

Structural changes in livestock production: the case northeastern Montenegro

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ABSTRACT

The production structure of agriculture northeastern Montenegro livestock production has a very important role, because without a stable and developed livestock production has neither developed agriculture. Therefore, in this paper, shows the change in the number of livestock by type and category. Fluctuations in the number of cattle in the period 1964-2005, primarily the result of economic factors, such as reduced local and regional markets, low purchasing power, transition, privatization, lack of long-term development strategy for livestock, technological and technical unwillingness processing facilities, primary production disorganization, poor farmers and processors association, insufficient and slow recovery racial composition of cattle. Applying the method of alternating splitter Systems 6/6 in 1964, we have found in northeastern Montenegro, type with a dominant share of sheep and cattle (O₅G₁), who in 2005 was gradually transformed into a type with equal participation of sheep and cattle (O₃G₃). Judging by the number and categories of livestock by type, production volume, as well as other indicators, livestock production in the region, mainly serves to meet the needs of the household. A smaller part of are intended market. To mention the problems were solved in an appropriate manner, it is necessary to adopt appropriate strategies in livestock development with the proposed measures, that has to be long term, because only in this way can stop the decline in the number of cattle to provide the increase livestock production and improve the quality of livestock products.

Keywords: Northeastern Montenegro; livestock breeding; production; incentives

1. INTRODUCTION

Northeastern Montenegro is a geographical unit which comprises 10.8 % of the total area of Montenegro (13.812 km²), that is, living in the territory, 8.12 % of the population compared to the total population of Montenegro in 2003 (673.094). Territory includes three municipalities: Plav, Andrijevica and Berane, with an area of 1.486 km², which is by the census of 2003 year, 54.658 people lived or 36.8 in/km² (Rajović and Bulatović, 2013a).

Types of agricultural land and its qualitative characteristics are favorable for the development of agriculture northeastern Montenegro. However, survey analysis that follows shows that livestock production is not in conformity with all available natural and social

conditions. Discrepancy between available resources and modern livestock production is determined by the global economic policy, tradition, demographics, economic structure and market (Rajović, 2007a). Specifically, the northeastern territory of Montenegro, insufficient attention was paid to the problems of agricultural development, especially the choice of the optimal structure of production. Also, the present method of management (small plots, tillage outdated, uncoordinated structure of production), is a function of agricultural development (Rajović, 2009a). Greater appreciation of agriculture as a primary activity, which can be exploited comparative advantages of the region.



Figure 1. the geographical position of the municipality Berane, Andrijevica and Plav (Northeastern Montenegro) on the map of Montenegro. (Source: Regional Business Centre Berane (2004a,b), Rajović and Bulatović (2013b).

The cycle of economic activities can best be initiated and run if the first approach to investing is the development of agriculture as a sector because it has the most massive economic resources. These resources need to intelligently and rationally (Rajović, 2012 a). Livestock production, as an integral and one of the most important parts of agricultural production and the area with the fastest turnover of capital in agriculture, directly depend on all the parameters that influence the market, either at the macro or micro level (Smiljanić et al, 2006) [30].

Animal Husbandry influences on the development of crop production, because about three-quarters of the production is spent on animal nutrition, noting that much of the biomass and the man would not be able to use it in another way. From livestock as a by-product of crop production returns manure, very important tool for maintaining are structure of the productive capacity of land. The manufacturing process is considered to be the toughest

livestock in agriculture, because it takes constant throughout the year, regardless of season and weather conditions (Nikolić et al, 2006). The results of this survey were used to work the authors consider structural changes and livestock production due to the application of alternate methods splitter in the system 6/6, allocate livestock use directions. This article refers only to the portion of the truth of important issues related to livestock production northeastern Montenegro, while other studies, such as those that indicate the typological characteristics of agriculture: current owner and socio-organizational-technical, of great importance from the point of view of scientific knowledge for the proper routing of all social actions and measures of agricultural policy. Of course, they are not the subject of this paper.

2. RESEARCH METHODOLOGY

This paper has the following objectives. First of all, to determine are structural changes in livestock production in the period 1964-2005. The next goal is to show the development of incentives. Finally, the research goal, we separate directions livestock use. The research methodology is primarily based on an analysis of existing agro-geographic literature and statistical data provided by the Statistical Office of Montenegro. The literature include: agricultural monographs, proceedings, books and statistics. Were studied and written sources on the internet. In the context of agro-geographic study of agriculture, we apply the method to a system of alternating dividers 6/6, developed at the Institute of Geography of the Polish Academy of Sciences (Kostrovicki, 1969 and Kostrovicki, 1970). This method determines the orientation of the agricultural territory studied (Jaćimović, 1976). The literature review and the terms under the agricultural structure and procedure for applying the method, "kolejnih ilorazow" (alternate splitter), and provides Tyżkiewicz (1978). The scientific explanation of the concepts in this study, we applied two methods are used: analytic and synthetic. Analytical methods are considered some of the dimensions of the research topic, and a synthetic whole, the interconnections between the case and suggested measures that derive there from (Rajović and Branković, 2015 c).

3. ANALYSIS AND DISCUSSION

Animal husbandry is the second agricultural activity which is closely adjacent to crop production. Therefore, are development of agricultural activity, determined by the quality and production of biomass from natural grasslands, on the one hand and the production of fodder from arable land on the other side? Moreover, the nature and extent of livestock production is greatly influenced by the social conditions and trends (quality of labor, farm size, market) (Rajović, 2011a).

Animal Husbandry northeastern Montenegro has long rested on the use of natural grassland (cattle, sheep) and forest area (pig). For grazing cattle and sheep were used mountain pastures, mountain meadows and pastures and meadows of the valley. Mountain meadows and pastures and meadows of the valley are typically used as a grazing area after cutting the first cut (June - July). During the winter period for livestock feed in addition to hay, hazelnuts and acorns, on a smaller scale was used and fodder from arable land (oats, barley, rye, corn) (Rajović, 2012b).

Statistics on the movement of livestock and agricultural production is difficult to obtain because of a lack of proper statistical material. In other words, this means that the statistics do

not pay enough attention to the condition of livestock and livestock production, and without such materials is impossible to give an overall view of agricultural production. Therefore, in view of the livestock we use data from the dairies and slaughterhouses in Berane and data through surveys milk and meat (Rajović, 2007b) in the region, which will be processed according to the data of the Statistical Office of Montenegro (1965 and 2006).

Before proceeding to view the present state of livestock in northeastern Montenegro, it is important to point out that farming is a significant potential for the development of agriculture and economic development of the region, but is underdeveloped compared to the natural resources and the demands of intensive agricultural production (Rajović, 2009 b; Rajović, 2011b).

Quantity movement of livestock in certain livestock sectors was different. An analysis of the number of livestock in each category in northeastern Montenegro in the period 1964 - 2005 year indicates a reduction in cattle (3.915 animals), sheep (26.500), pigs (972) and horses (3.020). Thus, in the period 1994 - 2005 the number of cattle in the region, fluctuated with the tendency to reduce the number of cattle, sheep, pigs, horses. "Oscillation of cattle during this period, as a result of economic factors that have influenced the development of certain cattle industries, such as extensive character, throat, low productivity, residual method of forest ..." (Jaćimović, 1978). Number of cattle by the National Statistical Office of Montenegro (2006), was reduced in the period 1964 - 2005 for 3.915 animals. The number of sheep in that period is drastically varied, depending on the number of cattle due to market disruption, or falling prices of mutton. Specifically, during 1964 - 2005, there was a reduction in the number of sheep for 26.500 pieces. The total number of pigs was also reduced by 972 pieces. Given that official statistics do not provide data on the number of poultry in 1964, will use the data of the Statistical Office of Montenegro from 1995 for the number of poultry in 1994. In the period of 1994-2005, the number of birds in the region has been reduced by 33.493 units. This reduction in poultry can only be explained, increased consumption of poultry meat. This is understandable, given at a much higher price: pork, beef and mutton. Thus poultry, gaining a greater role in are local economy.

Qualitative changes in production of livestock resulted in the change of direction livestock. Applying the method of alternating splitter in the system 6/6, we found in northeastern Montenegro in 1964, following the direction of livestock use: **O₅G₁Type the dominant share of sheep and cattle share** (The variables and their symbols used in the formula: G-Cattle, S- Pig, O-Sheep). So, the guy with the dominant share of sheep and cattle share in 1964 year, gradually transformed into a type of equal participation of sheep and cattle in 2005.

Quantitative changes in livestock northeastern Montenegro are reflected in changing the racial composition of livestock and crop husbandry. Specifically, the racial composition of livestock, is not widely applied by highly productive race, but races have dominated crossing of domestic and foreign species. In livestock farming are region, dominated by sheep and cattle. Only 91 ha of agricultural land (the total acreage of the region is 67.379 ha), 59.2 comes sheep, 27.6 cattle, 3.5 pigs, 3.2 horses, which is certainly not enough in relation to the potential opportunities in the region.

Sheep production is by the number of cattle heads most important activity in the region. Based on the development of the livestock sector, make natural grasslands and pastures (Rajović 2004). Is the development of sheep and determined the need for wool in their homes.

Reducing is total number of sheep. In the period 1964 - 2005 the number of sheep has decreased from 68.534 to 39.877 animals. This can be explained by the lack of labor, poor economic conditions, extensive ways herding, alienation lambs for slaughter with a small

measure of living up to 15 kg which reflects negatively on the profitability of production, low purchase price of lambs, sheep, wool and hides (Tomić 1984). The period reduced the number of sheep on one hectare of agricultural land. Number of sheep per unit of agricultural land (the total acreage of the region in 1964, was 70.478 ha), decreased from 0.94 head/ha in 1964 to 0.59 head/ha in 2005. The racial composition of livestock is very unfavorable. The racial composition of the two types of sheep predominates: mining and mountain sheep. Sheep breeding is usually related to their own needs, so that the market surplus estimates. Most of the surpluses of the livestock sector, traditionally, are sold in markets or sold to customers.

According to survey estimates in 2005, the region has produced about 324 tons of sheep meat. ILO also estimates indicate that in 2005, the sheep milk production was about 2.042.638 l, with an average milk production of 50 liters per dairy sheep during the year. Most of the sheep milk is processed into households, separately or together with cow's milk, the cheeses of varying quality. Wool production in 2005 was about 36 tons. Average yield of wool per sheep are very low at around 1.2 kg. Most of the wool produced is used in their homes; much less part is placed on the market.

Table 1. Number of livestock in the region in 1964 and 2005.

	1964	2005
Livestock type and number		
Cattle	22.543	18.628
Sheep	66.577	39.877
Pigs	2.51	2.367
Horses	5.162	2.142
Poultry	-	58.770
Beehives	-	3.050

Source: Statistical Office of Montenegro (1966 and 2006), Agricultural Census 1964 and 2005, and author's own data calculations by the author.

Cattle is the number of animals per livestock other developments in the region. Total number of cattle decreased by 3.915 cattle and 22.543 in 1964 with to 18.628 animals in 2005 (Table 1). Cattle are bred for getting the most milk, dairy products and meat, as well as to obtain organic fertilizers.

The racial composition dominated: Bush's domestic cattle and crosses of domestic drilling and spotted cattle. Number of head of cattle on one hectare of agricultural land declined from 0.32 in 1964 to 0.28 in 2005. "The spatial distribution of cattle showed a correlation with those surfaces that are constantly a greater share of green crops in the agricultural structure, i.e., with meadows and pastures, and also with the areas where a lot of fodder crops grown" (Jaćimović, 1978). Milk production in 2005 was about 1.722.580 l with an average milk production of 130 l per dairy cow. Low milk yield of cows is a consequence of racial composition and inadequate nutrition. According to survey estimates for 2005 in the region has produced about 620 tons of beef.

Poultry rising is an important livestock activity. The total number of head of poultry in the region in 2005 amounted to 58.770 heads. From the largest poultry: homemade chicken, homemade matzo and Styria, partridge Italian, Leghorn, "radajland".... Other poultry (PACT, geese, turkeys ...), is symbolically represented. According to survey estimates for 2005, egg production was around 100 eggs per hen coccid.

Other types of livestock are not in harmony with the natural capabilities of the region. Number of pigs in the period 1964 the year 2005 was reduced to 972 animals or the throat in 4.551 in 1964 to 2.367 animals in 2005 (Table 1). The racial composition of the pig prevails: Domestic white meaty pig, Yorkshire, Landrace, Dutch and Swedish. Growing pigs usually related to their own needs, with little production for the market.

Horse breeding cattle industries are which is significantly lost in economic importance. With the advent of mechanization importance of horses in agricultural production in the region, the region with a smaller inclination is marginalized. Something greater importance in agriculture, horses were kept in the hill - mountain rim region, where the use of machinery is limited due to the considerable slope. Number of head of horses in the period 1964 - 2005 was reduced to 3.020 animals, respectively, with 5.162 cows and 142 (Table 2). The racial composition of the most dominant horse horses mountainous race because they are best adapted to the hilly - mountainous areas and poorer conditions for feeding.

Beekeeping is an activity that livestock natural features of the region, is not nearly used. The total number of beehives in the region in 2005 amounted to 3.050 pieces. According to survey estimates for 2005, produced about 6.1 tons of honey. Total production and production per hive torn and is caused by the climate and quality of pastures.

Research results lead us to conclude that the state of livestock in northeastern Montenegro, may be assessed as unfavorable, because the number of animals constantly decreasing. Along with the decline in the number of cattle, there was a decline in the production itself. Problems in agriculture that the region is facing years, not well resolved and therefore animal production for decade decline.

To mention the problems well solved in an appropriate manner, it is necessary to adopt an appropriate strategy with the proposed measures, which must be long term since only in this way can you ensure progress in livestock production. Proposed strategy and accompanying measures necessary to stop the decline in the number of first animals provide increased livestock production and improve the quality of livestock products. This is especially important for the export of which depends largely on livestock development in the region in the future (Rajović and Bulatović, 2013 c).

4. CONCLUSION

Our research records, based on similar research and Kljajić, Arsić and Savić (2011), emphasized in the foreground, several important conclusions:

1. Stop drop and reduce the number of head of cattle. The region has a very favorable climate for intensive livestock production. Large areas of pasture are very big potential. Land holdings are fragmented, so in this situation, the land under utilized. Small farms in the region have a limited capacity of livestock production, due to the limited production of livestock fodder. Except valley Berane, Andrijevisa, Polimlja and Plav-Gusinje, other landscapes of the region, especially the highlands, have very poor infrastructure, no control of water quality (which is used in livestock production), and is the technology

obsolete (Rajović and Bulatović, 2013 d). Ways to overcome and solve these problems, there is, first of all, the agglomeration and education company. It is necessary, therefore, to stimulate rural development in order to reduce the differences between city and country, through financial assistance for union households, provision of technical documentation farms which began to livestock production.

2. Considering that food is one of the most important factors contemporary par genetic livestock productions, it is necessary to provide the required amount of feed, forage and concentrates. In this way it provides not only a higher animal production, but thus better quality of livestock products. Animal husbandry in the region does not have the necessary genetic basis, and will need the appropriate genetic-selectable measures improve to allow for greater production potential. In terms of the development of genetic resources priority should be given to strengthening the selection and advisory services. The main problem in livestock production in the region is the lack of skilled labor, and that the problem is even bigger, unfavorable age structure and the producer. In recent times in the region in addition to the standard methods of selection in animal husbandry, and methods used in molecular genetics, which is based primarily on the identification of genes, that are appropriate for specific production traits, then, is quick improving the production potential of certain breeds of livestock.
3. The introduction of new technologies in animal husbandry in the region, they would increase the efficiency and competitiveness in the market. Primary production is largely dependent on local resources. On the other hand record producer dependence on imports, especially when it comes to procuring the necessary equipment. One possible solution would be to strengthen domestic production and cooperation with those manufacturers of equipment and machinery, which are necessary for the production of livestock and fodder production. Thus, on the one hand, the improvement of livestock production and ensure greater export of livestock products, on the other hand, with the support of the state, through incentives, meet the standards of the modern market by the producers themselves.
4. It is essential to the region, favoring private farming, but market-oriented. In other words, market-oriented production need to connect to the association, the rational use of available resources in livestock. Interesting association of producers and processors is one of the weak points in the system of livestock production in the region. One gets the impression that the manufacturers themselves do not know enough about your market on the one hand, and on the other in the region and that there are no functional interest groups, to deal with the linking producers to markets (vertical connection) and interconnection in order to rationalize production and better market access. And, due to, procurement of necessary materials, and because sales of livestock products. In order to achieve these objectives, it is necessary to improve the laws on cooperatives and citizens' associations.

in, "the role of agriculture and rural areas must be first-rate, as are its potential, the main forces of the future development of the region. This requires radically new relationships between society and science to agriculture and the countryside (Rajović and Bulatović, 2013 e). Instead of the former quartermaster approach in which they viewed as a preventive cheap food manufacturers, must develop new concepts, comprehensive rural development, which will be based on the demographic, natural, economic and socio-cultural resources"(www.proučavanjesela.rs). Responsible role in developing the concept of rural development in the region, which will be based on the natural and socio-economic potential of the village, be sure that there are geographical science, agricultural geography, that their holistic approach to integrate research efforts and results of other scientific disciplines.

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