

LIVESTOCK FARMING IN RURAL AREAS

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Abstract

Serbia has favorable natural conditions for the development of livestock despite the third decade of recording negative trends. Autochthonous breeds are closely connected to geographical and cultural diversity in Serbian rural areas. Unfortunately, number of autochthonous breeds significantly decreased during the last 5 - 6 decades. This is the potential threat for further decrease in production and loss of agro-biodiversity in Serbia. There are 400 - 500 companies in Serbia which are involved in the breeding of rare, autochthonous, domestic animal breeds. According to the 2012 Agricultural Census, total number of cattle in the Republic of Serbia on the family farms had a share of 91.7%. In the last ten years, poultry and pig production is 20% of total number of pigs and 37% of poultry is grown on the farms of legal entities. The paper aims to point out the need for defining measures that should be adopted in the near future (special programs and developing legal, administrative and technical instruments) for preservation and support of the animal resources of Serbia.

Key words: *livestock, measure, rural areas*

Introduction

There is almost no official symposium where it is not underlined that livestock production in Serbia is facing with obstacles, which are mainly results of insufficient attention (on all levels) paid to this agricultural sector (Tomić et al., 2011; Bogdanov and Petronijević, 2009; Subić et al., 2009). In globalisation era, development and industrial growth in many countries, as well as prevention and control of biological catastrophes, depend on agricultural and food policy and economy. Responsible ministry must become ally with livestock breeders, by precise agricultural support measures aiming to preserve diversity of animal breeds in accordance to geographical diversity.

In the last decades local animal breeds are in disappearance, which makes threat for decreasing or even loss of some bio-diversity in Serbia. The main reasons for this are:

1. Loss of important genetic characteristics (general resistance, resistance to illness), which is caused by loss of genetic heterogeneity (specific for domestic- indigenous breeds). These

characteristics can be very important in genetic selection between animal breeds and improve quality of other breeds;

2. Local-indigenous animal breeds (cattle, sheep, and goats) are highly adapted to the breeding in poor/mountainous conditions and very important for general agro-eco system biodiversity maintenance, by traditional pasturing in high value pastures (in hilly and mountainous regions).

Rural areas description

The Republic of Serbia has no officially defined rural areas, since harmonization with EU geo-codes has not been done yet (*NUTS¹ regionalisation*; Bogdanov and Stojanović, 2006). OECD² defines rural areas-regions where 15 - 50% of population and more than 50% live in rural areas. By the Law on Territorial Organization of the Republic of Serbia the status of the city is defined for 24 towns, so that all of the rest of the territory can be considered as rural areas in Serbia. In accordance to abovementioned classification (*OECD*) some municipalities of city of Belgrade and Niš are classified as rural, where agricultural production is performed³. Apart from restructuring processes in agricultural sector, EU rural development policy defines ecological legal acts and very diverse rural population needs (Pejanović, 2009).

Based on the 2012 Agricultural Census data can be distracted objective pictures on regional development, what will be the starting point for eligibility for implementing the regional EU policy support as well as defining a rural development program activities in Serbia. Based on the 2012 Agricultural Census in Serbia animal farming takes place in the territory of Serbia with a higher share in Southern Serbia - region Šumadija and Western Serbia, and Southern and Eastern Serbia (Chart 1. - *Share of livestock production by regions, based on the 2012 Agricultural Census in Serbia*).

Livestock production by regions in Serbia

According to the 2012 Agricultural Census about 77% of total agricultural holdings are registered for livestock production. Livestock breeding is most dominant in the region of Šumadija and West Serbia and Mačva region. Leskovac municipality is the richest in the animal herd number. Regarding the herd size (in charts 2 - 4) the largest number of cattle, pigs and sheep is registered in households with 3 - 9 animals. Poultry is a dominant breed in Vojvodina region (45%).

¹ *NUTS* – Statistic nomenclature on territorial units is set of developing and harmonized statistical data on EU region level, which is used for socio-economical analyses.

² According to OECD definition there are two levels of territorial units: local and regional. *OECD defines rural areas by the population density below and above 150 citizens/km². On regional level OECD reports functional and administrative units, depending on ratio of population living in rural area in total population in particular region:*

1. Regions with more than 50% of population living in rural areas - dominant rural regions;
2. Regions with 15-50% population living in rural areas – mainly rural regions/transition regions;
3. Regions with less than 15% population living in rural communities - predominantly urban.

³ Rural areas are municipalities *Barajevo*, *Sopot* and *Surčin* of the city of Belgrade and *Niška Banja* municipality of the city of Niš.

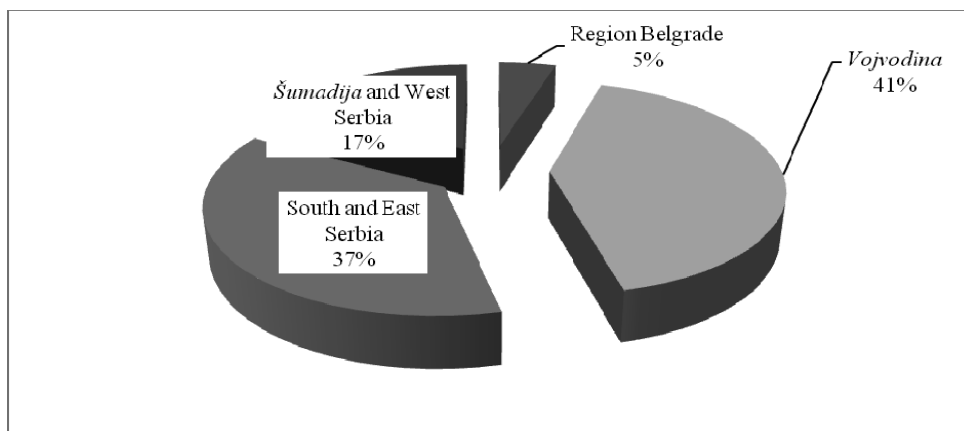


Chart 1. Share of livestock production by regions, based on the 2012 Agricultural Census of Serbia
Source: Statistical Office of the Republic of Serbia

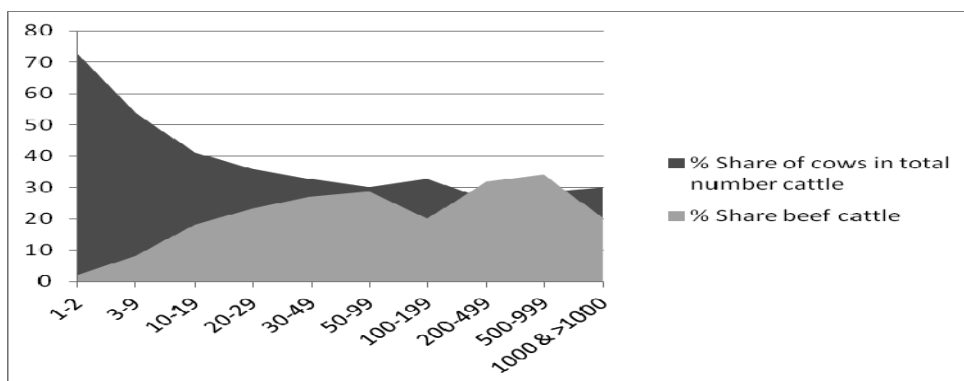


Chart 2. Share of milk production and fattening in total cattle population
Source: Statistical Office of the Republic of Serbia

Cattle breeding is the most important livestock sector in Serbia. According to the Report (PO12) of the Statistical Office of the Republic of Serbia, on 1/12/2013 balance, total number of cattle is 912,147 (Chart 2). According to 2012 Agricultural Census the biggest share of milk production (72.5% approx.) is organized on small households with 1 - 2 heads, while cattle fattening is predominant in households with 200 heads, i.e. 500 - 1000 heads. In the last 30 years a decreasing trend in number of cattle and calf heifers was recorded. Number of breeding cows in Serbia, in 2012 was 155,356 (MAEP, source). Total number of cows in Serbia is 445,365. Observing cow's breeding and milk production chain it can be assumed that 88% of total number of households owns 1 - 9 heads, and that structure makes 75.8% of households in the north of Serbia, but almost 90% (89.9%) in the south of Serbia. Generally speaking households with less than 3ha, breeds one cow, but this number makes almost 25% of total number of cows. According to the 2012 Agricultural Census, 9.5% of animals are

breed on pastures. Average pasture size is about 1.1ha (little more in central and south Serbia than in Vojvodina). Based on Veterinary Department data in 2012 it was registered 1,414 holdings for cattle fattening, from which 80 farms are of 500 heads capacities. Middle sized farms breed 100 - 499 heads and their number is 204 in Serbia (Table 1).

Sheep breeding in Serbia has a long tradition and very significant regional component. According to the Report (PO12) of the Statistical Office of the Republic of Serbia, on 1/12/2013 balance, total number of sheep is 1,616,220. Sheep breeding is organized on extensive pastures which are not suitable for other agricultural activities. Based on the 2012 Agricultural Census about 24.3% of sheep is on pasturing. Sheep production is organized on small holdings (with 3-9 heads) and their share is 51% in total sheep number in Serbia (Chart 3). From the total sheep number in Serbia, 79.8% is bred in the south of Serbia, while only 20-2% is on the holdings in the north of Serbia. Sheep production is dominant in Šumadija and west Serbia region. Total number registered holdings for sheep fattening is 190 (Veterinary Department, 2012; MAEP). There are 10 farms with the capacities of 2,000-4,000 heads recorded, followed by 9 farms with 500 – 1,999 heads (Table 1).

Table 1. – *Number of registered facilities for livestock breeding (for fattening)*

	Total registered facilities for fattening	Capacities for fattening		Other/unidentified for fattening capacities
		100-499	≥500	
Cattle (number of heads)		100-499	≥500	
Number of registered facilities	1,414	204	80	1,130
Pigs (number of heads)		10,000-19,999	20,000-50,000	
Number of registered facilities	959	13	17	929
Sheep (number of heads)		500-1,999	2,000- 4,000	
Number of registered facilities	190	9	10	171
Goats (number of heads)		200-500	600-1,500	
Number of registered facilities	24	7	5	12
Poultry (number)		20,000-100,000	>100,000	
Number of registered facilities	1,081	70	28	983

Source: Veterinary Department (2012)

According to the Report (PO12) of the Statistical Office of the Republic of Serbia, on 1/12/2013 balance, total number of **goats** in Serbia is 225,077. Goat breeding is mainly extensive in hilly and mountainous areas, although there are some tendencies for intensive production. The 2012 Agricultural Census reports about 24.8% goats on pastures. Total number of registered farms for goat fattening is 24 (Veterinary Department, MAEP; 2012). There are 5 farms with the capacity of 600 – 1,500 heads and 7 farms with the capacity of 200 - 500 goats (Table 1).

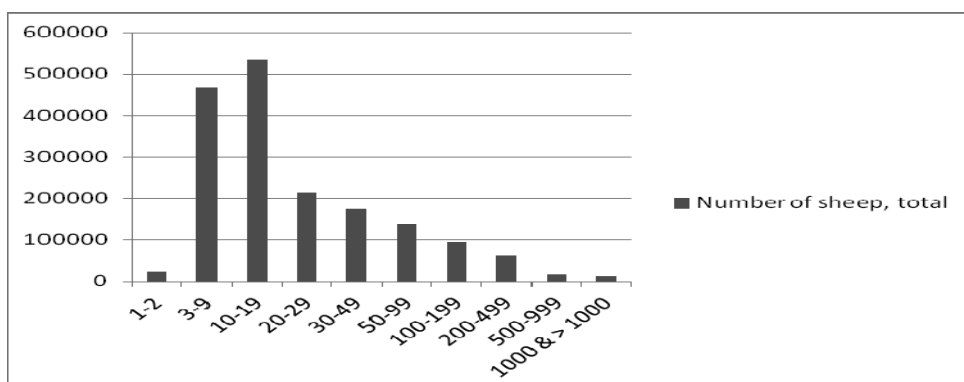


Chart 3. Structure of deployment of sheep, by herd size
Source: Statistical Office of the Republic of Serbia

Pig number reported in the Report (PO12) of the Statistical Office of the Republic of Serbia on 1/12/2013 is 3,144,207. Southern Serbia is the region where more than 53% of pigs are bred (Šumadija region - 34%, South and East Serbia - 19%). In Vojvodina 41% of total pig number is recorded and 6% are bred in Belgrade region. The most important area for pig production is Mačva region. Total number of breeding pigs in Serbia, in 2012, was 33,000 (27,000 in Vojvodina and 6,000 in central and south Serbia - MAEP source). On a 01/12/2013 date total number of fattening pigs was 2,339 thousand, which makes share of 74% in total pig number in Serbia. Share of sows and gilts in 2013 was 12% of total pig number. Veterinary Department (MAEP) registered in 2012, 959 farms for pig fattening (Table 1). There are 17 farms with the capacities of 20,000 – 50,000 pigs in one turn. There are 13 middle sized farms with 10,000 – 19,999 pigs. From the total number of registered agricultural holdings in Serbia, 90% are registered for pig production (2012 Agricultural Census). Agricultural holdings with less than 10ha share 92% of total pig number, with the average pig number of 3.8 (Table 2).

Table 2. Agricultural holdings and number of animals according to agricultural land use in 2012

	total	no land	0-2 ha	2-5 ha	5-10 ha	10-20 ha	20-50 ha	50-100 ha	> 100ha
Agricultural holdings, No	632,062	10,763	294,421	184,936	89,930	32,675	13,102	4,382	1,853
used agricultural land, ha	3,360,346	-	265,026	594,681	617,060	436,843	388,858	310,255	747,623
Cattle, No	908,990	10,95	75,565	184,844	233,318	184,070	108,824	32,409	78,965
Pigs, No	3,403,288	200,048	585,158	755,724	677,162	387,431	229,457	122,131	446,177
Sheep, No	1,729,278	15,334	293,104	524,355	485,729	249,87	108,674	27,524	24,971
Poultry, No	26,27,315	7,182,671	5,957,274	4,489,861	3,106,968	1,560,153	1,230,741	822,258	2,277,389

Source: Statistical Office of the Republic of Serbia

According to the Report (PO12) of the Serbian Statistics Office, with the 1/12/2013 balance, total number of **poultry** in Serbia is 23,450,387. Number of farms registered for broilers breeding is 1,081 (Vet. Dept., 2012 - Table 1) and there are 28 farms with capacity of over 100,000 heads. There are 70 middle capacity farms with 20,000 – 100,000 heads. Poultry production is characterized by the fast technology transfer. Broiler production is concentrated in few big installments, with modern slaughterhouses, and numerous small farms, which makes significant share in total production. This production, by its organization and high level of industrialization increase share in total production and consumption. Many small farms produce poultry for individual use and for selling through non registered trade chains.

The 2012 Agricultural Census reports 673,000 **beehives**, in Serbia, mainly in the south part of Serbia (South and East Serbia - 41%, Šumadija and Central Serbia - 35%). Potentials for bee pastures are used only 5%, but in this sector of livestock production, increase in number of registered holdings, as well as in number of beehives is recorded. Total number of bee flocks in Serbia is 665,022.

In total livestock production in Serbia, a cattle breeding is on the first place, which with the milk and meat production in 2012 shared about 43% of total value of livestock production, followed by the pig production (33%), poultry production (15%), goat production (7%) and beekeeping (1%). The data in Table 3 on the number of animals and poultry, which are reported on the slaughter line, observed in the total number of slaughtered animals, are important in terms of the level of compliance with international standards set by the slaughter line (Table 3).

Table 3. *Number of slaughtered animals/birds and the number reported on the slaughter*

Year	Cattle		Pigs		Sheep		Poultry	
	slaughtered	slaughtered in slaughterhouses	slaughtered	slaughtered in slaughterhouses	slaughtered	slaughtered in slaughterhouses	slaughtered	slaughtered in slaughterhouses
2011	368	153	5795	1819	1172	56	51,026	34,333
2012	387	143	5453	1714	1108	42	46,229	35,174
2013	318	147	5684	1483	1537	52	64,552	35,424

Source: Statistical Office of the Republic of Serbia

Organic livestock production in Serbia is organized dominantly for “small” and “big” animals with the share of 68% of total production, beehives shares 18% and poultry 14% (Chart 5). Serbia has a great natural potentials and favorable climatic conditions for organic livestock production. This production method can assure significant profit on small farms, specific for Serbia (with the 2 - 4ha sizes). Table 4 shows the number of animals in the organic production in Serbia.

Table 4. *Number of animals in the organic production in Serbia (January - December 2013)*

Category	Conversion Period- number of livestock, poultry birds, beehives	Organic status- number of livestock, poultry birds, beehives	Total
Large throat (cattle, buffaloes, horses, donkeys)	481	2,972	3,453
Small animals (sheep, goats, pigs)	3,473	708	4,181
Poultry (chickens, geese, ducks, turkeys, guinea fowls)	1,432	183	1,615
Beehives	764	1,273	2,037

Source: MAEP and SCCI

Livestock production in rural areas

Encouraging the sustainable systems of livestock production in Serbia was always a challenge for the representatives of science. (Jovanović et al., 2009; Jovanović et al., 2011; Savić et al., 2009; Todorović et al., 2009). In the cattle meat production in Serbia, Simmental breed is dominant, which had dual characteristics. Low share of fattening, of 31%-34%, which is organized on households of legal entities and entrepreneurs, shows dominant fragmented production. Rural characteristics of this production (70%) are additionally supported by the self-sufficiency on the farms. Genetic potentials and breeds composition, as a basis for livestock production, have been on the decrease for many years. Furthermore, a producer's economical motivation is not on a satisfactory level as well as the meat-input prices parities. Low purchase price cannot cover production costs. Livestock sector is directly influenced by products which are consumed in the household (farm) or placed on the market through illegal trade channels (in 2013 about 54% of total production). Quantities of beef and veal meat in Serbian market are neither sufficient to cover domestic consumption nor for export. Table 3 reports small increasing of number of cattle on slaughter line (5%) in relation to total number of slaughtered animals for period 2011 - 2013. Although, small increasing, it is important parameter for adjusting the market flows and international standards for slaughter line.

Milk production is strategically the most important livestock sector and it is considered as an axle of agricultural and rural development in Serbia. This sector reports the highest value of primary production (300 million euro/year, 7.6% of total agricultural GDP and with its regional structure can significantly contribute to the increasing of rural development in the Republic of Serbia. Annual milk production is stable at about 1.5 billion litres (Jovanović, S. et al., 2009). Milk production in Serbia implies production of raw milk in 98% of total production. In some quantities and some season's parts goat and sheep milk is present on the market, as well as its products. Of total milk production in Serbia, 98% is the share of cow milk and 1.6% goes on goat milk. Goat milk production in 2012 was 24 million litres (15

million litres in 2011). The highest milk production is in Central Serbia (42%) and Vojvodina (36%). In southern parts of Serbia, despite big number of households and milking cows, production share is only 22% of the total milk production.

Sheep production is important from the point of herd renewal, i.e. production of young animals, as a base for fattening and reproduction, revitalisation of traditional breeding systems in hilly-mountainous areas and biodiversity preservation. Self-sufficiency, which includes trade and food in sheep production was almost 97% in 2013.

Pig production in Serbia is mainly organized on small and middle farms (41% of total number of farms) in breeding herd (Chart 4). In the '90s in pig production in Serbia a period of intensive breeding started and the farms were the leaders in production and supplying of market with the surpluses of pig meat. In the recent years about 20% of total pig number is bred in the households of legal entities and entrepreneurs. The number of sows and gilts is biggest on the farms with 3 - 19 heads (share of 22% - 27%). Typical traditional pig breeding is dominant in Serbia and deviates from the most EU standards (bio safety measures, animal welfare on farms). Pig production sector expects important reforms in the near future.

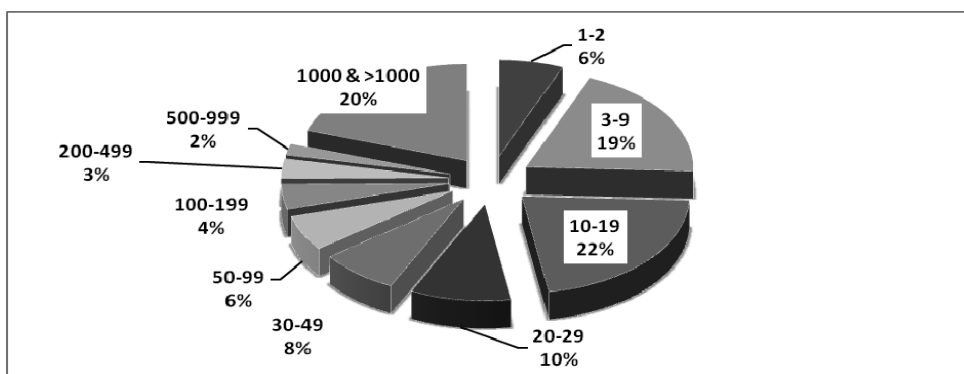


Chart 4. *Structure of deployment of pigs, by herd size*
Source: Statistical Office of the Republic of Serbia

Organic livestock is becoming more and more important although there are not official data on animal number with the “organic” status. Share of these animals in the total livestock production is still low but potentials for organic animal breeding are big, particularly in hilly-mountainous areas (Chart 5). Specific (economic) importance in the organic livestock production is cattle and sheep breeding. The results of numerous studies show the big potential of Sjeničko-Pester plateau natural resources in organization of sheep organic production. Some studies were performed speciality in organization of sustainable production of organic growth of lambs as a support of rural development (Savić et al., 2013).

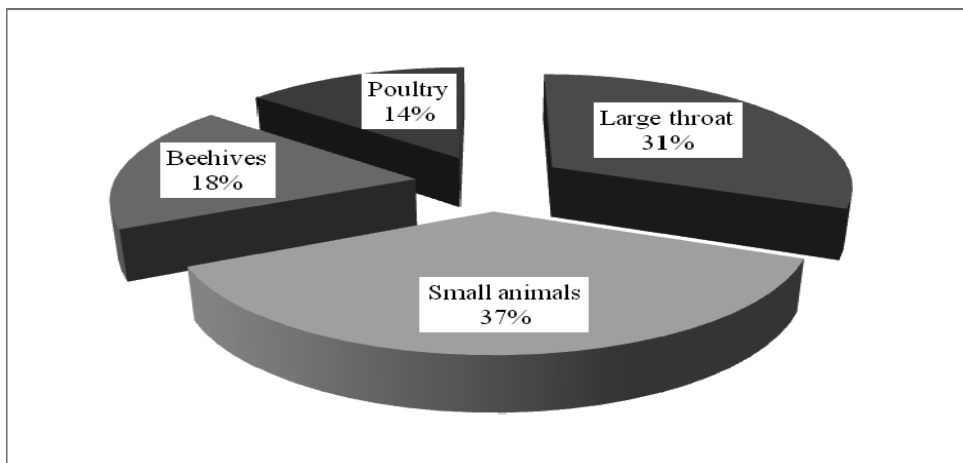


Chart 5. *Share of organic livestock production in Serbia in 2012*

Source: Statistical Office of the Republic of Serbia

Possibilities for development

In the beef meat production there is recorded decreasing in the number of breeding animals, which leads to smaller number of fattening cows as well. Further facing with these problems may be expected in the near future, because increasing of the milking per cow and decreasing number of animals for milk production is expected. Therefore, it is necessary to establish specialized systems aimed for beef meat production. Beef meat export quota (under preferential status) for EU market is 8,880 tons/year, but only about 5% is used. There are potentials for beef and veal meat export on the Russian Federation market and Asian countries as well. Low percentage of cattle on pastures (9.5%) is the result of introduction of new technological solutions where milking heads are in closed systems during whole year, with silage-concentrated feeding and easier milk collection (milking). Previously arranged pastures are excluded from technological turnover and stay unused what brings bigger economical problem because grass is much cheaper (2 - 3 times) than any other feed for milking animals (ruminants in general). Pastures offer important advantages in a livestock production because of the possibilities of decreasing the milk production price and, for a high productive pastures, can reach 9,000 – 12,000 kg/ha of green mass for feed (1kg of dry matter has more than 100gr of digestible proteins, 3 - 70gr of sugar and 10 - 12 MJ of energy).

Sheep meat production can be improved by increasing the herd number and improvement of genetic characteristics, particularly by the feed and welfare conditions which can lead to better fattening and higher lamb meat production.

As goats are resistant to certain diseases the experts are pointing to a high value of goat cheeses. Serbia was not an important producer of goat cheeses which are well known as high value food, particularly for dietetic human consumption. Importance of goat breeding is closely connected to touristic potentials of development of national industry in the EU countries (France, Swiss, Italy, Belgium, Holland), so it can be important resource for rural development in Serbia as well.

Goat cheeses are prepared in the same way as bovine milk cheeses. Specificity of milk drops of goat milk is that they are smaller, casein crud is softer than from cow milk (or sheep). Soft white or hard goat cheeses are mostly present on the market today. During the recent several years goat cheeses imported from France, Swiss or Greece have been very popular on a domestic market.

Serbian farmers are not burdened by the legal request for quality assuring, i.e. domestic market is for them completely opened. However, EU market puts some additional demands for them, so apart from harmonisation with animal welfare regulation it must be accomplished traceability and “from farm to fork” control system too. Currently in Serbia there is not present classification of carcasses in the slaughter line, therefore the payment to the farmers is not based on the quality of carcasses. In many cases payment is based on a net mass of the animal and/or on the animal's age at the time of selling (trade). Carcass classification on the slaughter line must be introduced in the near future. Pig meat production can be improved by the increasing of number of piglets per sow, and decreasing share of piglets in slaughtered animals. In order to achieve this goal, it is necessary to change farmer's awareness on importance of fulfilling the animal welfare standards, improvement of genetic characteristics, animal housing and appropriate feed. This can accomplish domestic market needs with an export increase (particularly of traditional products such as ham, “kulen”, etc.).

Conclusions

Agricultural policy measures do not include animal feeding nor direct producers to the possibility of significant use of pastures and production based on the combined animal feeding. For this reason significant Serbian territory under the meadows and pastures should be used for feed production, which is more economical and typical for local breeding areas (cattle, sheep, and goat breeding). Serbian farmers must be informed about animal conditions in stable, so it is important to educate farmers on capability to perform individual animal's body conditions. If the animal's health and body condition is not stable on a daily basis it could reflect on a productivity and production on the farm. One of the most important segments of the assessment of body condition is animal nutrition and daily feed intake.

Traditional products, which are connected to the cultural heritage of Serbia, are typical for old rural population (pig breeding, beekeeping, dairy cows, sheep and goat breeding). It will be very important to define by the national standards and with the legal background, those traditional products and place them on a world market as “made in Serbia” products.

Republic of Serbia has many regions with favourable conditions for organic livestock production, but it is not supported by the legal background, so the conditions and advantages therein are not well known. All natural, economical, cultural and other elements of geographical units can be considered as characteristic for rural development in Serbia.

For the final conclusions it could be pointed out that un-competitiveness of small production units, unfavourable industrial structure and specialization of livestock production is followed by farmer's level of education about livestock production and running business in rural areas. Taking into account the reduction in natural resources worldwide, the goal is to preserve territorial diversity and quality of the environment in the Republic of Serbia.

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