



Examination of the volume of meat production and the value of meat imports to Serbia from 2012 to 2021

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ABSTRACT

The total volume of meat production in Serbia from 2012 to 2021 was 550 thousand tons. In the overall meat production, pork accounted for over 50%. The trend in meat production during the observed period indicates an increase in production volume. The increased production volume is based on the fact that the slaughtering of cattle and the import of live animals to Serbia (pigs and poultry) for feeding and slaughtering as live animals from Serbia have both increased. The crisis in livestock farming in Serbia is evident from the data that the average value of meat and processed meat products imported and the value of live animal imports averaged over \$US 150 million from 2012 to 2021.

1. Introduction

Serbia is a country where agriculture and food production have always had a special significance, not only for the food security of its population but also for exporting food surpluses. Even in the medieval Serbian states, they were exporters of livestock products (dried meat, bacon, cheese, honey, lard, leather, wool) (Petrović-Garić 2023, Đorđević *et al.*, 2022). In the 19th century and until the beginning of World War I, Serbia was primarily an agrarian country (livestock and crop farming). Agricultural production relied heavily on livestock, particularly in pig, sheep, and cattle farming, and Serbia was a well-known exporter of livestock, especially to Austria-Hungary (Baltić *et al.*, 2020). Between the two World Wars, the Kingdom of Yugoslavia did not have significant slaughter and processing capacities and continued to export live animals. From the 1960s, a

larger number of modern slaughterhouses with meat processing facilities were established in Yugoslavia, and Serbia exported meat and meat products to several countries worldwide (Anon, 2019). The breakup of Yugoslavia, wars, sanctions, and societal changes (changes in ownership structures) affected the economic life of Serbia, including agriculture and the meat industry. Since 1990, the number of cattle has drastically decreased (by two-thirds), the number of pigs has been slightly declining or is stagnant, and the number of poultry has been decreasing. Only the number of small ruminants (sheep and goats) has seen a slight increase. In a little over 30 years, most of the industrial slaughterhouses have ceased to operate. There is no doubt that Serbia has good soil and climatic conditions, offering great opportunities for the production of plant and animal-based foods. However, it is undeniable that especially from the

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middle of the last century, there have been significant changes in the ratio between plant and animal-based production. Today, the main export articles are grain and fruit. For the past thirty years, this has led Serbia to transition from being an exporter to an importer of meat.

The aim of this paper is to highlight the changes in meat production and to emphasize that Serbia has shifted from being a major exporter of meat and meat products to becoming an importer of meat for processing as well as finished meat products.

2. Materials and methods

The data on the total volume of production and production of meat from individual animal species (cattle, pigs, poultry, and sheep), as well as data on the production of edible parts and fatty tissues in Serbia, and data on the volume of export and import of live animals from Serbia, along with data on the value of imported meat and live animals, were collected from the Statistical Yearbooks of Serbia from 2012 to 2021 (<https://www.stat.gov.rs/>). The results

obtained were compared by statistical analysis using Microsoft Excel 2010 and GraphPad Prism software, version 8.00 for Windows (GraphPad Software, San Diego, California USA, www.graphpad.com). The means and measures of variation for the volume of meat production, import, and export, as well as the value of meat imports and the value of live animal imports, were calculated. Trends in meat imports, meat production, and the values of meat and live animals have been calculated. All results are presented in tabular and graphical forms.

3. Results

The Serbian market is supplied with meat and meat products from the slaughter of animals raised or finished in domestic industrial and artisanal facilities, as well as partially from the slaughter and processing of meat in households (for personal consumption). Some meat intended for processing or already finished meat products are imported, while some meat for sale or processing comes from animals imported and partially fattened (finished)

Table 1. Meat production and import in Serbia from 2012 to 2021

Ordinal number	Parameters of the meat market	Unit of measurement	Means and measures of variation				
			\bar{X}	Sd \pm	Min.	Max.	Cv %
1.	Production Serbia ¹	000 tons	550	26.76	513	578	4.86
2.	Imports Serbia ²	000 tons	33.54	9.00	16.84	43.16	26.98
3.	Total 1+2	000 tons	583.54	32.97	53.84	62.16	5.65
4.	Import share ³	%	5.75	1.50	3.20	7.34	26.08

Note: ¹Meat with bones, edible organs, and fatty tissues; ²Frozen meat for processing and meat products; ³Percentage of imports in the total meat quantity

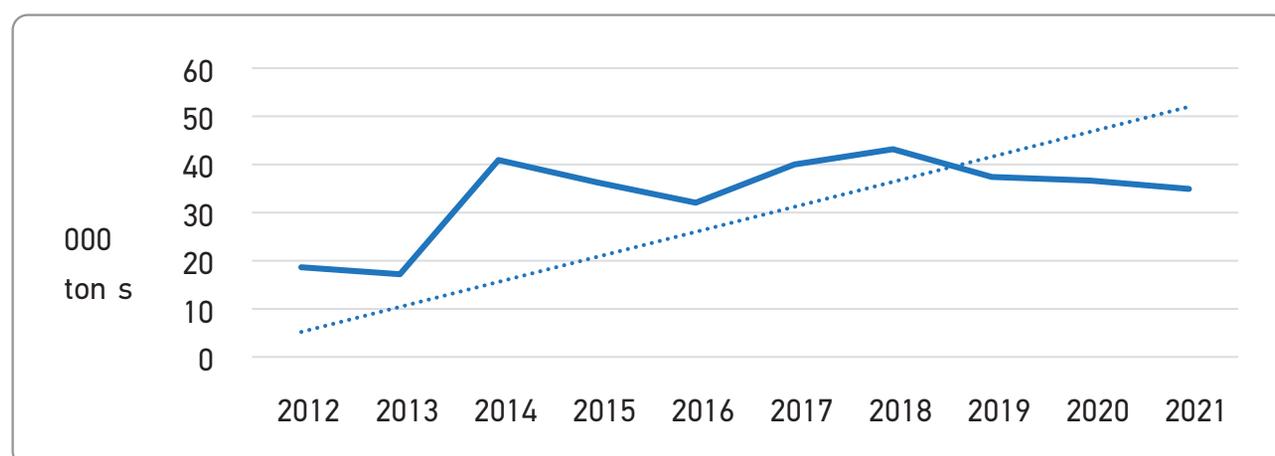


Figure 1. Trend of meat imports to Serbia from 2012 to 2021.

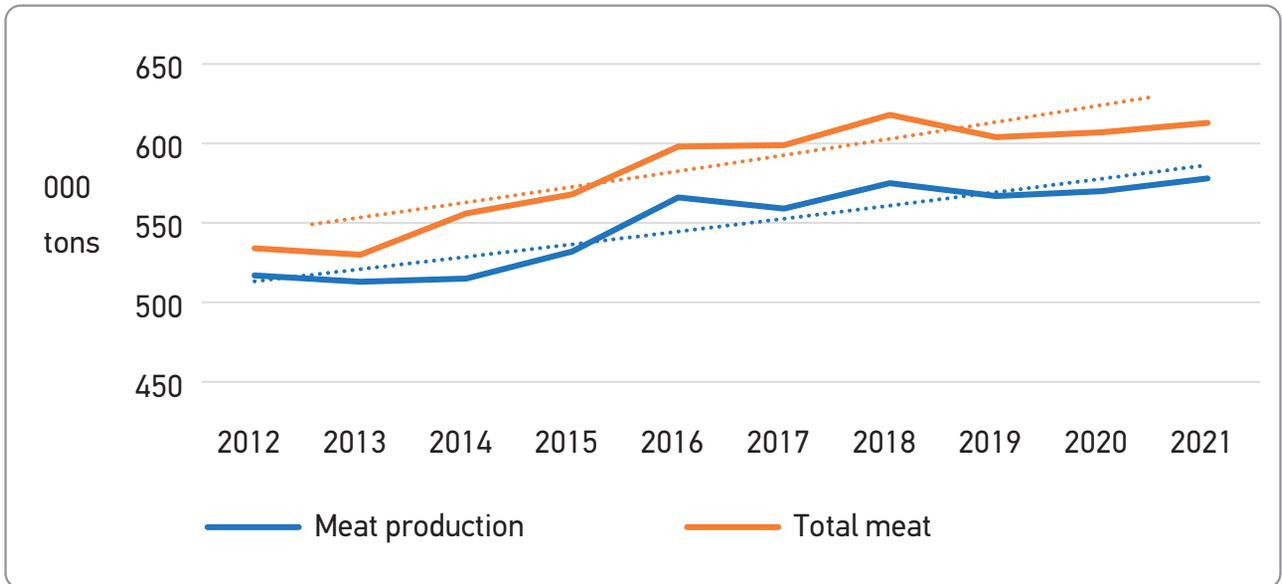


Figure 2. Comparative representation of the production trend and the total volume of meat on the Serbian market from 2012 to 2021.

in Serbia. Meat production in Serbia was, on average, 550 ± 26.76 thousand tons annually from 2012 to 2021. During the same period, Serbia imported 33.54 ± 9.00 thousand tons of meat annually for processing and finished meat products. On the Serbian market, from 2012 to 2021, there was an annual average of 583.54 ± 32.97 thousand tons of meat (domestic production and imported meat and meat products). The average share of imports in the total volume of meat on the Serbian market was $5.75 \pm 1.50\%$ (Table 1).

The trend of meat imports to Serbia from 2012 to 2021 is shown in Figure 1.

Comparative representation of the trend in meat production and the trend in the total volume of meat on the Serbian market for the same time period is shown in Figure 2.

Out of the total volume of meat produced in Serbia from 2012 to 2021, the largest share was pork meat (51.89%), followed by poultry meat (18.44%), beef meat (13.65%), sheep meat (6.15%), edible offal (5.45%), and fatty tissues (4.00%) (Figure 3).

The value of meat imports to Serbia from 2012 to 2021 was, on average, \$US 104.83 ± 24.00 million. The value per kilogram of imported meat and meat products to Serbia was on average \$US 3.20 ± 0.48

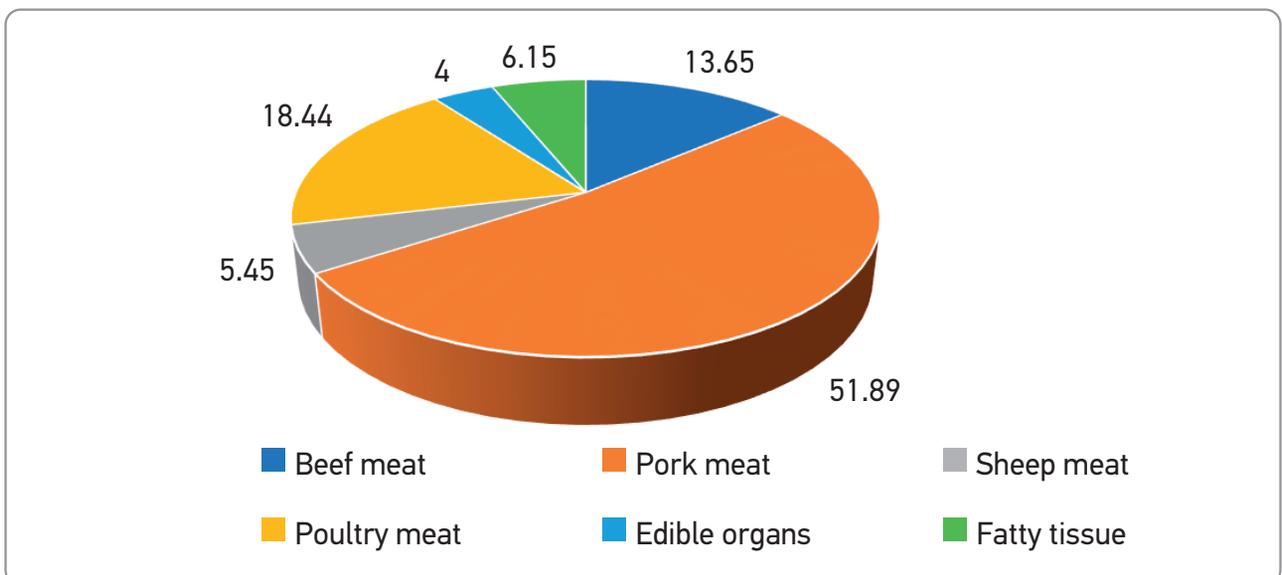
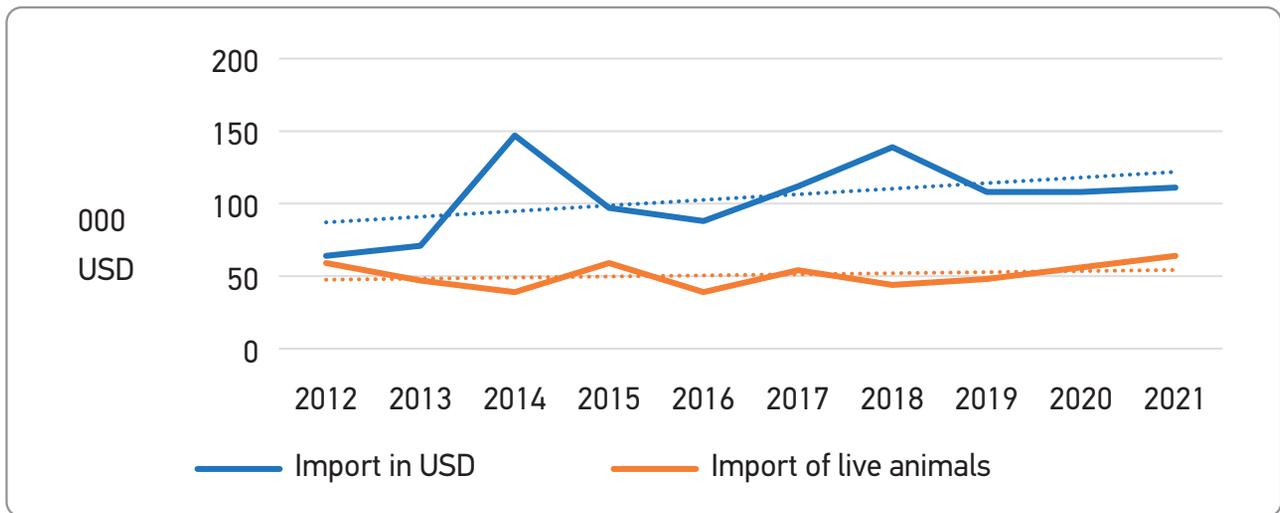


Figure 3. The share of different types of meat produced in Serbia (annual average from 2012 to 2021).

Table 2. The value of live animal meat imports to Serbia from 2012 to 2021.

Ordinal number	Parameters	Unit of measurement	Means and measures of variation.				
			\bar{X}	Sd ±	Min.	Max.	Cv %
1.	Meat import	million \$US	104.83	24.00	66	147	22.77
2.	per kg/import	\$US	3.20	0.48	2.68	4.12	15.00
3.	Import of animals	million \$US	50.23	9.09	38.75	64.14	18.82

**Graph 4.** Comparative representation of the trends in the value (\$US) of meat and meat product imports and live animal imports in Serbia from 2012 to 2021.

per year. Besides importing meat for processing and finished meat products, Serbia also imports live animals, mainly for the final fattening phase, which are then slaughtered as animals raised in Serbia. The average annual value of imported live animals to Serbia for the period 2012–2021 was \$US 50.23±9.09 million (Table 2).

The trends of the value of meat and meat product imports, as well as live animal imports, from 2012 to 2021, are shown in Figure 4.

From 1912 to 2021, Serbia imported 4.7±0.33 thousand head of cattle, 174±86.29 thousand pigs, 2.3±0.21 thousand sheep, and 8.10 million poultry. During the same period, 43±9.57 thousand cattle, 25±5.66 thousand pigs, 87±4.20 thousand sheep, and 2.23±0.26 million poultry were exported, indicating a positive import balance for cattle and sheep, and a negative one for pigs and poultry.

4. Discussion

Food production has been an essential activity for humanity's survival, gradually transitioning from a hunter-gatherer lifestyle to a settled way of life. This task is challenging for the entire world,

especially with the unexpected increase in the global population today (the “population bomb”). It was projected that the world's population would reach eight billion by 2026, up from seven billion in 2012, but this number was surpassed before the end of 2022. Providing sufficient quantities of animal-derived food, especially meat, which is a crucial part of human nutrition, poses a significant challenge. Meat is undoubtedly the most important animal-derived food (Baltić *et al.*, 2022).

Global meat production in 2020 was 337 million tons (MT), comprising 133 MT (39.47%) poultry meat, 110 MT (32.64%) pork, 68 MT (20.18%) beef, and 26 MT (7.71%) small ruminant and horse meat. In Serbia, pork makes up most of the meat produced, accounting for over 50% of the total meat production, followed by poultry (18.44%) and beef (13.65%). Over the first 20 years of this century (2000 to 2020), global meat production increased by 45%, poultry meat by 94%, pork by 22%, beef by 22%, and other types of meat by 39%. The demand for meat is projected to reach 400 MT in 2030 and nearly 500 MT in 2050 (Putnik, Bursać Kovačević, 2021).

While global meat production continues to rise, Serbia's meat production has been declining since

1990 (Dokmanović et al., 2017). Total meat production in Serbia was 616 thousand tons in 1990, decreased to 518 thousand tons in 2015, and slightly increased to 527 thousand tons in 2021. The most significant decline was observed in beef production, dropping from 155 thousand tons in 1990 to 71 thousand tons in 2021. This is mainly due to the reduced number of cattle, from around two million in 1990 to 878 thousand in 2021, caused by increased slaughtering (due to the unprofitability of keeping cows for milk production) and the fact that from 2012 to 2021, 43±9.57 thousand live cattle were exported, likely due to favourable prices. Pork production has not significantly changed from 1990 to 2021 (286 thousand tons in 1990, 283 thousand tons in 2000, and 298 thousand tons in 2021), despite the decline in the number of pigs from 4.3 million in 1990 to 2.8 million in 2021. This can be explained by the fact that Serbia imported an average of 174±86.29 thousand live pigs annually from 2012 to 2021. Poultry meat production was 112 thousand tons in 1990, decreased to 67 thousand tons by 2000, and slightly increased to 114 thousand tons in 2021. This increase can also be attributed to the import of live poultry (an average of 8.10±1.16 million head per year from 2012 to 2021). Sheep and goat meat production in Serbia increased from 24 to 34 thousand tons from 1990 to 2021. During the same peri-

od, the number of sheep and goats increased from 1.49 million in 2000 to 1.71 million in 2021. Meat production would have been even higher if an annual average of 87±4.20 thousand live sheep had not been exported from 2012 to 2021. From the analysis of meat production in Serbia from 2012 to 2020, it can be concluded that meat production is increasing, mainly based on the increased slaughtering of cattle, as their numbers drastically decrease. The production is also reliant on meat imports for processing (with an average annual value of \$US 104.83±24.00 million for the mentioned period) and imports of live animals (with an average annual value of \$US 50.23±9.09 million) (<https://www.stat.gov.rs/>).

5. Conclusion

Since 1990, Serbia has transitioned from being an exporter of live animals, meat, and meat products to becoming an importer. The reasons behind this change are numerous, complex, and multifactorial, and they are not justified. Serbia has sufficient quantities of roughage for ruminants and an adequate supply of concentrated feed (such as grains, soy, and sunflower) for animal nutrition, which are being used for the export animals. It would be much more beneficial to utilize these resources for feeding animals and exporting meat and live animals instead.

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