

Turnover and Consumption of Cucumber in Serbia

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Abstract

The aim of the research was to analyze the production, trade and consumption of cucumbers in Serbia in the period 2013-2022 using a quantitative research method. The results show that in relation to import and export, cucumber production in Serbia is declining. A surplus of over 6,191.00 tonnes, i.e. 1,083,000.00 dollars, was achieved in foreign trade in this vegetable, with a large fluctuation in the shortage. The self-sufficiency of these vegetables in Serbia was constantly growing and was on average over 100%, while the consumption of these vegetables showed a continuous decline in the same period with an average of 5.77 per capita. The largest importer of cucumbers from Serbia is Albania with an average import of 4,057 tons, while the most important export destination of this vegetable is Germany with an average export of 9,137 tons. The research is significant because it provides a solid basis for future rational planning and decisions in Serbian vegetable production.

Key words: cucumber, turnover, consumption, foreign trade exchange

Introduction

Cucumber is an important vegetable plant species and Serbia has good agroecological conditions for its cultivation. Cucumber is a plant species of subtropical and tropical climates (Popović and Takač, 2018), but today it has a wide area of distribution. According to Adeoye and Balogun (2016),

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cucumber is a significant source of antioxidant nutrients (vitamin C, beta carotene, manganese). As Marković (2010) points out, in addition to being used for food purposes, cucumber is also an important raw material in other industries (pharmaceutical, cosmetic).

In the world, according to the available data, the production of cucumber in 2021 was at the level of 93,528,796 tons, while the area under this vegetable in the same year was 2,172,193 hectares. China is one of the world's largest producers of cucumbers, with a production of over 75.5 tons, which accounts for over 80% of the world's total production. Far behind it in second and third place are Turkey and the Russian Federation with production of 1,890,160 tons and 1,648,639 tons, respectively (www.faostat.org). When it comes to foreign trade parameters of this vegetable, i.e. import and export, we can conclude that the situation is a little different. Namely, the largest importer of cucumbers in the world last year was the USA with 1,188,366 tons imported, while the largest exporter was Spain with 958,443 tons (www.trademap.org). In the global context, the production and import and export of cucumbers in Serbia is a very small part.

The aim of the work is to analyze the production, trade and consumption of cucumbers in Serbia in the past ten-year period (2013-2022). For this purpose, the works of individual authors who in the previous period dealt with the forecasting of the production of some vegetable species were analyzed (Lazić, 2014; Ivanišević, 2015; Hossain and Abdulla, 2016; Puškarić and Vlahović, 2018; Nedeljković and Vujić, 2020; Nedeljković, 2021; Nedeljković, 2022; Nedeljković et al., 2023).

In their research, Brankov and Matkovski (2022) deal with the potential shortage of food in the Balkans and on this occasion examine the consumption and self-sufficiency of certain groups of plant and livestock products in some of the countries of the Western Balkans. Apart from the previously mentioned authors, other authors also dealt with the analysis of self-sufficiency in food (Slaboch and Kotyza, 2016; Kubala and Stanuch, 2021).

Some authors in their research emphasized the comparative analysis of export and import prices of these vegetables (Stojanović, 2011; Vlahović and Puškarić, 2012; Puškarić, 2012; Vlahović, 2015; Workman, 2017).

Methodology and data sources

Ten-year data (2013-2022) of production and foreign trade parameters of fresh cucumbers in Serbia (area, production, yield, import and export) were analyzed, which were taken from the available databases of the Statistical Office of the Republic of Serbia (SORS), as well as the FAOStat database. and the International Trade Center ITC (International Trade Center). Also, for the purposes of the research, the per capita consumption of the analyzed vegetable species was calculated, as well as the degree of self-sufficiency according to the formulas of the applied FAO methodology. (degree of self-sufficiency = $\frac{\text{production}}{\text{production} + \text{import} - \text{export}} * 100$; consumption per capita = $\frac{\text{production} + \text{import} - \text{export}}{\text{estimated population}}$). Standard indicators of descriptive statistics (average, interval of variation, standard deviation (SD) and coefficient of variation (cv) were used to obtain the results. It should be noted that when obtaining the results, the occurrence of stock was not taken into account.

In the continuation of the paper, the results are presented in tabular and graphical form.

Research results and discussions

The average area of cucumber in the analyzed period in Serbia was slightly more than 3,503 ha. The movement of areas under this vegetable was relatively stable with a recorded maximum of 4,271 ha. Cucumber production in the same period showed greater instability, and its average was at the level of over 44,549 tons. Most cucumbers were produced at the beginning of the analyzed period (63,687 tons). The most stable trend was the cucumber yield (cv=15.04%), and its average value was 12.48 t/ha. (table 1).

Table 1. Dynamics of cucumber production indicators in Serbia (2013-2022)

Indicators	Average	Variation interval		Coeff. of variation (%)
		Min.	Max.	
Area (ha)	3.503,70	2.769,0	4.271,0	17,56
Production (t)	44.549,90	29.177,0	63.687,0	30,07
Yield (t/ha)	12,48	9,80	15,70	15,04

Source: Processing by the author according to the data of the SORS

Foreign trade indicators (import and export) of cucumber show relatively high instability in the past ten-year period. Namely, for the observed ten years, a foreign trade surplus was realized, which amounted to an average of over 6,191 tons, but its great instability measured by the coefficient of variation ($cv=90.71$) was also observed. The highest recorded surplus was in 2021 and amounted to 16,295 tons. It is interesting that the lowest production of cucumber in the observed period in Serbia was recorded then, while at the highest recorded production, which was at the beginning of the past ten-year period, the smallest import of this vegetable crop was realized. (table 2) Chart 1 gives us a visual representation of the production and quantitative import and export of cucumbers.

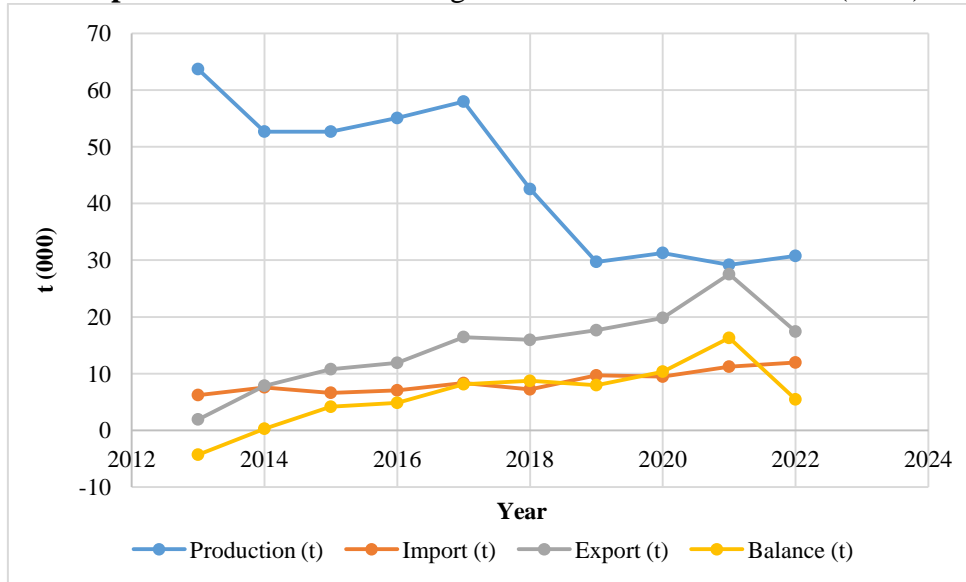
When it comes to the value presentation of foreign trade indicators of cucumbers in Serbia from table 2, we can see that there was a surplus in the foreign trade exchange of this vegetable for the given analyzed period, and it was an average of 1,083,000 dollars. The variation of the achieved balance was huge and ranged from the deficit (-3,349,000 dollars) that was realized in 2013 to the maximum surplus (5,409,000 dollars) that was recorded in 2021. On graph 2, we can follow the movement from year to year in the value (\$) of cucumber imports and exports.

Table 2. Dynamics of foreign trade indicators of cucumber in Serbia (2013-2022)

Indicators	Average	Variation interval		Coeff. of variation (%)
		Min.	Max.	
Import (t)	8.536,90	6.219,00	11.960,00	23,11
Export (t)	14.728,50	1.928,00	27.519,00	47,70
Balance (t)	6.191,60	-4.291,00	16.295,00	90,71
Import (\$)	6.587.200,00	4.256.000,00	11.617.000,00	41,26
Export (\$)	7.670.200,00	1.310.000,00	16.188.000,00	59,91
Balance (\$)	1.083.000,00	-3.349.000,00	5.409.000,00	268,20

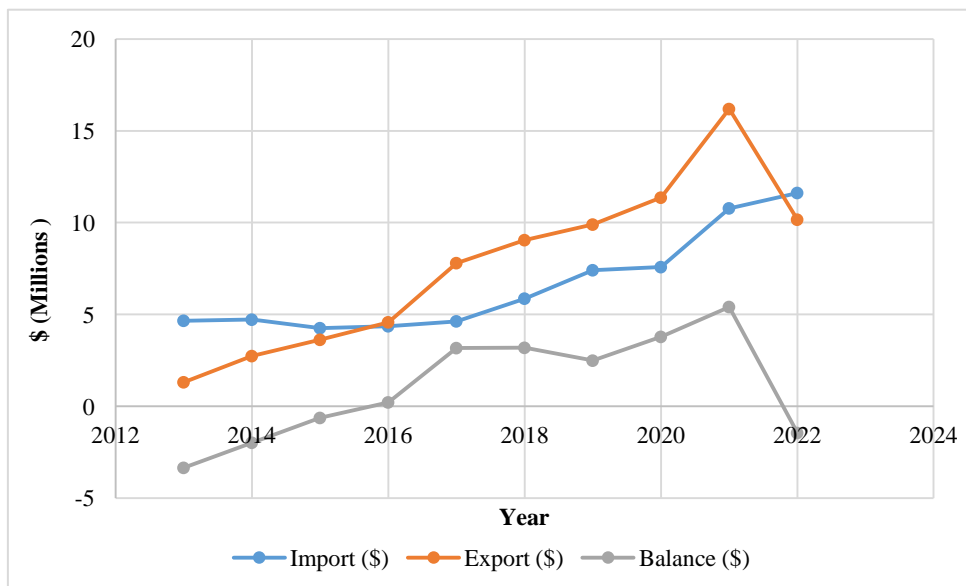
Source: Processing by the author according to ITC data

Graph 1. Production and foreign trade balance of cucumber (000 t)



Source: The chart was created by the authors

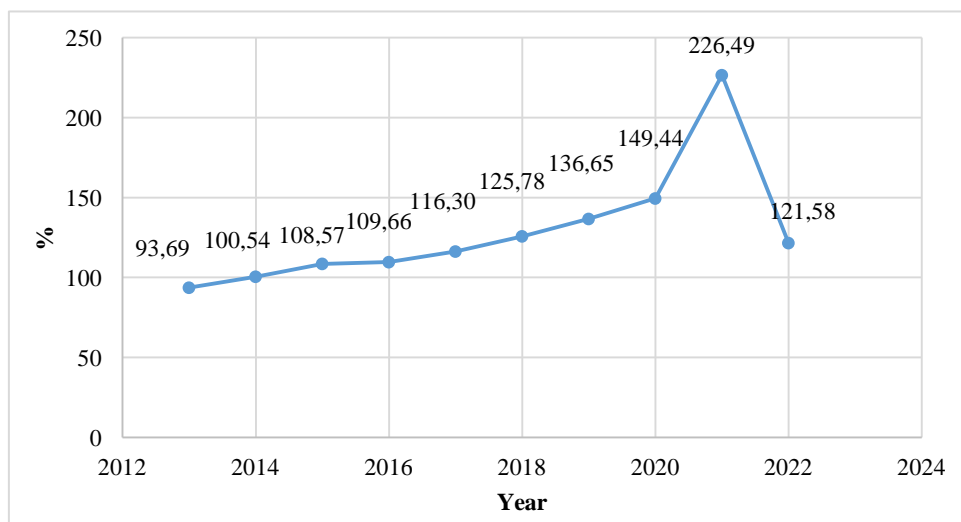
Graph 2. Cucumber foreign trade balance (\$)



Source: The chart was created by the authors

Food self-sufficiency is one of the most commonly used indicators. Serbia is self-sufficient in the production of vegetables, which is indicated by the fact that the average degree of self-sufficiency of these vegetables in the period 2013-2022 was over 100%, that is, about 129%. Self-sufficiency shows a constant growth, especially pronounced in 2021, by as much as 226.49%. (graph 3) The obtained data largely agree with the results of the research conducted in the past period by Brankov and Matkovski (2022). Namely, in their work, they show that the measured degree of self-sufficiency of vegetable products, and especially of certain agricultural products, is over 100% and that Serbia dominates in the self-sufficiency of these products compared to most countries of the Western Balkans.

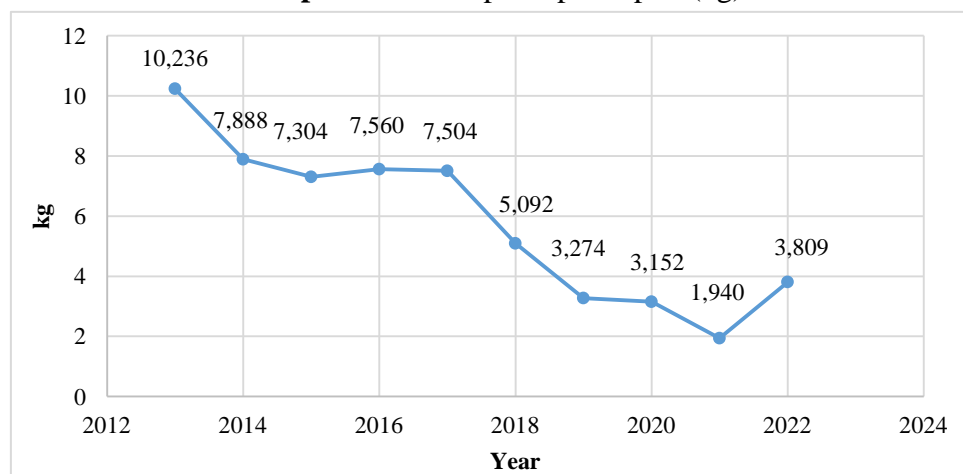
Graph 3. Cucumber Self-sufficiency (%)



Source: The chart was created by the authors

The average recorded consumption in the analyzed period was 5.77 kg/h. and in contrast to self-sufficiency in production, the consumption of cucumbers throughout the analyzed period shows a constant decline, the maximum of which is in 2021, while in the last year of the analyzed period there is an increase in consumption at the level of 3.8 kg/h. (graph 4) It should be noted that cucumber is sensitive to price movements, that is, that a higher price leads to a change in the behavior of customers, that is, that cucumber is easily replaced by some other similar and available vegetable, either for consumption or for industrial use.

Graph 4. Consumption per capita (kg)



Source: The chart was created by the authors

The data from the following table 3 show that the largest import of cucumbers was recorded from Albania, with an average of 4,057 tons for the ten-year period (2013-2022), while in the same period, the most cucumbers were exported to Germany, with an average of 9,137 tons for the observed period.

Table 3. The most important importers and exporters of cucumber

Countries	Average (t)	Variation interval		Coefficient of variation (%)
		Min.	Max.	
Import				
Albania	4.057,60	308,00	6.860,00	61,36
N. Macedonia	1.989,00	192,00	5.478,00	95,94
Greece	848,20	350,00	1.669,00	51,79
Spain	709,60	364,00	1.206,00	33,70
Italia	270,20	88,00	652,00	66,12
Export				
Germany	9.137,00	336,0	19.435,0	56,15
Austria	1.448,11	22,0	3.781,0	89,78
Croatia	1.242,40	80,0	2.738,0	84,29
Hungary	860,38	43,0	2.005,0	86,39
BiH	533,10	127,0	1.553,0	83,36

Source: Processing by the author according to ITC data

A large fluctuation was reported in both imports from the mentioned countries and exports.

Conclusion

Cucumber is an important vegetable species in Serbia, on the basis of which a surplus in foreign trade was realized in the past ten-year period (2013-2022). The average recorded balance in the foreign trade exchange was 6,191.60 tons, or 1,083,000.00 dollars, with large variations in its movement. Self-sufficiency was constantly growing until 2021 in relation to cucumber consumption, where a continuous decline was recorded and whose average value for the analyzed period was 5.77 kg/h. Cucumbers were mostly imported from Albania, an average of 4,057.60 tons for the period 2013-2022. year, and the country to which Serbia exported the most was Germany. In the following research, the additional impact on the foreign trade movements of these vegetables in Serbia should be examined, as well as the directions of action that would lead to rational production in the future should be determined.

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