784193	102,02
3. Export	59837	43654	54799	61842	57101	80085	133,84
4. Internal availability for consumption	3649532	3506357	3696477	3923548	3743190	3704108	101,50
5. Intermediate consumption	140481	127956	132495	138240	130848	128979	91,81
5.1 Seed consumption	3063	2939	2912	2984	2933	2891	94,38
5.2 Feed consumption	137418	125017	129583	135256	127915	126088	91,76
5.3 Industrial processing	-	-	-	-	-	-	
5.4 Industrial transformation	-	-	-	-	-	-	
6. Total losses	291329	270110	289103	309750	291403	294101	100,95
7. Stock change (±)	76936	37289	99099	97048	23882	47968	62,35
8. Available for human consumption	3140786	3071002	3175780	3378510	3297057	3233060	102,94

Source: Food balances 2015-2020, INS.

For vegetables and vegetable products in 2020, the total resources were lower than in the previous year by 16.09 thousand tons (Table 2).

Figure 2. Dynamics of trade balance for vegetables and vegetable products (tons)



Source: processing data from the 2015-2020 food balances, INS.

Regarding the dynamics of the trade balance registered in vegetables and vegetable products, a significant increase of the deficit was observed in the analyzed period, thus in 2020, the deficit reached 733.467 tons, 39% higher than in 2015, respectively 525.957 tons (Figure 2).

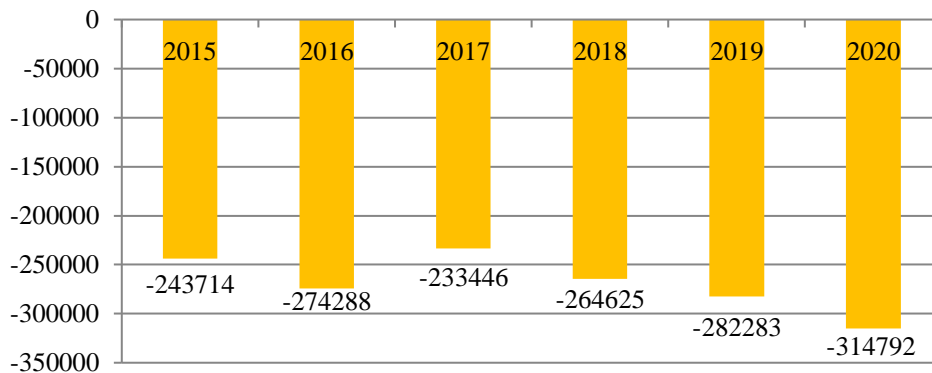
Table 3. Nutrition balance for tomatoes for the period 2015-2020

TOMATOES (equivalent to fresh vegetables)	Years						
	2015 tons	2016 tons	2017 tons	2018 tons	2019 tons	2020 tons	2020/2015 %
A. RESOURCES	943323	904756	917240	1012202	978126	1022008	108,34
1. Usable production	695188	627177	679807	742899	689401	698424	100,47
2. Import	248135	277579	237433	269303	288725	323584	130,41
B. USES	943323	904756	917240	1012202	978126	1022008	108,34
3. Export	4421	3291	3987	4678	6442	8792	198,87
4. Internal availability for consumption	938902	901465	913253	1007524	971684	1013216	107,91
5. Intermediate consumption	-	-	-	-	-	-	-
5.1 Seed consumption	-	-	-	-	-	-	-
5.2 Feed consumption	-	-	-	-	-	-	-
5.3 Industrial processing	-	-	-	-	-	-	-
5.4 Industrial transformation	-	-	-	-	-	-	-
6. Total losses	176771	161625	172651	189068	177005	180565	102,15
7. Stock change (±)	-2299	-15406	3470	13085	-7815	21083	-917,05
8. Available for human consumption	764430	755246	737132	805371	802494	811568	106,17

Source: Food balances 2015-2020, INS.

The total resources of tomatoes (equivalent to fresh vegetables) in 2020 were 43.8 thousand tons higher than in the previous year, mainly due to the increase in production (Table 3).

Figure 3. Dynamics of the trade balance for tomatoes (tons)



Source: processing data from the 2015-2020 food balances, INS.

In the period 2015-2020, the trade balance for tomatoes was deficient. In 2015, the trade balance registered a deficit of 243.714 tons, in 2020 it reached a deficit of 314.792 tons (Figure 3).

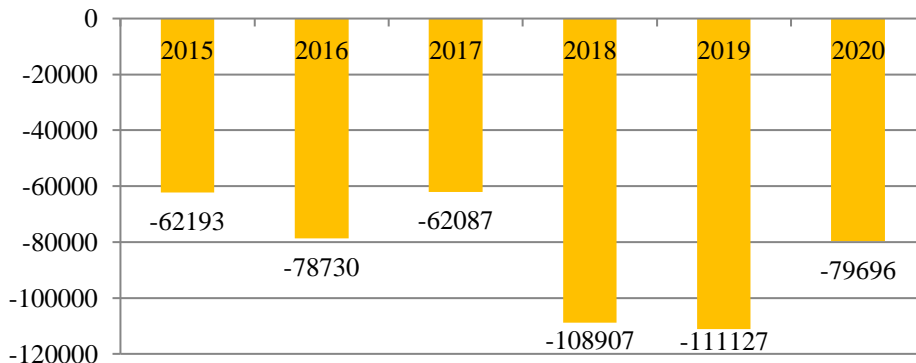
Table 4 Nutrition balance for dried onions in the period 2015-2020

DRIED ONIONS (equivalent to fresh vegetables)	Years						
	2015 tons	2016 tons	2017 tons	2018 tons	2019 tons	2020 tons	2020/2015 %
A. RESOURCES	417478	404470	415620	460586	452776	408373	97,82
1. Usable production	353622	325074	352165	350159	340635	326740	92,40
2. Import	63856	79396	63455	110427	112141	81633	127,84
B. USES	417478	404470	415620	460586	452776	408373	97,82
3. Export	1663	666	1368	1520	1014	1937	116,48
4. Internal availability for consumption	415815	403804	414252	459066	451762	406436	97,74
5. Intermediate consumption	433	386	418	434	425	405	93,53
5.1 Seed consumption	433	386	418	434	425	405	93,53
5.2 Feed consumption	-	-	-	-	-	-	-
5.3 Industrial processing	-	-	-	-	-	-	-
5.4 Industrial transformation	-	-	-	-	-	-	-
6. Total losses	12664	12440	12813	14160	13910	12567	99,23
7. Stock change (±)	-13390	-10941	10364	1440	-3479	-4588	34,26
8. Available for human consumption	416108	401919	390657	443032	440906	398052	95,66

Source: Food balances 2015-2020, INS.

For dried onions, the total resources (equivalent to fresh vegetables) in 2020 (408.373 tons) were reduced by 44.4 thousand tons compared to the previous year (452.776 tons) (Table 4).

Figure 4. Dynamics of the trade balance for dried onions (tons)



Source: processing data from the 2015-2020 food balances, INS.

Regarding the dynamics of the trade balance recorded for dried onions, there was an increase in the deficit in the analyzed period, so in 2020, the deficit reached 79.696 tons, 28% higher than in 2015, respectively 62.193 tons.

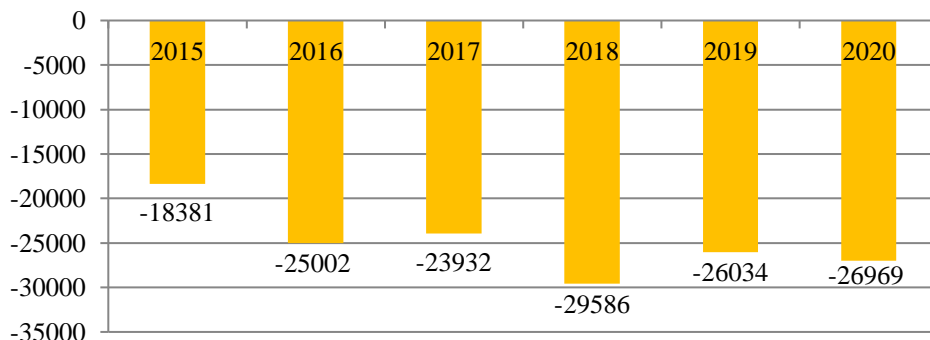
Table 5. Food balance for cabbage in the period 2015-2020

CABBAGE (equivalent to fresh vegetables)	Years						
	2015 tons	2016 tons	2017 tons	2018 tons	2019 tons	2020 tons	2020/2015 %
A. RESOURCES	1086472	1018824	1052568	1097213	1015208	1003455	92,36
1. Usable production	1066299	992398	1026575	1065537	985842	973667	91,31
2. Import	20173	26426	25993	31676	29366	29788	147,66
B. USES	1086472	1018824	1052568	1097213	1015208	1003455	92,36
3. Export	1792	1424	2061	2090	3332	2819	157,31
4. Internal availability for consumption	1084680	1017400	1050507	1095123	1011876	1000636	92,25
5. Intermediate consumption	106630	99240	102658	106554	98584	97367	91,31
5.1 Seed consumption	-	-	-	-	-	-	-
5.2 Feed consumption	106630	99240	102658	106554	98584	97367	91,31
5.3 Industrial processing	-	-	-	-	-	-	-
5.4 Industrial transformation	-	-	-	-	-	-	-
6. Total losses	34706	32536	33625	35034	32412	32055	92,36
7. Stock change (±)	108591	75915	80666	86633	32183	31391	28,91
8. Available for human consumption	834753	809709	833558	866902	848697	839823	100,61

Source: Food balances 2015-2020, INS.

The total resources of cabbage (in the equivalent of fresh vegetables), in the year 2020, were lower than those of the previous year by 11.7 thousand tons, due to the decrease of the production mainly (Table 5).

Figure 5. Trade balance in cabbage (tons)



Source: processing data from the 2015-2020 food balances, INS.

Analyzing the dynamics of the trade balance registered in cabbage, a significant increase of the deficit in the analyzed period was noticed, from 18.381 tons in 2015 to 26.969 tons in 2020, the increase being of 47%.

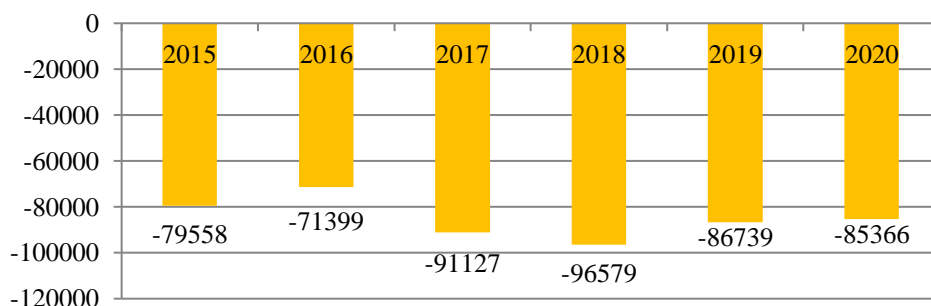
Table 6. Food balance for edible roots in the period 2015-2020

EDIBLE ROOTS (equivalent to fresh vegetables)	Years						
	2015 tons	2016 tons	2017 tons	2018 tons	2019 tons	2020 tons	2020/2015 %
A. RESOURCES	308196	290904	309566	330441	313910	295347	95,83
1. Usable production	227004	219232	217874	232836	226192	208130	91,69
2. Import	81192	71672	91692	97605	87718	87217	107,42
B. USES	308196	290904	309566	330441	313910	295347	95,83
3. Export	1634	273	565	1026	979	1851	113,28
4. Internal availability for consumption	306562	290631	309001	329415	312931	293496	95,74
5. Intermediate consumption	20430	19731	19609	20955	20357	18732	91,69
5.1 Seed consumption	-	-	-	-	-	-	-
5.2 Feed consumption	20430	19731	19609	20955	20357	18732	91,69
5.3 Industrial processing	-	-	-	-	-	-	-
5.4 Industrial transformation	-	-	-	-	-	-	-
6. Total losses	6267	5913	6293	6715	6379	6004	95,80
7. Stock change (±)	-1803	-1563	1100	219	336	-927	51,41
8. Available for human consumption	281668	266550	281999	301526	285859	269687	95,75

Source: Food balances 2015-2020, INS.

The total resources of edible roots (equivalent to fresh vegetables), in 2020, were lower than in the previous year by 18.5 thousand tons, mainly due to the decrease in production (Table 6).

Figure 6. Dynamics of the trade balance for edible roots (tons)



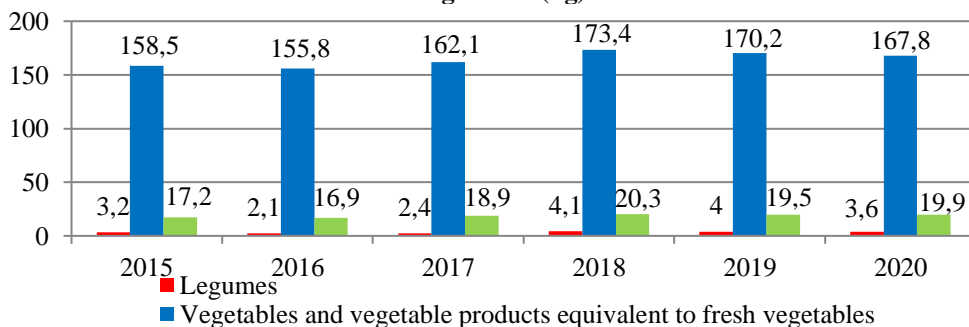
Source: processing data from the 2015-2020 food balances, INS.

In the case of edible roots, the registered trade balance was a deficient one, at the level of the analyzed period, respectively 2015-2020 the deficit showed increases reaching thus in 2020 to 85.366 tons, higher by 7.3% than in 2015, respectively, 79.558 tons.

Vegetable production per capita is higher in Romania compared to the average production per capita in the EU. On average, consumption increased in a positive way reflecting the production and imports obtained (Popescu, 2013).

In the period 2015-2020, the average annual per capita consumption of vegetables increased. For vegetables, the average consumption increased by approx. 112.5% in 2020 (3.6 kilograms / inhabitant) compared to the respective reference year 2015, when a consumption of 3.2 kilograms / inhabitant was reported.

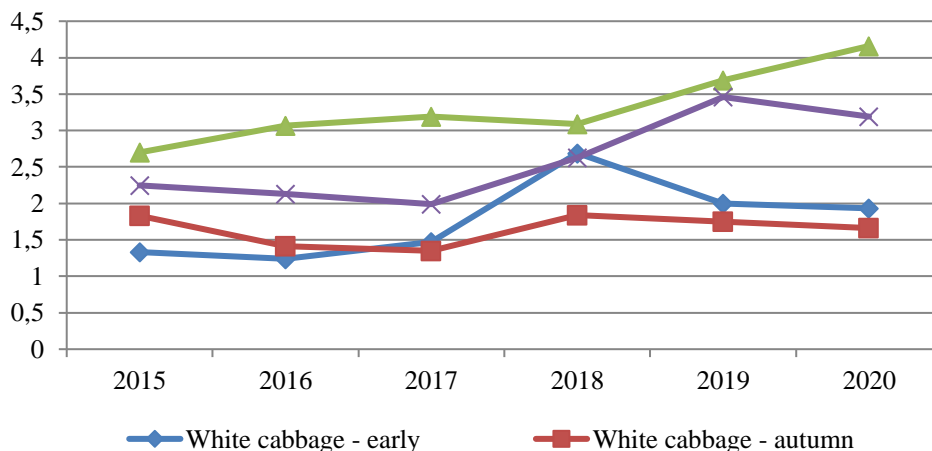
Figure 7. Dynamics of the average annual consumption per inhabitant, for vegetables (kg)



Source: processing data from the 2015-2020 food balances, IN.

Regarding the consumption of vegetables and vegetable products in the equivalent of fresh vegetables, there was an increase of 105% in the analyzed period, from 158.5 kg / inhabitant in 2015 to 167.8 kg / inhabitant in 2020 (Figure 7).

Figure 8. The average prices of the main vegetable products for the whole country in the period 2015-2020 (lei/kg)



Source: processing data from the 2015-2020 food balances, INS.

The average prices of early white cabbage and autumn white cabbage increased during the analyzed period by 156% and 118%, respectively. Regarding the average price of tomatoes in the field, it varied between 2.7 lei/kg in 2015 and 4.16 lei/kg in 2020, when there was an increase of 136%. For dried onions, the average annual price varied between 1.99 lei/kg in 2017 and 3.46 in 2019, with an increase of approximately 150% during the period.

6. Conclusions

Current research shows that the Romanian vegetable market is dynamic, with both demand and supply on an upward trend. However, the need for vegetable products cannot be met from domestic production, as imports have increased significantly in recent years. The supply of vegetable products is relatively unstable; this situation leads to the appearance of obstacles in the organization of production and marketing activities in this sector, for which it is very necessary to concentrate production to purchase large quantities of goods.

Following the research, it was found that self-consumption remains a feature of the Romanian vegetable market, as it was in the previous period. Given the particularly important role that vegetables play in their diet, their role is also highlighted in the place they have in the healthy food pyramid, as they are in the second position, the future strategic directions of the vegetable market would be it must focus on encouraging the consumption and export of vegetables, which requires the production of a large quantity of vegetables from domestic production.

Given that Romania is a net importer of agri-food products, with the exception of cereals, the level of competitiveness is constantly declining, vegetable production should increase in order to better cover the needs of the internal market and to support exports to the EU market.

Acknowledgment

This paper was co-financed by The Bucharest University of Economic Studies during the PhD program.

References

- [1] Best food importers (2017). *Romania Food Imports: Top players, trends and market specifics*, August 1, <https://bestfoodimporters.com/romania-food-imports-top-players-trends-market-specifics/>.
- [2] Constantin, M., Sacală, M.-D., Dinu, M., Piștalu, M., Pătărlăgeanu, S.R., Munteanu, I.-D. (2022). Vegetable Trade Flows and Chain Competitiveness Linkage Analysis Based on Spatial Panel Econometric Modelling and Porter's Diamond Model. *Agronomy*, 12, p. 411, <https://doi.org/10.3390/agronomy12020411>.
- [3] Ion, R.A., Dobre, I. (2015). Changes and Trends of Vegetables Market in Romania, Thematic Proceedings, *International Scientific Conference: Sustainable Agriculture and Rural Development in Terms of the Republic of Serbia Strategic Goals Realization within the Danube Region, regional specificities, 10-11 December 2015, Belgrade, Serbia. Thematic Proceedings*, pp. 54-69. Institute of Agricultural Economics Belgrade.
- [4] Ion, R.A., Dobre, I., Bran, M. (2015). Fruits and Vegetables Market in Romania: Better Understand Consumers' preferences, *International Conference Competitiveness of Agro-Food and Environmental Economy*, pp. 426-433.
- [5] Lădaru, G.-R., Ilie, D., Diaconeasa, M., Petre, I., Marin, F., Lazăr, V. (2020). Influencing Factors of a Sustainable Vegetable Choice. The Romanian Consumers' Case. *Sustainability*, 12, 9991.
- [6] Rahoveanu, A.T., Ion, R.A., Rahoveanu, M.T. (2008). Changes and Trends on Vegetables and Fruits' market in Romania. *Bulletin Uasvm*, 65, p. 2.
- [7] Soare, E., Chiurciu, I.A., David, L., Dobre, I. (2017). Tomato Market Trends in Romania. *Scientific Papers. Series Management, Economic Engineering in Agriculture and rural development*, 17(2), pp. 341-348.
- [8] Soare, E., Dobre, I., David, L. (2016). Economic Analysis in Vegetable Sector of Romania. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, 16(4), pp. 333-338.
- [9] Popescu, A. (2013). Considerations on Romania's vegetable market. *Scientific Papers. Series" Management, Economic Engineering in Agriculture and rural development*, 13(4), pp. 227-234.
- [10] Selina Wamucii (2022). *Romania Vegetables Market Insights*, <https://www.selina.wamucii.com/insights/market/romania/vegetables/>.
- [11] Selina Wamucii (2022). *Romania Vegetables Prices*, <https://www.selinawamucii.com/insights/prices/romania/vegetables/>.
- [12] Institutul Național de Statistică (INS) [National Institute of Statistics].