

ANALYSIS OF THE SUPPLY OF THE NUMBER OF CATTLE HEADS IN THE PRODUCTION OF BEEF IN THE REPUBLIC OF SERBIA

Slavica ARSIĆ¹, Nataša KLJAJIĆ², Predrag VUKOVIĆ³

Institute of Agricultural Economics in Belgrade, Volgina 15, 11060 Belgrade, Phone/Fax: +381-11-6972-858; E-mails: Slavica_a@iep.bg.ac.rs, natasa_k@iep.bg.ac.rs, predrag_v@iep.bg.ac.rs

Corresponding author: predrag_v@iep.bg.ac.rs

Abstract

From a global point of view, the Republic of Serbia has favorable conditions for cattle breeding and beef production, because there are favorable soil and climatic conditions, high production of roughage and fodder, available workforce, installed capacities of meat processing industries (for the production of beef and meat products) etc.. However, it is not the only, or exclusive, parameter of the development of cattle production, because there are significant differences in the racial composition and production potential of cattle in certain production districts of the Republic of Serbia. The paper shows the period of the movement of the number of cattle, as one of the potentials for the production of beef, and the heifers that provide new heads for fattening. In the observed time period from 2012 to 2022, it is in permanent decline. According to the obtained data of the calculated value of base and chain indices for the observed time period of ten years, there is no hint of stabilization of breeding and increase in the number of cattle for slaughter. The average number of cattle in the Republic of Serbia was 898 thousand head with a tendency to decrease from 2.5% to 3.0%. At the end of 2022, the estimate of slaughter outside slaughterhouses in December was reduced to 16 thousand heads, however, the number of slaughtered heads increased from May and reached its maximum in October with 20.61 thousand heads and in November when there were 26.45 thousand heads. From this data, it can be seen that the total number of heads has been decreasing since December, which means that there has been stagnation in the number of slaughtered heads.

Key words: beef, number of cattle, beef production, supply analysis

INTRODUCTION

Livestock farming represents one of the most important branches of agricultural production and is of great importance for breeders, producers and consumers. According to Stevanović et al. [18] the driving force behind the development of agriculture is precisely animal husbandry. The increase in livestock production is the basis for improving nutrition with high-value animal products necessary for the population. Meat is an irreplaceable component in a proper and well-balanced human diet [4]. Beef meat is particularly important due to its exceptional nutritional value, high biological value and content of minerals and vitamins necessary and important for human nutrition (B complex vitamins, minerals magnesium, zinc, potassium and phosphorus, but also proteins and fats), [5]. Also, meat is an important export product, which is why highly developed countries pay special attention to

the development of livestock production with various incentive measures of agrarian policy, placing livestock in a dominant place in the structure of total agricultural production [2]. The Republic of Serbia has favorable agroecological conditions for cattle production and high and stable meat production [7]. Despite this fact, in the Serbian livestock industry, a way to increase and stabilize production is constantly being sought [12], because in the last 10 years of the 20th century, the livestock industry in Serbia almost halved due to the decrease in the number of animals and the total production of all types of meat. According to Sredojević et al., [16], the number of cattle in Serbia has decreased to the level of the beginning of the 20th century. Meat production is conditioned by genetic factors and the action of a complex of exogenous factors, primarily of an ecological and economic nature. Meat plays an important role in nutrition, as it provides energy and

protein value. The long-term improvement of meat production implies the timely adoption of appropriate macroeconomic measures in order to increase production and stabilize the domestic market and increase exports. The awareness of producers in the livestock industry must rely on market demand and gradually introduce breeds that give a larger amount of meat into their herds. The following racial composition is represented in Serbia: 60% of the Simmental breed and the combined type, 35% of mixed breeds (Hereford, Limousin, Charolais) and 5% of the Holstein-Friesian breed.

Beef production is based mostly on domestic colored beef in the Simmental type (56.6%) and Simmental (25.3%), and to a lesser extent on cattle of the Holstein-Friesian breed (6.5%) and other breeds and crossbreeds (17.8%). A positive fact is that a large population of the Simmental breed of cattle has been preserved, which ranks well in terms of production characteristics, so it is to be expected that in the future beef producers in the Republic of Serbia could once again find a significant place and position in the European and other traditional markets previously had [2].

MATERIALS AND METHODS

In the article for the review and calculation of the structure, tendency and realized values of the effects of the work, the existing statistical material in our country was used, namely: data from the Statistics Office the Republic of Serbia for the observed period, the library of the Institute for Agricultural Economics, its own scientific research activity and other scientific material. Given the character of the topic, content and structure, the formation of the database and the processing of individual indicators were carried out using appropriate computer programs.

The cause-and-effect interdependence of phenomena will be determined by relational-regression analysis.

The balance method, structural changes in production will be used to determine the surplus and deficit of certain agricultural and food commodities, specifically veal and june meat, which is the subject of the paper. The

obtained results will be tabulated and analyzed in time periods.

RESULTS AND DISCUSSIONS

According to Table 1, the largest number of cattle is represented in the region of South Serbia with an average of about 600 thousand cattle, which is 66% of the total cross-section of Serbia, and in the observed period it shows a tendency to decrease. The north of Serbia has a smaller number of cattle, 246 thousand, but in the observed period it recorded a slight increase at a rate of 0.69% per year, which is a consequence of the emergence of more organized farming units than in other areas of the Republic of Serbia and attempts to harmonize the potential of cattle production and installed processing capacities.

Data about the total number of cattle in the Republic of Serbia, for the period from 2012 to 2022 [17] are given in Table 1. Also, the calculated values of base and chain indices are given.

Table 1. Movement of the number of cattle in the Republic of Serbia and calculation of the base and chain index (thousands).

Year	Republic of Serbia - total			North Serbia			South Serbia		
	Cattle	Base index	Chain index	Cattle	Base index	Chain index	Cattle	Base index	Chain index
2012	921	–	–	307	–	–	614	–	–
2013	913	99.1	99.1	306	99.7	99.7	607	98.8	98.8
2014	920	99.9	99.9	323	105.2	105.5	597	97.2	98.3
2015	916	99.5	99.6	306	99.6	94.7	610	99.3	102.2
2016	893	97.0	97.5	299	97.4	97.7	594	96.7	97.4
2017	899	97.6	100.6	307	100.0	102.6	591	96.2	99.5
2018	878	97.6	97.6	305	99.4	99.5	573	97.0	96.9
2019	898	97.5	102.3	310	100.9	101.6	588	95.7	102.6
2020	886	96.2	98.6	306	99.7	98.7	580	94.5	98.6
2021	860	93.4	97.0	303	98.7	99.0	556	90.5	95.8
Avg.	898	2,5	–	246	–	–	591	96.2	–

Source: RZS Statistical yearbooks from 2012 to 2021, Belgrade and author's calculation.

The calculated coefficients show cyclicity in the number of cattle as well as a decreasing trend of cattle for the observed period, and there is no hint of stabilization of breeding and an increase in the number of cattle for slaughter.

The movement of the number of heads of cattle is subject to cyclical movements, which are also called "cattle cycles". These cycles in

the world last five to six years on average. Almost no country is immune to this phenomenon. They are felt by producers and consumers over a longer period of time. In countries with a significant production of beef, such phenomena bring great difficulties to the entire cattle industry. This is especially true for those countries that export this type of meat. Since cattle production is also important for other branches of production, especially the meat processing industry, the leather industry, etc. such depressions lead to great difficulties in that activity.

Cattle breeding in the Republic of Serbia is organized through two types of production: agricultural enterprises and family households. Thus, it is possible to perform an analysis of the total number of cattle in the observed period that are located in agricultural enterprises and family households.

The production of beef in the Republic of Serbia is shown in Table 2, where a decline in production can be seen in the observed period. The biggest drop was recorded in 2013 compared to the base year 2012, by as much as 14.6%. However, there is a slight increase or stagnation of production in the other observed years as well [3].

Table 2. Production of beef in the Republic of Serbia and calculation of the base and chain index, in thousands of tons

Republic of Serbia				
Year	Beef	Base indices	Chain indexes	Meat consumption/ inhabitant
2012	82	Base year	–	11.4
2013	70	85.4	85.4	9.7
2014	73	89.0	104.3	10.2
2015	77	93.9	105.5	10.7
2016	77	93.9	100.0	10.7
2017	71	92.7	92.2	9.9
2018	76	86.6	107.0	10.6
2019	71	92.7	93.4	9.9
2020	75	91.5	105.6	10.5
2021	75	91.5	100.0	10.5
Average	75	90,8	99,3	10,4

Source: Author's calculation based on statistical data from statistical yearbooks for the analyzed period, RZS, Belgrade.

Both in the number of cattle and in the production of beef, there is cyclicity and there is no hint of stabilization or increase of beef in the Republic of Serbia. Such cycles negatively affect the quality of cattle breeding. Small farms are the most vulnerable, which in the period of contraction completely abandon production, and in the

period of expansion, they include cows of untested quality in breeding. In order to achieve production growth, it is necessary to build a set of anti-cyclical measures and instruments, in order to mitigate the cycles that are inherent in livestock production. Primarily, we are referring to regulatory - intervention measures on the market, which would be calculated to eliminate market disturbances. The primary prerequisite is reserves, both of animal products and animal feed.

Number of cattle for slaughter in family households

Family households are by far the largest breeders of cattle for slaughter, but unfortunately this sector recorded a decline in the observed period at an annual rate of 1.30%, which especially applies to central Serbia. One of the reasons for this decrease in the number of cattle is that agricultural companies adapt to unfavorable economic conditions by reducing livestock, while family households in these conditions produce more naturally, for their own needs, by extending production cycles, which adversely affects the quality achieved. meat. The largest number of cattle is located in the territory of South Serbia (Central Serbia) with 68.0%, while 32.0% is located in the territory of Northern Serbia (Vojvodina).

According to the 2012 Census of Agriculture [15], there are a total of 908,000 head of cattle in 177,252 agricultural holdings. About 50% of farms have 1-2 head of cattle, 40.0% of farms have 3-9 head of cattle, the share of all other farms is 10% with 10 or more head of cattle. Small share in the total number of farms are those farms that have a little more than 30 heads and participate with 1.6% [14]. Nastić [11] states in his dissertation that in the region of Serbia-North there is a greater number of farms engaged in cattle production compared to the Republic of Serbia, namely 42.2% of farms with 3-9 head, while the share of farms from 1-2 heads of only 32.1%. However, the share of farms with a larger number of heads (about 30 heads) compared to the level of the Republic of Serbia has a significantly higher share, which amounts to 6.0%. The analysis determined that the largest

number of farms engaged in cattle production is in the area of Serbia-South, which is 84.5% of the total number of farms in Serbia. Farms with 1-2 heads are the most numerous and amount to 53.2%, while farms with 3-9 heads amount to 39.6%, and compared to the Republic of Serbia and the region of Serbia-North, farms with more than 30 heads have a smaller share of everything 0.8%.

In the Region of Western Serbia and Šumadija, according to the number of head of cattle per 1 ha of used agricultural land, there are 0.41 head/ha, and the lowest number of head in the Region of Vojvodina is 0.15 head per hectare of land. With over two years of age, there are an average of 491,000 cattle, which make up 54.5% of the total number of cattle. Heads of cattle between one and two years of age have a tendency to decline, and precisely those heads represent the potential for beef production in the country [8]. The average number of heads in family households in central Serbia accounts for more than 4/5 of the total number of heads in the structure.

Advantages in family households are reflected in the following:

- In family households, investment per product unit (calves, steers, tons of live mass for slaughter or beef) are several times lower than in the social sector. It should be added that with individual producers, any existing building, regardless of what it was used for before, can be equipped for modern cattle production with very little investment;
- Smaller farms more easily solve the problems of location, infrastructure, removal and use of manure, pollution of the human environment and nature in general;
- The possibility of greater employment of people in the countryside, which would increase the income of the agricultural population, etc.

Since family households are responsible for the production of cattle for slaughter, it is necessary to pay special attention to their lending, so that it goes in the direction of improving the racial composition, then obtaining financial resources faster based on the delivery of cattle to the meat processing industry, the price of cattle for slaughter, etc.

The relationship between the price of feed and the price of cattle for slaughter is a very significant moment for the breeding of cattle for slaughter, because the price of cattle for slaughter - on the income side and the price of feed - on the side of expenditure, i.e. costs, have a dominant influence on the realization of the financial result of production [1]. Subsidies awarded by the Ministry of Agriculture, Forestry and Water Management per fattened head have a significant share in the formation of income (12.3%) [6].

In the developed countries of the world, and especially in the European Union, rural households (farmers) are given strong support for their survival and development, primarily for production and economic reasons, but also for demographic, social and political reasons [10].

Number of cattle for slaughter in agricultural enterprises

In all areas of the Republic of Serbia, the number of cattle in agricultural enterprises has a decreasing trend. It is characteristic for these producers that they have a trend of decreasing the number of head in breeding at a rate of over 4.0%, which has a direct consequence of reducing production, that is, supply. Considering that all production from these companies is directed to the meat processing industry, this results in a reduced number of slaughtered heads and a lower percentage of capacity utilization, which is reflected in higher costs per unit of production.

It is noticeable that in the same economic conditions, family households have a smaller decline than agricultural enterprises, which indicates the reason that family households are small market producers who primarily produce for their own needs and individual sales, which is why they are less affected by changes in the market, while agricultural enterprises are more difficult to bear crisis strikes.

According to Table 3, we can see that the lowest number of slaughtered cattle was in 2012 (143 thousand head), while every subsequent year there is an increase in the number of slaughtered cattle.

Table 3. Cattle slaughtered in slaughterhouses for the period from 2012 to 2022.

Year	Number, thousand throats	Base index	Chain index
2012	143	Base year	–
2013	147	2.8	2.8
2014	151	5.6	+ 2.7
2015	162	13.3	+ 7.3
2016	170	18.9	+ 4.9
2017	178	24.5	+ 4.7
2018	173	21.0	-2.7
2019	173	21.0	-
2020	172	20.3	-0.6
2021	181	26.6	+5.3
2022	164	14.7	-9.9

Source: Search of the deseminatation database, Republic office of statistic of the Republic of Serbia.

Compared to 2012 (the base year), an increase in the number of slaughtered heads can be observed, so that the largest increase in 2017 was by 24.5% and in 2021 by 26.6%, when there was also the largest increase in the number of slaughtered heads. If we look at the percentage of increase in 2021, compared to 2020, more cattle were slaughtered by 5.3%. According to the chain calculation, it can also be observed that every year there is an increase of 3.0% to 5.0%, while the largest was in 2015 of 7.3% compared to the previous year 2014. However, in 2022, compared to 2021, we have about 10% (9.9%) fewer slaughtered cattle, which means that the stock of cattle and thus the cattle offered for slaughter has decreased. In our country, the supply of fattened beef is decreasing, because many farmers gave up this business due to low prices and expensive plant nutrients, so they did not see the possibility of making money, as well as covering production costs with a premium of 15,000 dinars per delivered beef to a slaughterhouse or exporter [13].

The production of cattle for slaughter is an essential condition for obtaining stable meat production and depends on the influence of a whole series of factors such as the production of coarse and concentrated feed. The price parity between beef and milk is also extremely important, because it depends on whether cattle producers will focus more on the meat or milk production line. Cattle breeding and meat production are influenced by the production of breeding material, as well as the average weight of the head at slaughter and the slaughter structure [19]. The

basis of production is the demand on the domestic market, i.e. supply, the degree of connection of all participants in the repro-chain of production from producers of animal feed, reproductive material, through cattle breeders, meat processing industry and the like.

Meat production in 2021 was an average of 75 tons, while Serbia used to be a traditional exporter of beef, i.e. baby beef, meat products and fattening beef in many even the most developed countries. Today, there are several slaughterhouses with an EU certificate, and the approved quota of 8,000 tons for the export of meat and beef cannot be realized. Therefore, cattle production is expected to provide quality products for export, especially beef of defined origin and quality [9].

In order for production to be as good as possible, better state support is needed in incentive measures such as: rebates, premiums, loans and beneficial interest, then in systemic measures that include prices, foreign exchange policy and the reserve mechanism, support in protective measures is also important. measures that include tax policy, customs measures and levies, as well as development measures that include scientific and research work and professional and advisory services. The implementation of all measures will significantly contribute to the overall development of beef production. Therefore, in the following period of development of cattle breeding, the basic subject should be peasant farms united in cooperatives and individual companies intensively engaged in the production of beef.

CONCLUSIONS

The paper provides an analysis of the total number of cattle and production of beef (beef and veal) for the period from 2012 to 2022 in the Republic of Serbia. According to the data issued by RO of statistic of the Republic of Serbia, the current situation in cattle breeding is considered very unfavorable.

The results and analysis according to the base and chain indexes, for the observed period, showed that there is a certain cyclicity in the number of cattle and beef production and that

there is no hint of stabilization and increase in beef production in the Republic of Serbia.

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Based on the analysis of the current state of the number of cattle for beef production, the obtained results should draw attention to the elements that are important for increasing domestic production, perspectives and possible destinations for export.

It is necessary to stop the negative trend in livestock production with appropriate measures, first of all, macroeconomic policies, in order to fully satisfy the domestic market and create the necessary market surpluses for export. In order to revive animal husbandry, it is necessary to provide financial resources for the stimulation of this production, which will serve as a function of the overall agricultural development.

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