
PRODUCTION OF CHICKEN MEAT IN THE REPUBLIC OF NORTH MACEDONIA COMPARED WITH THE OTHER FORMER YUGOSLAV COUNTRIES

Aleksandra Silovska Nikolova

Faculty of Agricultural Sciences and Food, Ss. Cyril and Methodius University in Skopje,
Republic of North Macedonia, silovska@fznh.ukim.edu.mk

Martin Gjorgjiev

Faculty of Economics and Organization of Entrepreneurship,
International Slavic University Sveti Nikole, Republic of North Macedonia martinstip@hotmail.com

Abstract: Poultry meat, particularly chicken, plays a significant role in the human diet and has seen a global increase in production over the years. This research focuses on chicken meat production in the Republic of North Macedonia and other former Yugoslav countries from 2012 to 2022, using data sourced from the Food and Agriculture Organization of the United Nations (FAO). Among these countries, the Republic of Serbia leads in chicken meat production with an average of 96,667.64 tons over the period. The Republic of Slovenia and the Republic of Croatia follow, each also producing an average of 96,667.64 tons. The Federation of Bosnia and Herzegovina produces an average of 57,574.28 tons. In contrast, the Republic of North Macedonia and the Republic of Montenegro are much smaller producers, with averages of 1,711.91 tons and 1,424.95 tons, respectively. Compared to the other former Yugoslav countries, chicken meat production in Montenegro and North Macedonia is about four times lower. Despite its smaller production volume, the Republic of Montenegro shows the highest average growth rate of 6.67% for the period 2012-2022. The Federation of Bosnia and Herzegovina follows it with a growth rate of 2.61%, Slovenia with 2.29%, Serbia with 2%, and Croatia with 1.66%. The Republic of North Macedonia, however, experiences a slight negative growth rate of -0.02%. The National Strategies for Agriculture and Rural Development in these countries are crucial in guiding the development of poultry production. These strategies outline the goals, policies, and measures needed to advance agricultural practices and improve poultry production.

Keywords: poultry meat, chicken meat, costs, investments, strategies

1. INTRODUCTION

Poultry meat is an essential source of animal proteins crucial for human growth and development, making it highly sought after by consumers globally (Wahyono and Utami, 2018). It offers several benefits, including being a high-quality protein source, flavorful, affordable, and readily available to the population.

According to Jalić et al. (2023), chicken meat production is the fastest-growing sector in global meat production, with chicken meat becoming an increasingly dominant type of meat in the human diet. The per capita consumption of chicken meat has seen a significant increase, having quadrupled since 1961 (Ritchie et al., 2019; Whitton et al., 2021).

Chicken meat is easily digestible and boasts high protein content with low-fat content, making it more dietary compared to other meats (Senčić and Kralik, 1993; Gajčević et al., 2007). The chemical composition and energy value of chicken meat are as follows: water content ranges from 67.5% to 72.10%, protein content ranges from 19.8% to 21.40%, fat content ranges from 6.8% to 13.7%, ash content ranges from 0.9% to 1.0%, and the energy value ranges from 631 to 873 KJ/100 g (Senčić and Kralik, 1993). Chicken meat is recommended for all age groups due to its nutritional benefits (Kralik et al., 2001; Gvozdanović et al., 2021).

Poultry farming is a vital component of livestock production, primarily aimed at providing the market with poultry meat and eggs. This industry encompasses domestic birds such as hens, turkeys, geese, ducks, ostriches, and more, with a strong focus on egg and meat production. Enhancing the efficiency of poultry production significantly relies on the genetic potential of the birds. A crucial attribute in this regard is the efficiency of converting feed into body mass or meat gain.

The chicken meat production industry is experiencing rapid growth due to several factors. Lower production costs and shorter production cycles make chicken meat more affordable compared to other meats, which is why consumers often prefer it. This affordability, combined with efficient production methods, has contributed to the industry's expansion. (OECD/FAO, 2019).

Under to Article 47 of the Law on the Quality of Agricultural Products ("Official Gazette of the Republic of Macedonia" No. 140/10), poultry meat intended for direct human consumption is placed on the market in the form of whole carcasses or prepared carcass parts. These can be sold as fresh or chilled, frozen, and quick-frozen

products. Whole carcasses are marketed in three main categories: partially eviscerated, with internal organs for human consumption, and without internal organs for human consumption.

The Rulebook regulates poultry meat quality in the Republic of North Macedonia on the criteria for determining the quality of poultry meat in terms of carcass conformation, appearance, damage, color, and other visual characteristics and the method of classification ("Official Gazette of the Republic of Macedonia" No. 35/11). This Rulebook outlines specific criteria for assessing the quality of poultry meat.

The classification process evaluates poultry carcasses based on their overall shape and muscle distribution (carcass conformation), visual presentation (appearance), absence of bruises or physical damage (damage), uniformity and desirability of meat color (color), and any additional visible traits that could affect quality perception (other visual characteristics).

Poultry meat that meets the standards set in Articles 2, 3, and 4 of the Rulebook is classified as Class A. If the meat fails to meet any of these criteria, it is classified as Class B.

This paper aims to analyze the official statistical data on chicken meat production from 2012 to 2022 in the Republic of North Macedonia and compare it with production data from other former Yugoslav countries. The analysis seeks to provide insights into the trends and developments in the poultry industry within the region, highlighting both progress and challenges in poultry meat production. The economic analysis enables the identification of key factors affecting productivity, profitability, and competitiveness in this sector, as well as the identification of potential policies for its improvement.

2. MATERIAL AND METHODS

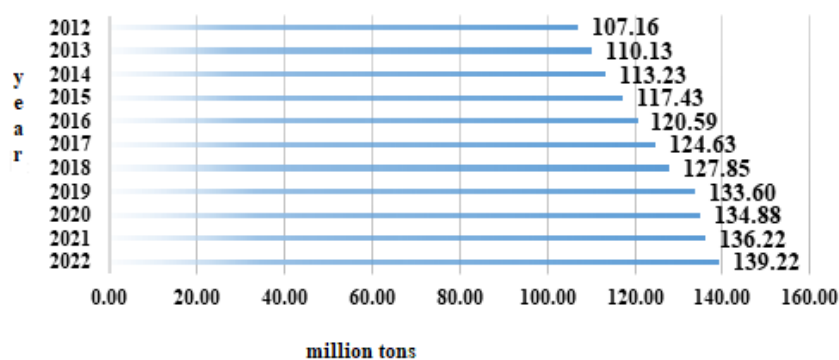
The data on chicken meat production from 2012 to 2022 for the Republic of North Macedonia and other former Yugoslav countries (Republic of Serbia, Republic of Montenegro, Federation of Bosnia and Herzegovina, Republic of Croatia, and Republic of Slovenia) were obtained from the official website of the Food and Agriculture Organization of the United Nations (FAO). The research employed both quantitative (statistical-mathematical) and qualitative methods.

The quantitative analysis was based on standard mathematical-statistical methods. The arithmetic mean (\bar{x}) was used to determine the average values of chicken meat production across the specified period. The variation interval, which includes the minimum and maximum values, provided insights into the range of production levels within the analyzed period. Additionally, the standard deviation and coefficient of variation were calculated to measure the dispersion and relative variability of the production data. The average rate of change (%) was also computed to indicate the percentage increase or decrease in chicken meat production over the years. The analyzed data is presented in graphs and tables.

3. RESULTS AND DISCUSSION

With the growth of population, urbanization, industrialization, and an increase in purchasing power, there has been a consistent rise in poultry meat production globally (Jafari, 2021).

Graph 1. Overview of poultry meat production worldwide for the period 2012-2022

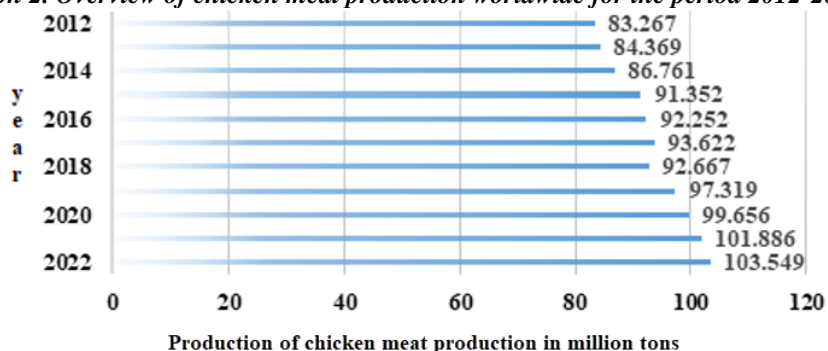


(Source: FAOSTAT database)

Graph 1 illustrates a steady increase in global poultry meat production over the years. In 2012, the world produced 107.16 million tons of poultry meat, which rose to 139.22 million tons by 2022. Similarly, Graph 2 demonstrates the

trend in chicken meat production globally from 2012 to 2022. The data shows a consistent annual growth in chicken meat production, with 83.267 million tons produced in 2012, marking a 1.24-fold increase by 2022, when production reached 103.549 million tons.

Graph 2. Overview of chicken meat production worldwide for the period 2012-2022



(Source: FAOSTAT database)

In the Republic of North Macedonia, the average chicken meat production from 2012 to 2022 was 1,711.91 tons. Production figures ranged from a low of 1,490 tons in 2019 to a peak of 2,011 tons in 2015. Notably, chicken meat production increased by 23.27% from 2019 to 2022. The National Strategy for Agriculture and Rural Development for 2021-2027, developed by the Ministry of Agriculture, Forestry, and Water Management (2023), highlights the need for additional income and investment support for poultry producers. This support aims to meet animal welfare standards and modernize the industry. Additionally, there is an emphasis on promoting and regulating small, self-sustaining meat production businesses to encourage their growth and integration.

Encouraging the development of small, self-sustaining poultry meat businesses with innovative approaches is crucial for re-regulating and promoting this sector. Establishing a comprehensive production chain for broiler meat is necessary to create the first commercial-scale broiler production system in the country since its independence.

Comparing poultry meat production across the former Yugoslav countries reveals significant disparities. The Republic of Montenegro, with the smallest average production of 1,424.95 tons from 2012 to 2022, is followed by the Republic of North Macedonia, producing an average of 1,711.91 tons. This represents a production level more than forty times lower than that of other former Yugoslav countries. In contrast, the Republic of Serbia is the largest producer, with an average of 96,667.64 tons, followed by the Republic of Slovenia with the same production figure, the Federation of Bosnia and Herzegovina at 57,574.28 tons, and the Republic of Croatia with 96,667.64 tons.

Despite its low overall production, Montenegro experienced the highest average growth rate of 6.67% over the same period. The Federation of Bosnia and Herzegovina follows this with a 2.61% growth rate, Slovenia with 2.29%, Serbia with 2%, and Croatia with 1.66%. The Republic of North Macedonia, however, faced a negative average growth rate of -0.02% (Table 1).

The Ministry of Agriculture, Forestry and Water Management of Montenegro highlights in its strategy for 2023 to 2028 (2023) that the country imports more poultry meat than it produces. Montenegrin poultry producers face several challenges compared to their regional counterparts, including low production levels, inadequate production and processing facilities, limited access to inputs, high feed prices, insufficient storage for fertilizers, difficulties in meeting animal welfare standards, and inadequate agricultural budget support. Despite these issues, the poultry sector in Montenegro has shown a positive growth trend over the past decade, contrasting with the performance of other animal husbandry sectors.

The strategic plan for agricultural policy in the Republic of Croatia for 2023-2027, prepared by the Ministry of Agriculture (2023), emphasizes the country's long-standing tradition of intensive poultry farming in medium and large farms. The plan highlights that poultry welfare is addressed in four key areas: enhanced nutrition, improved breeding conditions, open access, and better care, in line with the European Green Deal. These measures aim to ensure the production of healthy and high-quality poultry meat.

The strategy for agriculture and rural development for 2021-2027, developed by the Federal Ministry of Agriculture, Water Management, and Forestry of the Federation of Bosnia and Herzegovina (2024), emphasizes the need for targeted support to enhance poultry production. This support involves investments aimed at increasing yields, improving animal welfare standards, and modernizing the sector. Achieving economic stability and sustainability for

agricultural producers is contingent upon maintaining current levels of budget support while adapting to market fluctuations.

The strategy also addresses the challenges posed by the volatility in prices for input products such as feed and energy, which can hinder production improvements. To mitigate these issues, appropriate support measures must be implemented. Additionally, there is a need for enhanced knowledge transfer and continuous education for poultry producers, focusing on new technologies and digital advancements.

Table 1. Overview of chicken meat production in the former Yugoslav countries for the period from 2012 to 2022

Years	Republic of North Macedonia	Republic of Serbia	Republic of Montenegro	Federation of Bosnia and Herzegovina	Republic of Croatia	Republic of Slovenia	
2012	1945	94860	1006.5	53399	50000	54558	
2013	1801	83824	1330.55	41549	48800	52611	
2014	2011	85552	1279.6	43431	49800	55284	
2015	1729	76243	1303.79	48704	52300	53939	
2016	1509	78641	1632.4	57420	52000	58769	
2017	1716	85018	1400	60970	52400	63383	
2018	1499	105505	1533.51	61926	52600	64020	
2019	1490	113577	1670.7	67165	53940	64230	
2020	1494	113978	1264.4	65932	56650	67040	
2021	1695	110528	1332.66	63703	58610	66600	
2022	1942	115618	1920.34	69118.1	58960	68440	
Average 2012-2022	1711.91	96667.64	1424.95	57574.28	53278.18	60806.73	
Variation interval	Min	1490	76243	1006.5	41549	48800	52611
	Max	2011	115618	1920.34	69118.1	58960	68440
SD	187.93	14723.28	236.52	9125.90	3292.40	5619.76	
CV (%)	10.98	15.23	16.60	15.85	6.18	9.24	
Average rate of change (%)	-0.02	2	6.67	2.61	1.66	2.29	

(Source: FAOSTAT database)

Moreover, the strategy underscores the importance of integrating green economy principles and ecological practices to minimize environmental impact, particularly concerning fertilizer management. Support for biogas production and the adoption of eco-friendly practices in poultry farming should be incorporated into agricultural policy measures.

The strategic plan for agricultural policy for the period 2023-2027, prepared by Slovenia's Ministry of Agriculture, Forestry, and Food (2022), highlights the country's focus on supporting investments that help poultry farms comply with advanced animal welfare standards and environmental regulations. These supports aim to promote superior animal welfare practices. However, since Slovenia is still in the developmental phase, the additional costs associated with higher animal welfare are not shared across the food chain. Instead, these costs are predominantly borne by the farmers themselves, who voluntarily invest in better welfare conditions. This situation imposes extra financial and labor burdens on those who choose to exceed the minimum standards, compared to those adhering only to the basic requirements.

The strategy for agriculture and rural development in the Republic of Serbia for the period 2014-2024 (Official Gazette of the Republic of Serbia, No. 85/2014) highlights significant regional variations in livestock production trends and systems across the country. Generally, the importance of livestock types is ranked as follows: cattle, sheep, poultry, and pigs. However, in Vojvodina and the plains, this order is reversed. While a large portion of

livestock production occurs on numerous small farms, recent trends show a shift towards concentration in poultry and pig farming on larger farms operated by legal entities and extensive family farms.

A major challenge for expanding poultry meat production in Serbia is the prevalence of small producers who mainly focus on subsistence production. These small-scale farms traditionally use low-intensity production methods. Furthermore, the advancement of poultry production heavily relies on the import of hybrid breeds designed for fattening, which presents an additional barrier to development in this sector.

In the Republic of North Macedonia, poultry meat production is insufficiently developed to meet domestic needs, which significantly increases the country's dependence on imports. This results in a negative trade balance in the sector. The production capacities are limited due to a lack of economies of scale, leading to increased marginal costs per unit of production. In Serbia and Croatia, vertically integrated production chains provide lower operational costs and better price competitiveness. This highlights the need for structural investments in North Macedonia, including expanding production capacities, optimizing logistics processes, and improving distribution efficiency.

Domestic demand for poultry meat is growing due to accessibility and changes in dietary habits, but the high price elasticity creates market instability, especially during inflation and price shocks. Unlike Serbia and Bosnia and Herzegovina, where stable domestic production reduces import pressures, North Macedonia is a net importer, increasing dependence on foreign suppliers and the trade deficit. Strengthening export potential requires technological investments, alignment with EU standards, and trade facilitation with the region for better market integration.

The main challenges for the economic sustainability of poultry meat production in North Macedonia include:

- ✓ Lack of economies of scale – Fragmentation of production leads to high fixed costs per unit of output.
- ✓ High feed prices – About 60% of total poultry meat production costs are related to feed, which is largely imported.
- ✓ Regulatory barriers – The lack of alignment with EU standards limits access to broader markets.
- ✓ Insufficient investment activity – The small number of investors in this sector limits growth and modernization potential.

To improve competitiveness and economic sustainability in the sector, investments in automation and digitalization are necessary to increase efficiency and reduce production costs. Increasing domestic feed production will contribute to financial stability by reducing import dependency. Collaboration between companies in the sector will enable better resource utilization and reduce operational costs. Additionally, proactive regional integration and improving trade relations with neighboring countries will strengthen market position and open opportunities for export.

4. CONCLUSION

Based on the analysis of chicken meat production data from 2012 to 2022 across the former Yugoslavia, a general upward trend is observed, with the notable exception of the Republic of North Macedonia, which has experienced a slight decline. To enhance the poultry sub-sector, it is essential to implement and achieve the objectives and measures outlined in the National Strategies for Agriculture and Rural Development of each country in the region. Key areas for focus should include improving animal welfare, advancing producer education, and addressing other critical factors that support the sector's growth and sustainability. Poultry meat production in the Republic of North Macedonia lags behind other former Yugoslav countries, primarily due to insufficient investments, high production costs, and limited state incentives. To improve competitiveness, strategic reforms and economic policies are needed to increase productivity, enhance trade positions, and reduce import dependence. Only with this approach can the sector become long-term sustainable and competitive in the regional market.

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