ORIGINAL SCIENTIFIC PAPER

PRODUCTION AND ECONOMIC ANALYSIS OF PEPPER IN THE REPUBLIC OF SERBIA

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ABSTRACT

Pepper is one of the most important vegetable crops in the world. This article analyzes the economics of pepper production in the Republic of Serbia, based on a family farm located in the South Banat region, covering an area of 1 ha. In open-field production, all necessary agrotechnical measures are applied, including drip irrigation. Given that the market placement of pepper is secured, the objective is to assess the economic justification of pepper production, which represents the main source of income for a five-member household. A yield of 50 t/ha was achieved. The calculation determined revenues from the sale of pepper amounting to EUR 40,492.73/ha, variable production costs of EUR 14,784.84/ha, and a coverage margin of EUR 25,707.89/ha. The economic efficiency coefficient of pepper production is 2.74.

Based on the established parameters for one production cycle, the research results show that this type of production is economically justified, providing a stable source of income for growers in the long term.

Keywords: *pepper, production, import/export, prices, yield, costs, coverage margin, economic justification*

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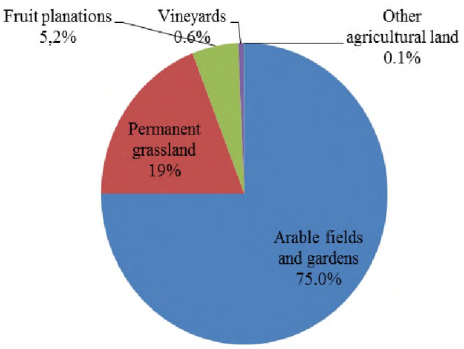
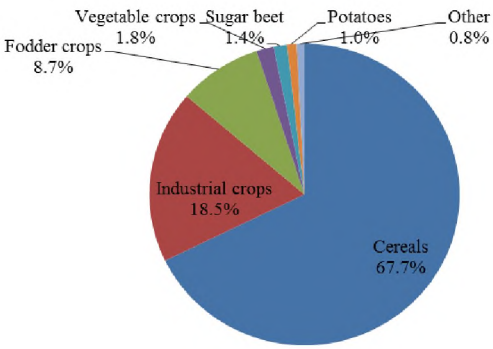
INTRODUCTION

In the Republic of Serbia, the share of agriculture in the Gross Domestic Product (GDP) is 7.4% of the total GDP, while the share of employees in the agricultural sector accounts for up to 15.6% of the total number of employees in the economy [11]. According to data from the Statistical Office of the Republic of Serbia [16], there are 564,541 registered agricultural holdings in the Republic of Serbia, using about 3.5 million ha (3,506,075 ha) of agricultural land. Of the total number of registered agricultural holdings (RPGs), 99.7% are family farms that cultivate 83.9% of the agricultural land. Legal entities account for 0.2% and use 16.0% of the total utilized agricultural land, while 0.1% are entrepreneurs who use only 0.1% of the total. Family farms in rural areas are the main carriers of agricultural production.

Of the total agricultural land used, arable land and gardens cover 75.0%, i.e., 2,615,194 ha; permanent grass areas (meadows and pastures) make up 19.1%; orchards 5.2%; vineyards 0.6%; and other agricultural areas 0.1% (Graph 1).

Within arable land and gardens, of the total sown areas, 67.7% is under grains, 18.5% under industrial crops, 8.7% under fodder crops, 1.8% under vegetables, 1.4% under sugar beet, 1.0% under potatoes, and 0.8% under other crops (Graph 2).





Graph. 1. Utilized agricultural area, 2021. Graph 2. Sown areas by species of crops, 2021
Source: www.stat.gov.rs Statistical Yearbook,, Statistical Office of the Republic of Serbia, 2021.

The Republic of Serbia has favorable natural conditions for vegetable production. The moderate-continental climate, with an average air temperature of 11°C to 12°C, and an average annual amount of precipitation in the range of 600 to 800 mm in the plains (lowlands), as well as various types of soil with favorable characteristics, favor successful, sustainable vegetable production [6, 18]. According to [8, 9], about 45% of soil in our country is suitable for agricultural production (including vegetable growing), without any restrictions. However, due to the uneven rainfall regime during the year, the application of irrigation is mandatory in the production of vegetables, but with water of optimal quality. If we take into account the resources that Serbia has at its disposal, the possibilities for vegetable production are much greater than those shown by statistics [5], and its advantages are reflected in the following: - vegetable production is a very intensive branch of plant production that generates a high income and a large financial profit per unit area. Income from vegetable production per unit of capacity is many times higher than the income of e.g., corn and wheat, so better financial effects and more stable economic sustainability of agricultural producers are achieved in the production of vegetables [2]; - the need for hiring labor in vegetable growing is great, which increases the need for jobs in rural areas; - the negative ecological consequences are relatively small and are proportional to the small area of agricultural land used in the field of vegetable growing and others.

Vegetable production predominantly takes place in an open field, and a part of it in a protected area. In recent years, the production of vegetables in a protected area and under controlled conditions has become increasingly intensive, because in this way, vegetables arrive earlier and significant economy of production is realized [13, 14]. Also, in recent years, more has been invested in modern equipment and machinery as well as the use of quality raw materials, which increases the volume of vegetable production in the protected area [7]. As Vlahović et al. state [18], vegetable production mainly takes place in lowland areas and near larger cities as potential markets. Consequently, villages that gravitate towards these areas are more seriously engaged in

vegetable production, while villages in hilly and mountainous areas have a limited number of vegetable species that they can successfully grow in terms of economically justified production.

Of the 11 vegetable species that are monitored by the official statistics of the Republic Office of Statistics of the Republic of Serbia, pepper is analyzed in this paper work.

Pepper (*Capsicum annuum L.*) is one of the most important commercial as well as spice vegetable crops grown worldwide [1, 4, 17]. The most economically important species in the world are *C. frutescens* and *C. annuum* [10]. It is often used in food (nutrition), throughout the year, in fresh or processed form (canned, frozen, dried, ground, pounded, etc.).

Each variety of pepper is characterized by its own biological and production characteristics, as well as its intended use. In our conditions, different types of pepper varieties are grown: tomato peppers, babur, semi-babur, long-fruited peppers, in the type of sticks, "pepperoni," etc., with different colors and shapes.

The optimal temperature for the growth and development of peppers is in the range of 22°C to 25°C. At temperatures below 15°C and above 36°C, it stops growing and developing, while temperatures from -0.3°C to -2.5°C lead to its death. It gives the best results on deep, loose, fertile and structural soils, with favorable physical and chemical properties and rich in humus. Alluvial soils and chernozem are the most suitable for peppers. It is a big consumer of water, which is provided by rainfall and irrigation.

MATERIALS AND METHODS OF RESEARCH

The paper is designed so that the first part of the article shows the production of pepper at the level of the Republic of Serbia, by region. It also presents the export and import of pepper, from and to Serbia, as well as its purchase prices for the ten-year period from 2012–2021 at the level of the Republic of Serbia. In the second part of the work, based on data collected in the field, the calculation of pepper production in the open field during conventional production, with the application of drip irrigation, was compiled.

For the purposes of research in this paper, we used data from the Statistical Office of the Republic of Serbia, the Food and Agriculture Organization of the United Nations (FAO), data from Trade Statistics for the Development of International Business (Trade Map), the results of previous research related to this issue by domestic and foreign authors, as well as data collected in the field from producers of agricultural family farms in the South Bačka region.

The approach of descriptive statistics (DESK) was used to analyze pepper production, sale and purchase of pepper, movement of purchase prices, and import and export of pepper from Serbia. In addition, relevant scientific works by domestic and foreign authors were used, which dealt with similar topics in this field.

The economic analysis determined the following indicators: gross income, variable costs, coverage margin, and critical production values (critical price, critical yield, and critical variable costs), as minimum values that are economically acceptable from the producer's point of view.

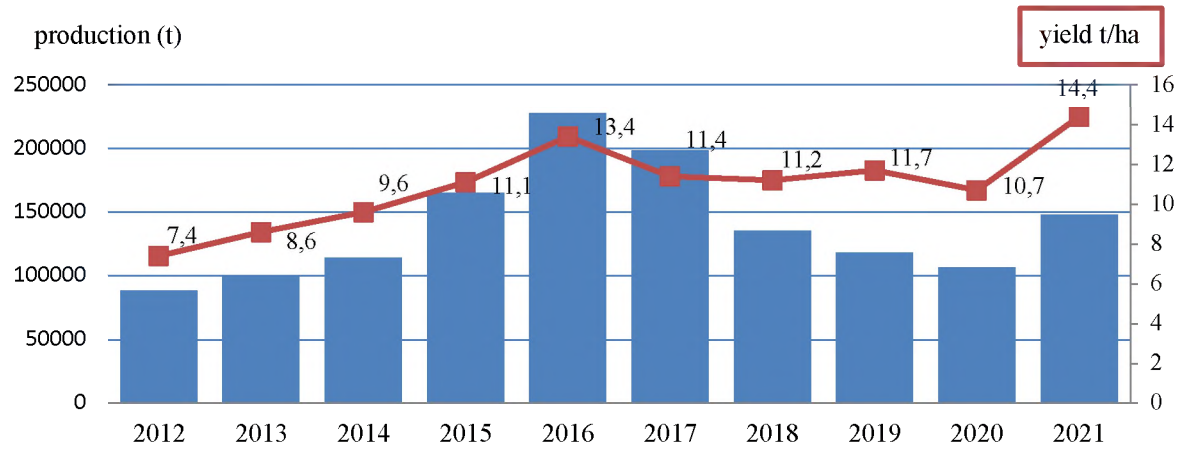
RESULTS OF RESEARCH AND DISCUSSION

PRODUCTION AND YIELD OF PEPPER

Worldwide, pepper is grown on 1,990,423 ha, while in Europe these areas reach 106,904 ha. China is the largest pepper producer in the world, followed by Mexico and Turkey. In Europe, the main producers are Spain, Italy, and Romania (FAOSTAT, 2018). In Serbia, since 2010, pepper has been grown on areas ranging from 11,714 to 16,977 ha, with a constant annual growth trend of 5.25% [3].

When it comes to the production of pepper in the Republic of Serbia, it can be divided according to several criteria, namely: production by *type of pepper* (e.g., bell pepper, green pepper "šilja", and hot peppers); by the use of *hybrids or domestic varieties*; by *production method*, based on whether the pepper is grown in the open field or in a protected area (tunnels, plastic greenhouses, or greenhouses); and by *production purpose*, based on whether the pepper is produced for fresh consumption, for industrial processing, or for export [15].

In the database of the Statistical Office of the Republic of Serbia, there are data on general pepper production, so it can be concluded that for the research period of 10 years (2012–2021), pepper was grown in the Republic of Serbia on an average area of 12,706 ha (Table 1), with a total production of 140,250 t and an average yield of 11.0 t/ha. The production and yields of pepper for the ten-year research period are shown in Graph 3.



Graph 3. Comparative presentation of the production and yield of pepper at the level of the Republic of Serbia for the period 2012–2021

Source: www.stat.gov.rs

Pepper is dominantly produced in the south of Serbia (Central and Southern Serbia), with an average production of 107,408 t (76.58%), namely in the Šumadija and West Serbia region 55,789 t or 39.78%, while in the South and East Serbia region, average production is 51,619 t or 36.80%. The remaining 32,842 t or 23.42% of pepper production is realized in the north of Serbia, namely in the Belgrade region with an average production of 3,664 t or 2.61%, and in the Vojvodina region with an average production of 29,178 t or 20.81%. In terms of yields, the Vojvodina region leads with 13.9 t/ha.

Table 1. Average pepper production in the Republic of Serbia (total and by region) for the period 2012–2021.

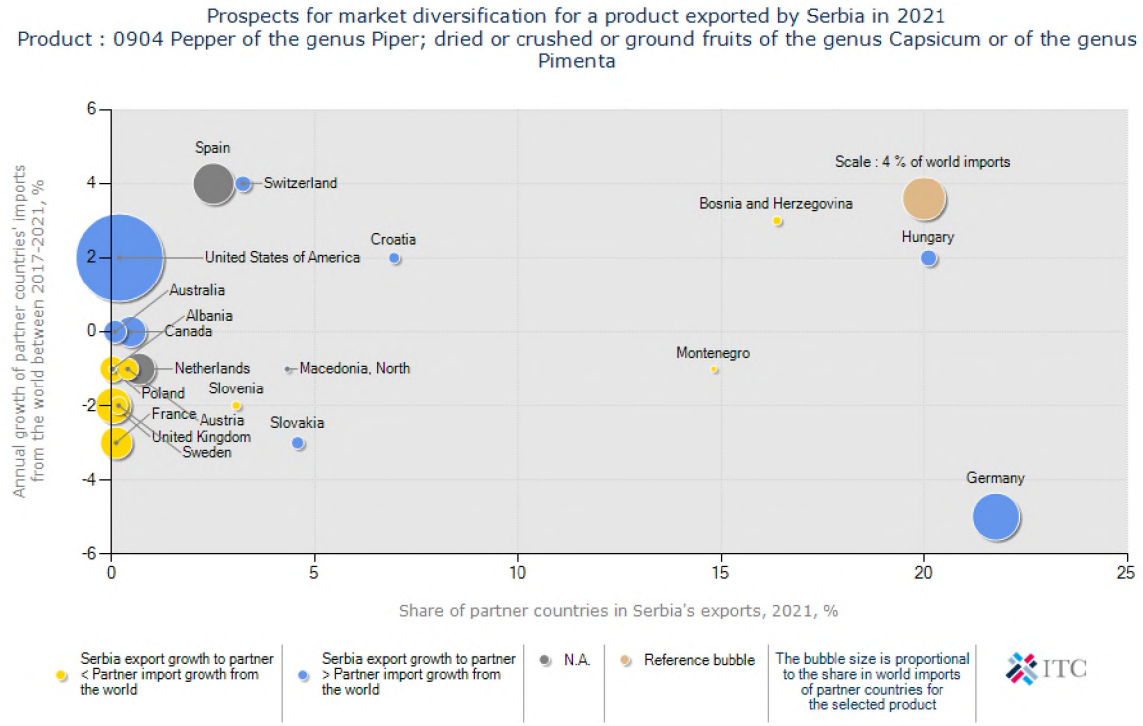
Area of pepper production	Harvested area, ha/arable land, ha	Total production (t)	Yield (t/ha)
REPUBLIC OF SERBIA	**12,706**	**140,250**	**11.0**
SERBIA–NORTH	2,663	32,842	12.3
Belgrade region	519	3,664	7.0
Vojvodina region	2,144	29,178	13.9
SERBIA–SOUTH	10,043	107,408	11.0
Šumadija and West Serbia region	4,984	55,789	11.0
South and East Serbia region	5,060	51,619	10.0

Source: *www.stat.gov.rs*

Pepper producers from Central and Southern Serbia predominantly use domestic varieties in their production, with which they achieve yields of 20 to 30 t/ha, as well as their own seeds. Pepper produced in this way is usually baked, pickled, or processed into ajvar. At the same time, the yields have very variable quality. On the other hand, producers from the area of Vojvodina use high-yielding hybrids in pepper production, apply intensive irrigation in combination with fertilization with high-quality fertilizers, and therefore achieve yields of 50 to 70 t/ha. Produced peppers are mostly sold and exported raw [15].

Export and import of peppers from/to the Republic of Serbia

It can be said that peppers are the most exported vegetables. The total export of peppers exceeds USD 2 million on average. The largest quantities of peppers from Serbia are exported to Germany, Hungary, Bosnia and Herzegovina, and Montenegro (Graph 4 taken from: *https://www.trademap.org/*).



Graph 4. Export of pepper from Serbia in 2021%

Table 2. shows the list of countries, world importers of peppers from Serbia in 2021. Of the total value of pepper imports from Serbia at the world level, which amounted to USD 6,734,000 in 2021, the largest importers are Germany with USD 1,466,000, Hungary with USD 1,354,000, Bosnia and Herzegovina with USD 1,103,000, etc.

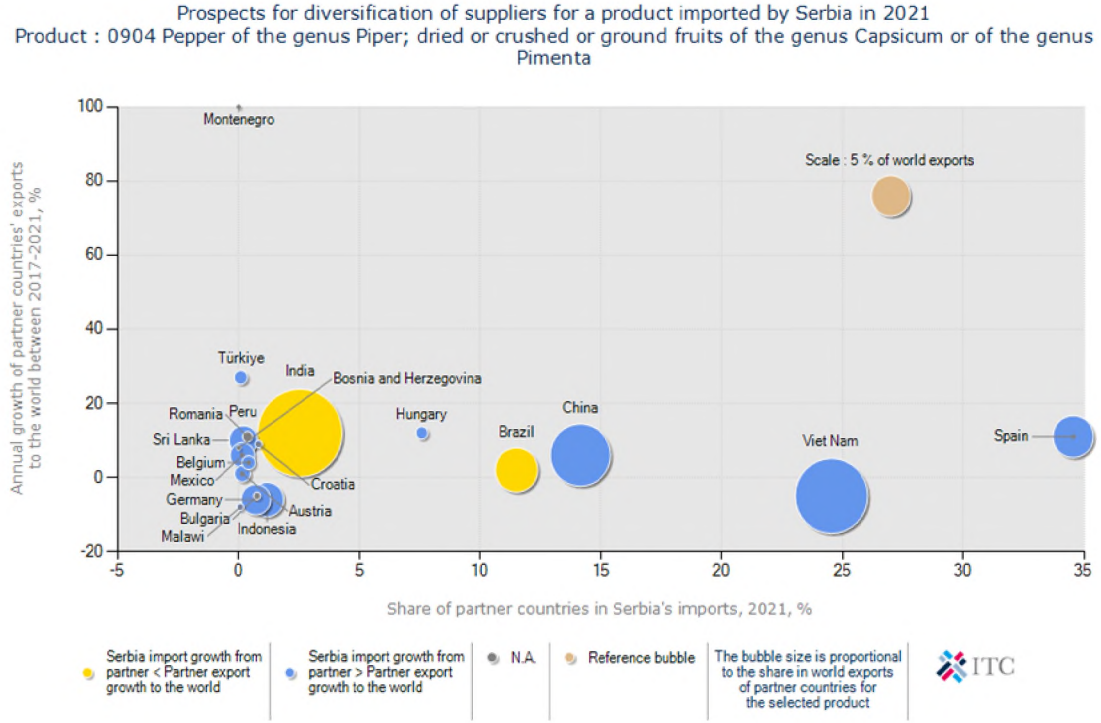
Table 2. List of importing markets for the product exported by Serbia in 2021
Product: 0904 Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum or of the genus Pimenta

Exporters	Value imported in 2021 (USD thousand)	Trade balance 2021 (USD thousand)
World	6,734	2,127
Germany	1,466	1,433
Hungary	1,354	1,005
Bosnia and Hercegovina	1,103	1,103
Montenegro	998	998
Croatia	468	430
Slovakia	308	308
Macedonia, North	291	291
Switzerland	218	218
Slovenia	207	207
Spain	169	–1,423

Source:*https://www.trademap.org*

Serbia's exports represent **0.1%** of world exports for this product. Its ranking in world exports is **42**. The average distance of importing countries is **693 km**, and the export concentration is **0.15**.

The Republic of Serbia is a signatory to several different interstate trade agreements related to agricultural products. These agreements have enabled the free flow of goods and services, which is why imported goods are increasingly present, increasing competition for our agricultural producers. Peppers are imported to Serbia mostly from Spain and Vietnam, and in smaller quantities from other countries of the world (Figure 5, taken from: https://www.trademap.org).



Graph 5. Import of pepper in Serbia in 2021%

Table 3 shows the list of countries that exported pepper to Serbia in 2021. Of the total value of pepper imports to Serbia, which amounted to USD 4,607,000 in 2021, the largest exporters were Spain (USD 1,592,000), Vietnam (USD 1,131,000), and China (USD 652,000), among others.

Table 3. List of supplying markets for the product imported by Serbia in 2021
Product: 0904 Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum or of the genus Pimenta

Exporters	Value imported in 2021 (USD thousand)	Trade balance 2021 (USD thousand)
World	4,607	2,127
Spain	1,592	–1,423
Vietnam	1,131	–1,131
China	652	–652
Brazil	530	–530
Hungary	349	1005
India	117	–117
Indonesia	54	–54
Croatia	38	430
Bulgaria	35	–34
Germany	33	1433

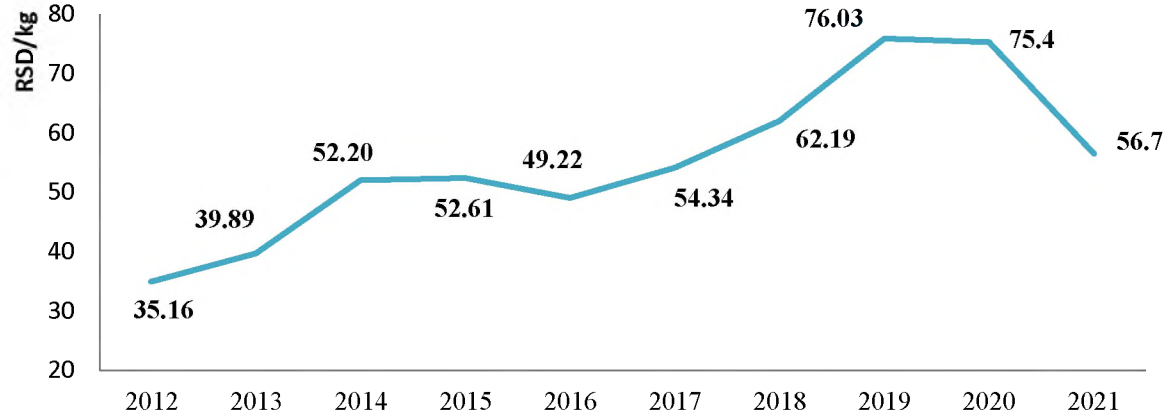
Source:https://www.trademap.org/

The import of peppers to Serbia represents **0.1%** of the world import of this product. The average distance of pepper supplier countries is **5,351 km**, and the market concentration is **0.22**.

SALE AND PURCHASE OF PEPPER IN THE REPUBLIC OF SERBIA

There's not a unique pepper price on the market. Its price depends on the type of pepper, then on the place of sale, the period of the year when it is produced and sold, etc. The two basic characteristics of the pepper price are: - the annual price movement, which fluctuates slightly during the season, but the oscillations are significantly higher outside the season; - larger price fluctuations depending on whether the place of sale is the green or wholesale market or whether peppers are exported outside the country [15].

Average annual purchase prices of pepper in the Republic of Serbia for the period 2012–2021 are shown on graph 6. Purchase prices ranged from 35.16 din/kg in 2012 to 76.03 din/kg in 2019.



Graph 6. Average annual purchase prices of pepper in the Republic of Serbia for the period 2012–2021
Source: https://data.stat.gov.rs/Home/Result/0302010302?languageCode=sr-Cyrl&displayMode=table&guid=7e8e34b1-d053-4bbf-aa00-5091a3c66b75

In the sale and purchase in 2021, fresh pepper accounted for 23,148 tons (Table 4), with a dominant share in the Region of Vojvodina at 83.50%, followed by the Region of Šumadija and Western Serbia with 9.95%, the Region of Southern and Eastern Serbia with 5.59%, and the Belgrade Region with 0.97%..

Table 4. Sale and purchase of fresh pepper in the Republic of Serbia, 2021

	Republic of Serbia (total)	Serbia–north		Serbia–south	
		Belgrade region	Vojvodina region	Šumadija and West Serbia region	South and East Serbia region
Total (millions of RSD)	270,134	11,698	180,481	55,442	22,513
Vegetables (millions of RSD)	8,556	456	5,566	1,592	941
Pepper (millions of RSD)	1,247	20	991	141	95
Pepper (t)	23,148	224	19,328	2,303	1,293

Source: Statistical Yearbook of the Republic of Serbia 2022.

In the year 2021, 12,901 tons of fresh pepper were sold on the markets in our country (Table 5). Of that amount, the highest sales were recorded in the Region of South and East Serbia (38.20%), followed by the Belgrade Region (35.45%), the Region of Vojvodina (13.67%) and the Region of Šumadija and Western Serbia (12.69%).

Table 5. Sale of pepper on markets in the Republic of Serbia, 2021

	Republic of Serbia (total)	Serbia–north		Serbia–south	
		Belgrade region	Vojvodina region	Šumadija and West Serbia region	South and East Serbia region
Total (millions of RSD)	40,319	19,426	7,682	7,058	6,153
Vegetables (millions of RSD)	13,819	6,858	2,503	1,675	2,783
Pepper (millions of RSD)	1,707	665	297	200	544
Pepper (t)	12,901	4,573	1,763	1,637	4,928

Source: Statistical Yearbook of the Republic of Serbia 2022.

The price of peppers fluctuates significantly, so the profitability of pepper production, in addition to quality and quantity, largely depends on their selling prices [12].

Economic justification of production of pepper on an area of 1 ha

The economic analysis of pepper production realized in 2021 on a family farm in the South Banat region was conducted based on the calculation of production on an area of 1.0 ha (Table 6). The selected farm produces peppers from seedlings obtained from a local certified nursery. Pepper production is carried out in the open field. All agrotechnical measures are applied in the production process. The farmer uses a drip irrigation system. The family farm possesses all the necessary machinery and equipment for vegetable cultivation. Subsidies from the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia were not used. Harvesting is done manually, and during the peak harvest period, additional labor is hired, i.e., pickers from the local area. Peppers are harvested in several passes. After harvesting, peppers are sorted into two classes based on size and shape. The peppers produced are mostly sold at the local green market, as well as directly at the farm to regular customers from the surrounding area. A portion is processed into pepper-based products.

Table 6. Economic results of pepper production on the family farm (P = 1.0 ha)

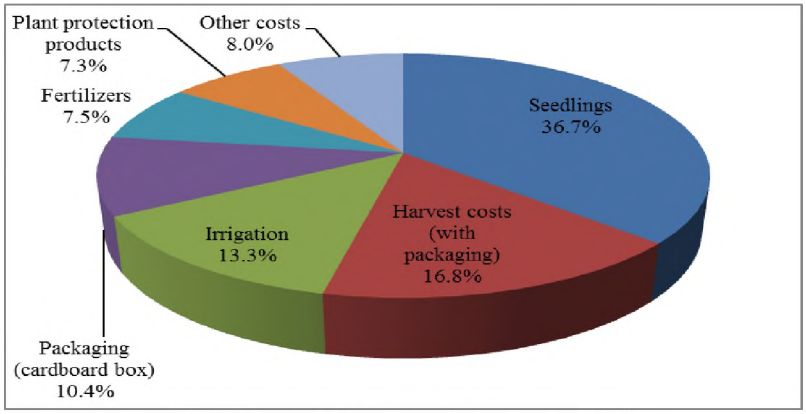
Description		Quantity	Unit of measure	Price per unit of measure	Total RSD/ha	Total EUR/ha
A Income						
Pepper		50,000.00	kg	90.00		
I class	75,00%	37,500.00	kg	100.00	3,750,000.00	31,967.95
II class	25,00%	12,500.00	kg	80.00	1,000,000.00	8,524.79
Subventions					0,00	0,00
Total A					**4,750,000.00**	**40,492.73**
B Variable costs						
Seedlings		70,000.00	piece	9.10	637,000.00	5,430.29
Fertilizers					129,610.00	1,104.90
Plant protection products					126,750.00	1,080.52
Packaging (cardboard box)		3,600.00	piece	50.00	180,000.00	1,534.46
Loading, export and manure spreading					4,062.50	34.63
Ploughing					15,600.00	132.99
Seed preparation					7,800.00	66.49
Spreading of mineral fertilizers					2,600.00	22.16
Sprinkling					52,000.00	443.29
Planting seedlings – machine					10,400.00	88.66
Planting seedlings – labor		40.00	hour	300.00	12,000.00	102.30
Hoeing		80.00	hour	300.00	24,000.00	204.59
Harvesting (with packaging)		970.00	hour	300.00	291,000.00	2,480.71
Drip tapes		14,400.00	m	9.10	131,040.00	1,117.09
Irrigation (diesel generator 7.5 kW)		450.00	1	209.00	94,050.00	801.76
Maintenance of irrigation and aggregates					5,707.00	48.65
Other hired labor		36.00	hour	250	9,000.00	76.72
Other costs (electricity, small inventory)					1,716.00	14.63
Total B					**1,734,335.50**	**14,784.84**
Coverage margin (A-B)					**3,015,664.50**	**25,707.89**

Source: Authors' calculation based on field research (2021).

* Exchange rate of the National Bank of Serbia as of July 31, 2021 (1 EUR = RSD 117.57)

On an area of 1 ha, a production of 50 tons was achieved, with first-class peppers accounting for 37.5 tons or 75% of total production, and second-class peppers for 12.5 tons or 25% of the total. At an average price of 90.0 din/kg, the income amounted to RSD 4,750,000.00 or EUR 40,492.73.

Total variable costs amounted to RSD 1,734,335.50 or EUR 14,784.84. The highest costs were related to seedlings, accounting for 36.7% or RSD 637,000.00, followed by harvesting with packaging (16.8% or RSD 291,000.00). Irrigation was also a significant cost, accounting for 13.3% of the total or RSD 230,797.00, including the purchase of diesel generators, drip tapes, and maintenance of irrigation systems. Packaging made up 10.4% of total costs or RSD 180,000.00, fertilizers 7.5% or RSD 129,610.00, plant protection products 7.3% or RSD 126,750.00, while 8.0% was allocated to other costs, as shown in Graph 7.



Graph 7. Structure of variable costs (%)

Source: Based on data from Table 6.

Considering the total variable costs and the realized income, a profit of RSD 3,015,664.50 or EUR 25,707.89 was obtained for production on an area of 1 ha, which represents a favorable economic result for one growing season.

The sensitivity of the coverage margin in outdoor pepper production in relation to the drop in yield or selling price is shown in Table 7. The coverage margin in outdoor pepper production is relatively sensitive to changes in yield decline and equals zero when the pepper yield drops by 60–70%.

Table 7. Analysis of the sensitivity of the coverage margin in outdoor pepper production in relation to the drop in yield or selling price

Decrease in yield or sales price of pepper (%)	Coverage margin in pepper production (RSD)
10	2,540,664.50
20	2,065,664.50
30	1,590,664.50
40	1,115,664.50
50	640,664.50
60	165,664.50
70	negative

***Source**: Authors' calculation based on data from Table 6.*

The values at which the profit in pepper production is equal to zero are shown in Table 8.

Table 8. Critical values of pepper production on the family farm

Description	RSD / (kg/ha)
Expected yield (EY)	50,000.00
Expected (average) price (EP)	90.00
Subventions (S)	0.00
Variable costs (VC)	1,734,335.50
Critical (average) price: CP = (VC - S) / EY	**34.69**
Critical (average) yield: CY = (VC - S) / EP	**19,270.39**
Critical (average) variable costs: CVC = (EY x EP) + S	**4,500,000.00**

Source: Authors' calculation based on field research (2021).

These values show that the yield or the price of peppers can fall by 38.54%, that is, to 61.46% of the expected price or the expected yield, while pepper production would still result in a positive financial outcome. The economic efficiency of pepper production, calculated as the ratio between the realized production value and the total production costs, is 2.74. In other words, this production is profitable, as the value of output exceeds the realized costs.

CONCLUSION

For the research period from 2012 to 2021, the average annual production of pepper in the Republic of Serbia was 140,250 t, with an average yield of 11.0 t/ha. In the Vojvodina region, the average total production was 3,664 t with an average yield of 7.0 t/ha. The largest quantities of peppers from Serbia are exported to Germany, Hungary, Bosnia and Herzegovina, and Montenegro. On the other hand, Serbia imports a certain amount of peppers, with the largest exporters to Serbia being Spain, Vietnam, and China. There is not a unique pepper price on the market. Average annual purchase prices of pepper in the Republic of Serbia for the period 2012–2021 ranged from RSD 35.16/kg in 2012 to RSD 76.03/kg in 2019.

Based on the calculation of pepper production in the open field, on an area of 1.0 ha on a selected agricultural family farm in the South Banat district, economic indicators were determined which show that pepper production is economically profitable. The amount of peppers produced is 50 t/ha and ensures a positive financial result of EUR 25,707.89/ha. When calculating the variable costs for 2021, it was shown that the largest share goes to the cost of seedlings (36.7%), accounting for more than one-third of the total production costs, which amounted to EUR 14,784.84/ha.

When analyzing the critical values of production, it was shown that the pepper yield can drop to 19.3 t/ha and still result in a positive financial outcome under the given production conditions. Also, the price of pepper can fall to a critical value of RSD 34.69/kg, while the production still remains profitable. The economic efficiency of pepper production is 2.74.

It can be concluded that pepper production in this part of Serbia is highly profitable. To further improve production, efforts should be focused on processing within the family farm, such as drying or other methods. Production can also be enhanced by preseason cultivation, increasing the market value of the product, and improving the process of converting peppers into various processed products and placing them on the market.

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REFERENCES

[1] Abdelkhalik A., Pascual B., Nájera I., Domene M. A., Baixauli C., Pascual-Seva N. (2020): „Effects of deficit irrigation on the yield and irrigation water use efficiency of drip-irrigated sweet pepper (Capsicum annuum L.) under Mediterranean conditions“. Irrigation Science volume 38, pages 89–104.

[2] Hadelan, L., Grgić, I., Zrakić, M., & Crnčan, A. (2015). Financial aspects of greenhouse vegetable production. Bulletin of plant protection, No 4, pp. 51-59.

[3] Ilin Ž., Sabadoš S., Dorotić D., Ilin S., Adamović B., Vojnović Đ. (2021): „ Effects of soil amendments and foliar fertilization on the pepper yield“. In: VIII South-Eastern Europe Symposium on Vegetables and Potatoes 1320. p. 217-224.

[4] Jihyun Park, Suna Kim, BoKyung Moon (2011): „Changes in Carotenoids, Ascorbic Acids, and Quality Characteristics by the Pickling of Paprika (Capsicum Annuum L.) Cultivated in Korea“. Journal of Food Science, Vol. 76, Nr. 7, pp. C1075 - C1080.

[5] Jeločnik Marko, Subić Jonel, Nastić Lana (2021): „Upravljanje troškovima na poljoprivrednim gazdinstvima“. Monografija. Institut za ekonomiku poljoprivrede, Beograd, Republika Srbija.

[6] Kljajić Nataša, Grujić Biljana, Vuković Predrag (2013): "Analiza proizvodnje povrća u Republici Srbiji", Zbornik naučnih radova sa XXVII savetovanja agronoma, veterinara, tehnologa i agroekonomista, Vol. 19, br. 1-2, str. 261-272.

[7] Momirović Nebojša, Moravčević Đorđe, Poštić Dobrivoj, Dolijanović Željko (2015): „Unapređenje metoda i tehnika integralne proizvodnje plasteničke proizvodnje paprike". Zbornik radova sa XX Savetovanja o biotehnologiji. Vol. 20 (22). str. 123-133.

[8] Moravčević Đorđe, Ćosić Marija, Zarić Vlade (2019): „Mogućnosti unapređenja povrtarske proizvodnje u seoskim područjima kroz održivo korišćenje prirodnih resursa". Srpska akademija nauka i umetnosti. Načni skupovi. Knjiga CLXXIX. Odeljenje hemijskih i bioloških nauka. Knjiga 14. „Obnovljivo korišćenje prirodnih resursa u seoskim područjima Srbije". Primljeno na III skupu Odeljenja hemijskih i bioloških nauka od 20. Aprila 2018. godine. Beograd, 2019.godina. str. 275-293.

[9] Moravčević Đorđe, Zarić Vlade, Ćosić Marija, Pavlović Nenad, Savić Slađana, Ugrinović Milan, Marjanović Milena (2021): „Povrtarstvo Srbije – Izazovi i mogućnosti". Zbornik radova sa nacionalnog naučno-stručnog skupa sa međunarodnim učešćem: „Biotehnologija i savremenei pristup u gajenju i oplemenjivanju bilja". Institut za povrtarstvo Smederevska Palanka. Smederevska Palanka, 15. Decembar. 2021. godine, str. 31-49.

[10] Perez-Galvez Antonio, Jaren-Galan Manuel, M. Mınguez-Mosquera Isabel (2006): „Processing of Red Pepper Fruits (Capsicum annuum L.) for Production of Paprika and Paprika Oleoresin", Handbook of Fruits and Fruit Processing, Blackwell Publishing, pp. 565-580.

[11] Petrović Mladen, Savić Bojan, Cvijanović Vojin (2021); „FINANCIAL ASPECTS OF PEPPER (Capsicum annuum L) PRODUCTION ON FAMILY FARMS IN SERBIA", Ekonomika poljoprivrede, Vol. LXVIII, No4 (857-1160) str. 1015-1028.

[12] Russo, I., & Vincent, M. (2012). Peppers: Botany, production and uses, CPI Group, Ltd, Croydon.

[13] Subić Jonel, Cecić Nataša, Kuzman Boris (2007). Economic Aspects of Vegetable Production in Greenhouses – Results of Mini Projects. Economics of Agriculture, Vol. 54, No 22, pp. 231-240.

[14] Subić Jonel (2017): "Assessment of investments by the use of software application for development OF the business plan in agriculture", Ekonomika, Godina LXIII, IV-VI 2017, broj 2, str. 1-15.

[15] Sektorska analiza prerade ostalih useva u Republici Srbiji, SEEDEV, 2020.

[16] Statistical Yearbook, 2022

[17] Tirupathamma T. Lakshmi, Ramana C. Venkata, Naidu L. Naram, Sasikala K. (2021): „Genetic variability, heritability and genetic advance for quantitative traits in paprika (Capsicum annuum L.)". Journal of Pharmacognosy and Phytochemistry 10 (1), pp. 2384-2389.

[18] Vlahović Branislav, Puškarić Anton, Červenski Janko (2010): „Obeležja proizvodnje povrća u Republici Srbiji". Ekonomska analiza. Ratar. Povrt./Field Veg. Crop Res. 47 (2010) pp. 461-466.

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