

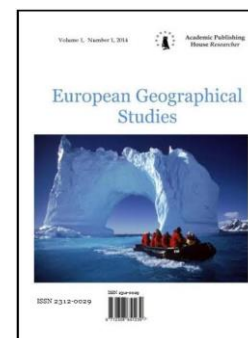
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Structural Changes in Livestock Production in Montenegro (2004–2012): A Review

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Abstract

This paper analyzes the structural changes of livestock production in Montenegro in the period 2003 - 2012 years. To get adequate picture the structure of agricultural land and structural changes in livestock Montenegro in 2004 and 2012 year we applied the method of alternating splitter in the system found the following and 6/6 trends. The structure of use agricultural land prevailing $O_1L_2P_3$ uniformly pasturing trends using agricultural land with a greater share of meadows and participation arable land in 2003 which remained without changes in 2012. While in the structure of changes in livestock recommend 2004 direction with equal participation of breeding bovine animals and sheep farming $o_3 G_3$ which is in the year 2012 in the transformed in $o_3 G_2 K_1$ direction with equal participation of sheep farming with higher participation herding bovine animals and participation of goat breeding. Montenegro towards membership in the EU will have to comply with the requirements and standards of the EU, which will significantly change the situation in the Montenegrin livestock, which will include the restructuring and diversification of existing livestock production with a view to harmonizing it with the EU standards, increasing quality and productivity, competitiveness development and training for the occurrence outside (global) market.

Keywords: Montenegro, livestock production, structural changes, development.

1. Introduction

In Montenegro, under the influence of industrialization and urbanization proceeded rapidly process deagrarianization and de rural shrinking share of the agricultural population in the total population and the population that still lives in the countryside. The process went very quickly, much faster than in the more developed parts of the world. Agricultural population in the total population, for a few decades, declined several times - from about 75% immediately after the Second World War, to around 6%, according to the latest estimates in most of the municipalities today. In a short period of time (even abnormally short for this type of social processes) a huge number of people have changed occupation and place of residence. On the Montenegrin village are

however, remained to live much more people compared to those who are engaged in agriculture (Šarović, 2012).

According to the National Statistical Office of Montenegro (2010), are the Montenegrin households living 98.949 people, which also represent workforce households. The age structure of agricultural holdings is characterized by a high proportion of older working-age population in the farm and a small number of younger members. Of are the total number of working-age residents of these 23.204 persons older than 65 years. Process aging village is deeply affecting all spheres of Montenegrin rural communities, as nearly 44% of the total number of persons employed in the household over 55 years of age. At least those which would be progressive farm that most, only 7% of the workforce in the Montenegrin households younger than 24 years,

According to Šarović (2013), most family agricultural holdings in Montenegro have between one and four. Of the total number of households (48 847) is by far the most of those holdings are counted from 1 to 2 members, even 37.518 or 76.8%; 3 to 4 members is 9.686 (19.84%) households; 5 to 7 members, numbering 1.424 (2.93%) households and is by far the least of those farms with more than 7 members who were once the backbone of the rural areas, they have only 196 or 0.43%. Taking into account the age structure and size of the family on the farm, we can argue that the Montenegrin village most other elderly couples or single people, and they now form the basis on which to build a safe and Montenegrin disappearance of family farms and the village as a whole,

The reasons for the poor state of livestock production are numerous, such as the low purchasing power of the population, the lack of long-term strategy for the development of livestock production, insufficient organization of primary production as well as the weak link between producers and processors, the process of transition and privatization is present in our country, outdated racial composition of livestock, lack of readiness both technically and technologically most manufacturing capacity for export ... (Rajović and Bulatović, 2013; Rajović and Bulatović, 2015; Rajović and Bulatović, 2015).

Montenegro towards membership in the EU will have to comply with the requirements and standards of the EU, which will significantly change the situation in the Montenegrin livestock, which will include the restructuring and diversification of existing livestock production with a view to harmonizing it with the EU standards, increasing quality and productivity, competitiveness development and training for the occurrence outside (global) market.

2. Research Methodology

Two basic group's data sources were we in the study. The first group includes sources statistical data on livestock, available to of the Statistical Office of Montenegro. The second group of data is results of previous studies (Rajović and Bulatović, 2015; Rajović and Bulatović, 2013). The focus of the research is related to the structural changes in livestock production in the time period 2004-2012. Although livestock Montenegro has potentially great development opportunities, current development is characterize by a continuous and extreme decrease. In this paper is been used: a comparative, descriptive method, the method of theoretical analysis, a statistical method (Rajović and Bulatović, 2014; Rajović and Bulatović, 2015; Rajović and Bulatović, 2014; Rajović and Bulatović, 2015). To get adequate picture the structure of agricultural land and structural changes in livestock Montenegro in 2004 and 2012 year we applied the method of alternating splitter in the system found the following and 6/6 trends Kostrovicki (1969), Kostrovicki (1970), Jaćimović (1976), Tyszkiewicz (1978). The method of alternating divisor in system 6/6 has found they are application and in the texts (see Rajović and Bulatović (2013), Rajović and Bulatović (2013), Rajović and Bulatović (2013), Rajović (2010) authors of this paper.

Used were and data from the Internet.

3. Analysis and discussion

Before we approach view of livestock production in Montenegro, it is important to point out the structure of use of agricultural land. In the period 2004 - 2012 in the structure of agricultural land in Montenegro there was a change in the method of exploitation in order to decrease the area of meadows.

Table 1: Agricultural land by categories of use

	Agricultural area	Arable area					Pastures	Ponds, fish ponds and swamps
		Total	Fields and gardens	Orchards	Vineyards	Meadows		
2004	518.067	189.745	44.818	9.580	3.864	131.483	325.671	2.651
2012	515.717	189.075	45.809	12.028	4.512	126.726	323.998	2.644

Source: Statistical Office of Montenegro, Department of Agriculture statistics (2013).

Agricultural areas in Montenegro, was reduced from 518.067 ha in 2004 to 515.717 ha in 2012, or 2.350 ha. Area of meadows in the period was reduced from 131.483 ha to 126.726 ha, or 4.757 ha. In contrast increased are the area under arable land and gardens, orchards and vineyards. Area of arable land and gardens increased from 44.818 ha in 2004 to 45.809 ha in 2012, i.e. 991 ha, while the area under vineyards increased by 648 ha or 3.864 ha to 4.512 ha. In the same period, increased the area under orchards and with 9.580 ha to 12.028 ha, or 2.448 ha. Thus, the total arable land in Montenegro in the period 2004-2012 years was slightly reduced to 670 ha or 189.745 ha to 189.075 ha. Area under pastures in the period 2003-2012 years, recorded a decline from 325.671 ha to 323.998 ha or 1.673 ha. Also, the area under swamps, fish ponds and ponds were reduced to 5 ha or 2.651 ha to 2.644 ha. In order to compare the structure of the agricultural land in Montenegro in 2004 and 2012, we applied the method of alternating splitter 6/6 in the system and to determine the next trends*: **O₁ L₂P₃ balanced** pasture trends use agricultural land with a greater share of meadows and participation arable land in 2004 which remained without change in 2012. "Such a large percentage is share of meadows and pastures in the overall structure of agricultural land, are indicating the hilly and mountainous nature of Montenegro"(Rajović and Bulatović, 2014; Bulatović and Rajović, 2015).

Table 2: Number of livestock (000)

2004	
Bovine	175
Sheep	252
Pigs	12
Goats	25
Horses	8
Poultry	890
Beehives	42
2012	
Bovine	84
Sheep	207
Pigs	18
Goats	23
Horses	4
Poultry	732
Beehives	43

Source: Statistical Office of Montenegro, Census of Agriculture (2013).

* Variables and their symbols used in the formula: O-arable land, V - Orchards and vineyards, L- Meadows, P- Pastures.

To get a proper picture of the structural changes in livestock and here we are apply the method of alternating the divisor in the system 6/6 and found the following direction*: in 2004 direction with equal participation of breeding bovine animals and sheep farming $O_3 G_3$ which is in the year 2012 in the transformed in $O_3 G_2 K_1$ direction with equal participation of sheep farming with higher participation herding bovine animals and participation of goat breeding. In addition to the exceptional importance and favorable natural conditions of animal husbandry in Montenegro is in a big crisis. Number of livestock in the period 2004-2012 years declined in (bovine 175-84, sheep 252-207, goat's 25-23 horses 8- 4, mercury 890-732). The exception is the number of pigs who's the number increased from 12 to 18 thousand and the number of beehives from 42 to 43 thousand. "The reasons for bad state of livestock production are numerous, such as the low purchasing power of the population, the lack of long-term strategy for the development of livestock production, insufficient organization of primary production as well as the weak link between producers and processors, the process of transition and privatization, outdated racial composition of livestock, lack of readiness both technically and technologically most manufacturing capacity for export ... "(Popović et al, 2009).

Table 3: Milk production

	Milk				
	Total (000 liters)	Cow's milk (000 liters)	per cows (liters)	sheep milk (000 liters)	per sheep (Liters)
2004	182 .486	173. 346	2. 184	9 .140	40
2012	159. 240	145. 953	2. 474	9 .584	70

Source: Statistical Office of Montenegro, Census of Agriculture (2013).

The total milk production in Montenegro for the analyzed period was reduced from 182.486 (000) liters per 159.240(000) or 12.74%. Production cow's milk is characterized by decline and with 173. 346 (000) liters per 145.953 (000), or 15.80%, until are increased milk production per cows from 2.184 to 2.474 liters, or 290 liters. Our research evidence based on similar research Kljajić et al (2011), points out that the current placement of milk in the domestic market by keeping large because of favorable producer prices and low purchasing power of home buyers. But the emergence of foreign producers of milk can be a threat to domestic producers by price, quality and assortment. Therefore, it is necessary to improve domestic production through repressive measures - the introduction of a control system for producers of animal feed - a system of national laboratories. Placement of milk on the domestic market is pretty narrowed. Montenegro is competitive with indigenous dairy products, and in its neighborhood as the raw material, and with the produce. However, these problems can be resolved by favoring marketing domestic product (introduction of brands), regulating consumer protection and diversification of production. Great weakness is the gray market, which is very well organized. Ways of overcoming these problems are heightened traffic control and strengthening the implementation of veterinary care.

When it comes to the production of sheep milk in the time period 2004 - 2012 years, we recorded an increase from 9.140 (000) liters in 9.584 (000) or 4.86% per sheep milk 40 to 70 liters. In Montenegro, mainly "placement of milk and milk products from mainly done on farms and vegetable markets. Small dairies produce traditional white cheese and yellow cheese, but are very rare that these cheeses are made from pure sheep's milk, but it is mixed with cow's milk. It reflects poorly on the development of the market of dairy products from sheep's milk. In addition, products are rarely standard quality, insufficiently and inadequately labeled and poorly packaged. Branding, organic certification protection of geographical origin and the like in any other branch of animal husbandry cannot bring many benefits to producers and production development, as for sheep breeding "(Kljajić et al, 2011).

* Variables and their symbols used in the formula: G- breeding bovine, S- Pig farming, O- Sheep farming, K-Sheep goat, Ko- horses.

Table 4: Livestock slaughtered in enterprises and cooperatives and private farms

	Bovine animals	Pigs	Sheep
	Total		
2004	29.256	27.711	31.828
2012	26.649	39.470	25.625
Enterprises and cooperatives			
2004	20	153	193
2012	1.956	13.113	195
Private farms			
2004	29.236	27.558	31.635
2012	24.693	26.357	25.430

Source: Statistical Office of Montenegro, Census of Agriculture (2013).

The number of slaughtered cattle in the period of 2004-2012 was reduced from 29.256 to 26.649 throats (In enterprises and cooperatives in 2004 - 20.2012- 1956; on private farms 2004 - 29.236, 2012 - 24.693), of sheep with 31.828 to 25.625 heads (in enterprises and cooperatives 2004-193, 2012 - 195, on private farms 2004 - 31.635, 2012 - 25.430). Pork production is dominated by on family farms and has expressed a high degree of in-kind character. The total number of pigs slaughtered in the analyzed period increased from 27.711 to 39.470 throats (In enterprises and cooperatives 2004 - 153, 2012 - 13.113; on private farms 2004 - 27.558, 2012 - 26.357). According to Škorić (2006) of the annual production of poultry meat per inhabitant is around 12 kilograms (as it was at the beginning of the nineties) at about 6 to 8 pounds of what is moving now. The downfall of modern poultry production, intensive branches that twenty years ago, achieved the highest growth rate in agriculture - and one might say in the overall economy - starts closing (decay) large socially owned enterprises. The causes for this should be sought, inter alia, in the disturbed parity price, loss of markets, reduced purchasing power of population, battered by the system of funding, lack of resources in the agricultural budget... In order to overcome the existing problems as well as the necessity of stems the need for defining a comprehensive program of livestock development in Montenegro. "This program should be directed to: the organization of production on the principles of respecting the contemporary world standards in this area, improving the racial composition of all kinds of livestock, increasing the number of animals in breeding particularly on family farms. The program must include specific agricultural policy measures such as tax breaks..., incentive measures relating to export milk premiums and reimbursement for breeding animals, as well as providing funds from the Development Fund for projects in the area of improving livestock production" (Popović et al, 2009).

Table 5: Production of eggs, honey and wool

	Egg		Honey		Wool	
	Total(000)	per hen	Total(t)	per hive (kg)	Total(t)	per sheep (kg)
2004	59.187	134	532	14	345	1,5
2012	68.060	157	554	13	275	1,5

Source: Statistical Office of Montenegro, Census of Agriculture (2013).

Quick turnover, modest investment and small risks, the benefits are poultry production. Thus, the production of eggs in Montenegro in the time period 2004 - 2012 years increased from 59.187 to 68.060 or according to laying hen from 134 to 157 eggs. According to Škorić (2006) in developed countries, the total spending two-thirds of the eggs used in the industry of pasta and confectionery industry, in the production of mayonnaise and other forms of consumption, as well as intermediates, and the other part in consumer, here the egg is still used exclusively in the shell.

The organization of the poultry production on the family farm, and for it to be profitable, they must comply with the necessary conditions that make this production intensive and high technological level (production of 300 eggs per year per hen housed) it is necessary to adopt a "Dutch model". After the "Dutch model" production would be profitable but it is necessary that the owners must join in the cooperative stakeholders (clubs). A number of households, for example, in one municipality only deal rearing pullets to 17 weeks of age. They grow popcorn to secure a buyer for family farms engaged in the production of eggs. This group of producers, produced eggs supplied central sorting center for grading eggs (family farm), which also organizes the network and sells eggs. Profit share in proportion to the funds invested by all participants in the chain of production (Milišević, 2003). However, of all branches of agriculture in Montenegro beekeeping is at this point in the expansion as has never been more bee colonies (2012 - 42.680 hives). Beekeeping Alliance brings together 1.650 beekeepers in 25 associations. These beekeepers according to the National Statistical Office of Montenegro (2013) have a total of 42.680 beehives from which in 2012 had a total honey production of 532 tons, or 13 kg per hive. Thus, the production of honey in Montenegro was higher in comparison to the year 2004 to 22 tons, not counting other bee products, such as wax, propolis, pollen, royal jelly ... Montenegrin beekeepers and invest a lot of effort to produce between modern technology with preservatives organic origin with previously planned construction of the "House of Honey" which is supposed to possess the three essential components of the Montenegrin beekeeping. These are the processing plant wax, and then drive for food industry and drive for processing sugar and making cakes for consumption honey bee colonies. . The building area of about 600 square meters is located in a place Daljam, municipalities Danilovgrad and cost about half a million euro (www.pcelarstvo.me). Because of its superior properties such as thermal conductivity, elasticity, process ability, dyeing ... wool despite the huge success achieved in the production of artificial fibers, remains an indispensable raw material in the textile industry and domestic industries to produce various products. However, the total wool production in Montenegro decreased with 345 tons in 2004 to 275 tons in 2012. The average yield of wool per sheep remained unchanged at 1.5 kg. The racial composition dominated pramenka (80%) whose quality wool than 32 micrometers, so that Montenegro is forced to import so-called crossbred wool (26 - 30 micrometers). It is necessary to emphasize that domestic wool mainly low-quality in terms of suitability for the production of fabrics in the textile industry, primarily due to impurities. Only about 23% of domestic wool is higher quality and is used for industrial purposes. The quality of yarn produced in the domestic market does not meet the standards and requirements of manufacturers who deal with handmade. in order to facilitate the work of individual producers, it is necessary to carry out the collection of wool farmers' associations, cooperatives or other associations that should compile a list of vendors and learn about wool and both sides of the needs related to the quantity and quality and what farmers have to offer. Marketing is also a weak component of the agricultural business in Montenegro, and is therefore a strong need to support agro business in this segment.

4. Conclusion

Our research records foundation for similar research Tuan and Tingjun (2001), Stienfeld et al (2006), Seo and Mendelsohn (2007), MacDonald and McBride (2009), Herrero and Thornton (2013), Rajović and Bulatović (2013), Rajović and Bulatović (2014), Rajović and Bulatović (2015), Rajović and Bulatović (2014), Rajović and Bulatović (2015) and Rajović and Bulatović (2015) pointed out in the first, several important conclusions:

1. The structure of agricultural land in Montenegro in 2004 and 2012. The method of alternating divisor in the 6/6 system and determine the next direction: $O_1 L_2 P_3$ balanced pasture trends use agricultural land with a greater share of meadows and participation arable land in 2004 which remained without change in 2012. Such a large percentage share of meadows and pastures in the overall structure of agricultural land, indicating the hilly and mountainous nature of Montenegro.

2. To get a proper picture of the structural changes in livestock and here we are apply the method of alternating the divisor in the system 6.6 and found the following direction: in 2004 direction with equal participation of breeding bovine animals and sheep farming $O_3 G_3$ which is in

the year 2012 in the transformed in $O_3 G_2 K_1$ direction with equal participation of sheep farming with higher participation herding bovine animals and participation of goat breeding.

3. In addition to the great importance and favorable natural conditions of animal husbandry in Montenegro is in a big crisis. Number of livestock in the period 2004 - 2012 years declined in (bovine 175-84 (000), sheep 252-207 (000), goats 25-23 (000), horses 8 - 4 (000), poultry 890-732 (000)). The exception is the number of pigs whose number increased from 12 to 18 thousand and the number of beehives from 42 to 43 thousand.

4. The total milk production in Montenegro for the analyzed period was reduced from 182.486 (000) liters per 159. 240 (000) or 12.74%. Placement of milk and processed milk is mostly done on farms and vegetable markets. It reflects poorly on the development of the market of dairy products from milk. In addition, products are rarely standard quality, insufficient and inadequately labeled and poorly packaged.

5. The number of slaughtered cattle in the period of 2004-2012 was reduced from 29.256 to 26.649 throats, sheep from 31.828 to 25.625 head. On the other hand an increase to the number of slaughtered pigs from 27.711 to 39.470 head. Annual production of poultry meat per inhabitant is around 12 kilograms (as it was at the beginning of the nineties) at about 6 to 8 pounds as moving now. The causes for this should be sought, inter alia, in the disturbed parity price, loss of markets, reduced purchasing power of population, battered by the system of funding, lack of resources in the agricultural budget ...

6. Egg production in Montenegro in the period 2004 - 2012 years rose from 59. 187 to 68. 060 or hen child-bearing from 134 to 157 eggs. However, while in developed countries, the total spending two-thirds of the eggs used in the industry of pasta and confectionery industry, in the production of mayonnaise and other forms of consumption, as well as intermediates, and the other part in consumer, here the egg and continues to be used exclusively in shell. Also, it is apparent that poultry production in large part still occurs on farms that are often several decades, with worn-out equipment and fleet management, high maintenance costs, as a significant burden on the costs and prevents use of the genetic potential of high productivity and expensive paid imported livestock. As a separate issue to be considered at the existence of zoo hygienic and technological conditions on farms.

7. However, of all branches of agriculture in Montenegro beekeeping is at this point in the expansion as has never been more bee colonies (2012 - 42.680 hives). Beekeeping Alliance organization gathers 1.650 beekeepers in 25 associations. These beekeepers according to the National Statistical Office of Montenegro (2013) have a total of 42.680 beehives from which in 2012 had a total honey production of 532 tons, or 13 kg per hive. Thus, the production of honey in Montenegro was higher in comparison to the year 2004 to 22 tons, not counting other bee products, such as wax, propolis, pollen, royal jelly ...

In conclusion, in recent decades, livestock Montenegro have reduce, in a word disappears. In order to keep the population in rural areas, necessary to invest more in the livestock development, development of farm cooperatives live, to invest in the infrastructure of the village, establish small enterprises of the processing factory for milk and meat, a young farmer from the state especially encouraged to remain the countryside. Agriculture and the village, developed in sustainable system, it is essential that over the long-term development strategies and regulating relationships and obligations that the strategy to be fully state obligation and responsibility to livestock breeding grasp and to accept as the backbone of economic development of a country village as a necessity, and historical development of facts. Agriculture Development Strategy should clearly define macro-zones on which to foster specific livestock species, and based on that subsidizes and assists farmers and households. Law concerning land is necessary to clearly specifies, it is defines the terms of use and disposition of land for the purpose of food production. It should be clear that the specifies how and under what conditions will be used state lands, what about the natural meadows and pastures, by taking advantage of available forest land for livestock ... (Lazić, 2013).

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