Conference Paper

Strategy for Sustainable Development and Utilization of Sheep and Goat Resources in Serbia

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Abstract

The aims of this study were to determine the status of small ruminant production in Serbia and to provide projections for their sustainable use with optimal strategy of genetic improvement of sheep and goats in the future. For sustainable sheep and goat production, it is necessary to know a number of biological, technological, organizational and market factors. Number of sheep in Serbia during the past two decades fell by about 20%. This country grows more than 1.7 million sheep. In terms of breed structures, most of the populations are indigenous Pramenka sheep (80%), while the remaining 20% are Tsigai, Merinolandschaf, Ile de France, Pirot improved, Mis sheep, and other less important populations, as well as the crossbreed with foreign and domestic sheep. Interest of goat rearing is constantly increasing in last years for 20-30%. In regard to the breed structure, the least represented are goats of Alpine breed–approx. 2-3%, White Serbian goat - 15%, different types of crosses–approx. 35% same as goats of low land Balkan type, and approx. 12% of high land Balkan type. Strategy of sheep and goat breeding programs in Serbia is focused on the improvement of indigenous breeds, because they are less demanding, and most importantly, the input is lower and their products have higher quality.

Keywords: sheep; goat; sustainable; resources; meat; milk.

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1. Introduction

Sustainability in food networks has become a dominant issue in the development of the food sector in light of the challenging scenarios one might expect in the future [1]. The sustainable development of animal agriculture, across the many different eco-regions or agroecological zones that are found in the developing countries poses many fundamental challenges. The challenges are faced by the primary users of livestock, their extension, research and support service agents (private- and state-sponsored), local and regional development authorities, investment banks, government policy

makers and their institutional organs and, in the final analysis, the consumer or user of animal output [2].

Sheep and goat breeding is an important area of the economy because the breeding of small ruminants get valued products even those using the marginal natural resources. Integrating sheep and goat into a farming operation can contribute to the economic and environmental sustainability of the whole farm. The relatively small investment required and the gradually increasing sizes of the flock make sheep and goat production become a good choice for the small-scale or part-time farmers. For the established farmer seeking for diversification, sheep offer a number of benefits [3–6].

For sustainable sheep and goat production in today's conditions, it is necessary to know a number of biological, technological, organizational and market factors [7]. For the improvement of sheep and goat production, it is necessary to apply modern selection procedures [8–14]. Success in sustainable sheep and goat breeding also depends on other factors: effectiveness of controls and recording production characteristics, evaluation of genetic parameters and value of animals and organization of the diffusion of genetic material [15–17].

For the realization of sustainable sheep and goat, breeding should find strategies that take into account the habits and preferences of consumers to ensure market supply chains. Attention must be paid to environmental protection, the development of acceptable social status, as well as the production of healthy and safety food for consumers. Sustainability in the Food Industry offers an overview of sustainable sources of impact and improvement, how they relate to the key sectors of the food industry and how programs may be implemented for further improvement. The main objective of this study is to assess the status of small ruminant production in Serbia and to provide projections for their sustainable use with optimal strategy of genetic improvement of sheep and goats in the future.

2. Sheep and goat resources in Serbia

Sheep and goats are important branch of animal husbandry in the Republic of Serbia, especially in the mountainous area [17]. Out of 826,834 ha of grassland and 601,152 ha meadow in Serbia, about 86% are located in mountain area where it is about 50% of the rural population (Figure 1). However, due to the intense process of industrialization, from the second half of the twentieth century until today there is a trend of depopulation, demographic discharge of the village, which has resulted in reducing the number of sheep. Goat breeding after the Second World War in Yugoslavia-Serbia was prohibited by law, allegedly to preserve forests. The consequences are felt today.

Figure 1: Mountain areas in the Republic of Serbia.

Variable structure and numbers of sheep and goat in the last twenty four years can be seen in Figures 2 and 3. From the figures, it can seee that the number of sheep in the past two decades fell by about 20%. The greatest reduction is in the number of sheep registered in the nineties. Today, in Serbia there are more than 1.7 million sheep.

In terms of breed structures, most of the populations are indigenous Pramenka sheep (80%), while the remaining 20% are Tsigai, Merinolandschaf, Ile de France, Pirot improved, Mis sheep, and other less important population, as well as the crossbreed with foreign and domestic sheep. In Serbia sheep production, for the last few decades, there have been a certain changes in the system of breeding. The conditions of keeping feeding and care have improved. Also imported of foreign breeds and some of them adapted to new conditionsare grown in pure breed. Finally, more productive breeds

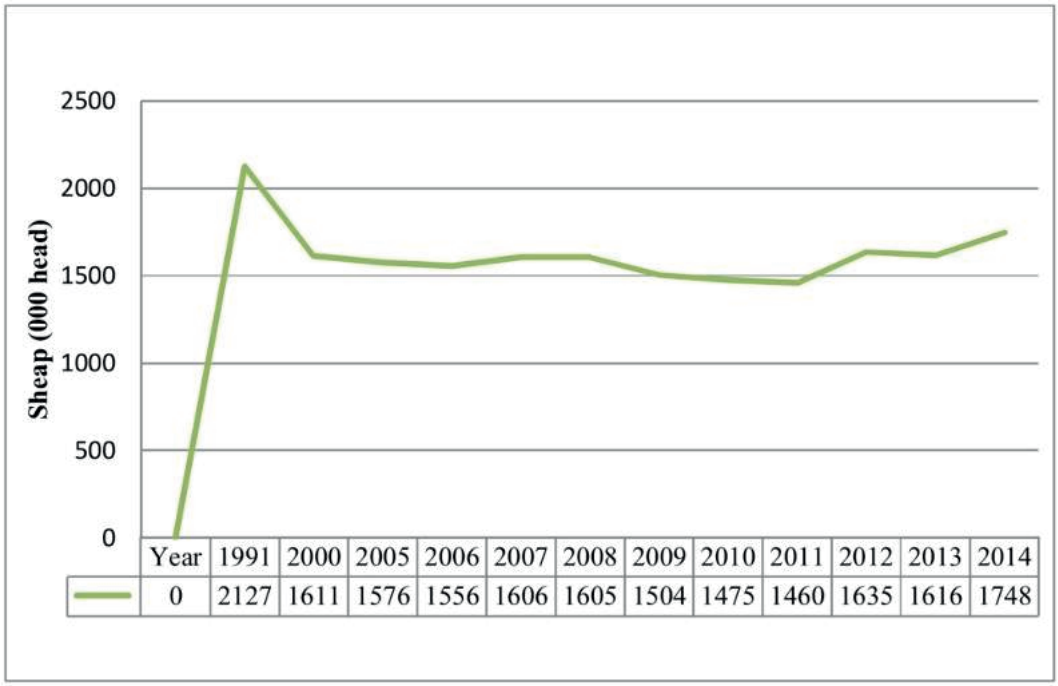

Figure 2: The numbers of sheep in Serbia (ooo head).

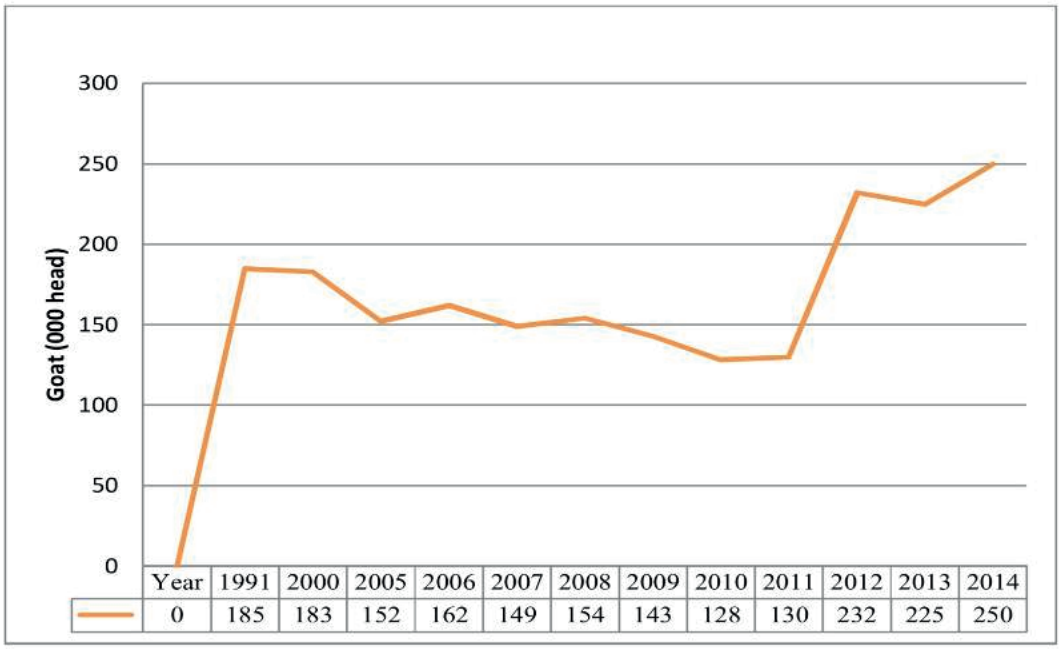

Figure 3: The numbers of goat in Serbia (ooo head).

i.e. Mis sheep and Pirot improved population and this should have an important role in the future [6].

Concerning of goat (Figure 3), rearing is constantly increasing in last years by 20-30%. Individual farmers mainly kept goats. In regard to the breed structure, the least

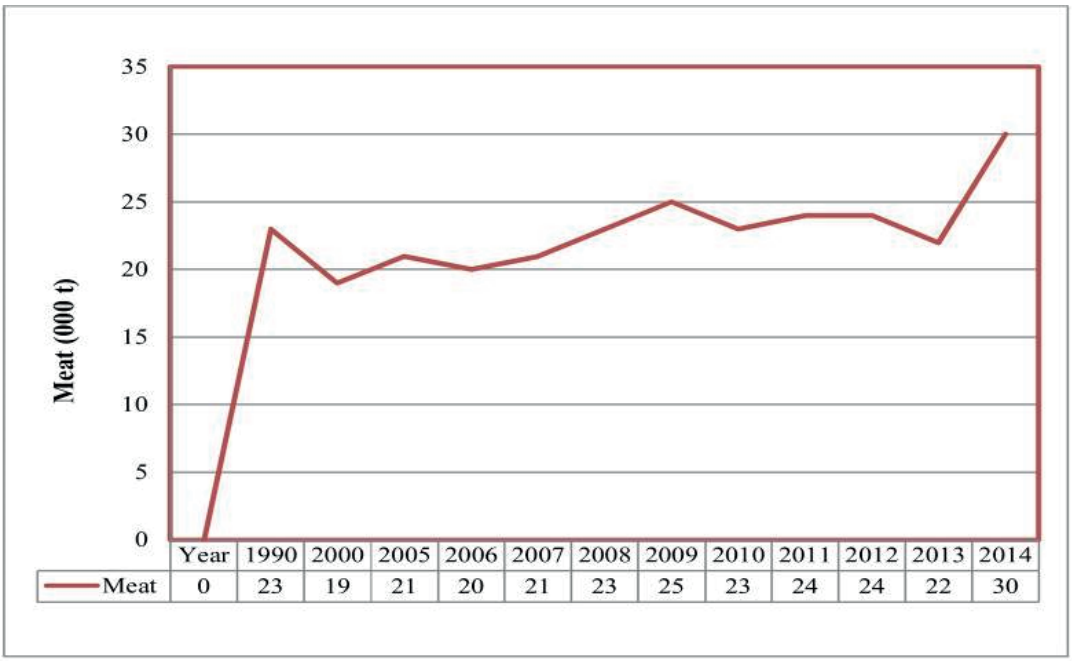

Figure 4: Production of sheep meat.

represented are goats of Alpine breed – approximately 2-3%, White Serbian goat - 15%, different types of crosses – approximately 35% same as goats of low land Balkan type and approximately 12% of high land Balkan type. Based on results of scientific studies on goat rearing – phenotypic and production data, generally, in Republic of Serbia [14, 18] most goats represent a product of various mutual crossing of Balkan goat of low and high land type, as well as their crossing with different types of crosses with Saanen breed. Domestic white goats, especially short haired animals, are different types of crosses of Domestic White goat and Saanen goat, increase their number in certain way caused an increase of number of dairy goats on account of Domestic Balkan goats.

Serbia, in the past, has achieved significant revenue from exports of lamb and sheep cheese. In addition, sheep and goat cheeses, yogurt, young lamb and goat have always been respected in our market. Production of sheep and goats vary depending on the genetic and numerous external factors.

Figure 4 shows that the production of meat increased by 30% in 2014. It was also showed in Figure 5 that milk production in 2009 declined by 50% as a result of neglect of this production, but the year 2014 reached the level from 1990. Statistics for goat milk does not lead, though it is estimated that annually produces about 25 million liters and about 4 thousand tons of meat.

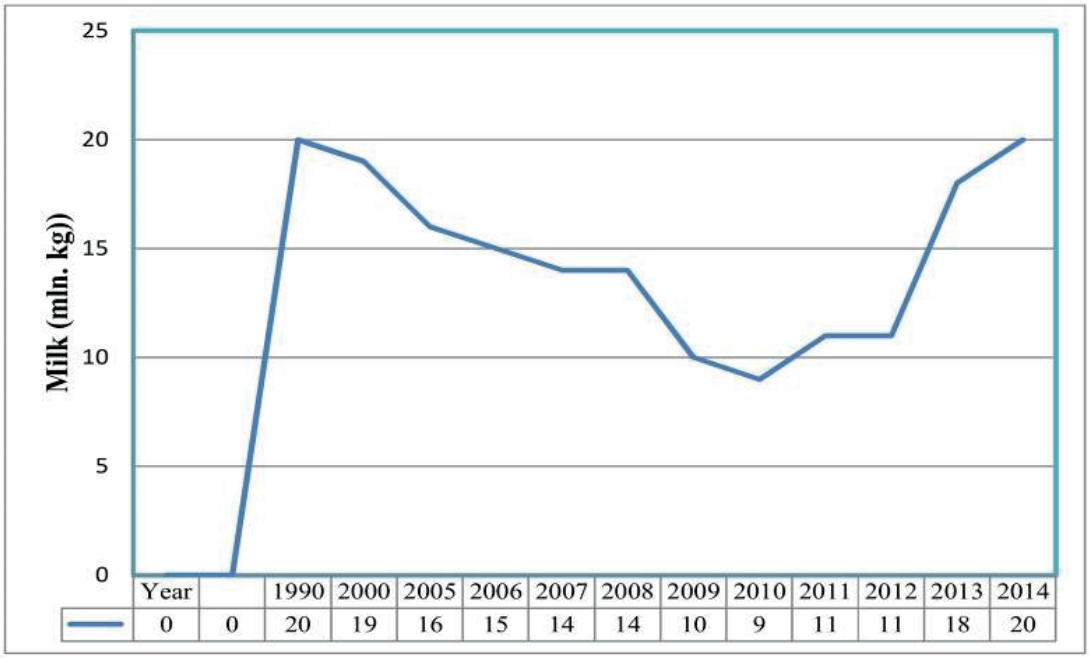

Figure 5: Production of sheep milk.

3. Utilization of sheep and goat resources

Sheep and goat farming is one of the oldest professions throughout history which were the lifestyle and the main source of livelihoods. Thanks to technical progress and different habits, today the purpose of breeding sheep is slightly changed, and this ancient occupation has become a lucrative Agro-business [3, 7, 19]. When we talk about sustainable development strategy of sheep and goats in Serbia, we must bear in mind that there are complex interactions and conflicts of interest between the various components in the development process. Thus, for example, an individual farmer, the extended family or community and regional and / or national governments often have very different perceptions on development and sustainable development strategies. In Serbia during the Yugoslav era, farmers were allowed to have a maximum of 10 hectares of land. Because of this, and sheep farms were limited available resources. However, the state has in its possession huge sheep farms with a capacity of up to 10,000 head. The dissolution of Yugoslavia, the situation changed. Nowadays, private farmers with large areas of the country are seeking sustainable development system for sheep and goats breeding.

Why are some people in Serbia involved in the rearing of sheep and goats? In the modern point of view, there are three main reasons: 1) The main activity (due to business, to achieve earnings), 2) Supplementary activities (because of using resources on the farm) and 3) Hobby (love for the sheep, and nature). Regardless of the motives behind the desire to deal with the growing of sheep or goats, the same rules were

Figure 6: The most important factors for the success of the farm.

used for a successful business i.e. 1) Proper choice of direction and production systems, 2) Production must be kept under control, 3) The technique of breeding sheep is constantly improving and 4) Animals must be treated humanely. Success in sheep and goat breeding depends on many factors (Figure 6). The figure shows nine factors during the production process in farm. Almost half of the above factors are the techniques of breeding sheep. To achieved a high production per animal, farmers has to provide several conditions: Good genetically potential of animals, a high percentage of conception, high fertility, low rates of mortality of offspring, good quality of products (meat, milk, wool), and Long term use of animals.

The first condition is the quality of animals growed or in other words the breed and its genetic potential. There are many believes that purchasing a good race solve everything and put an end to further care about the success of the production. If that were so, it would not be saying that race is only "genetic potential". What it means? Breed will exert its potential as much as we might be able to handle it. For example, the same

breed can give a 20-30% higher or lower values conception, fertility, mortality, quality of product and time preview use in breeding. Everything depends on our knowledge. and earning is the the ultimate goal of production.

The second half of factor for the successful breeding of sheep and goat is not exactly easy to make a tangible impact. It depends on the ability and willingness to deal with them. Farmers need to collect information about the market and develop marketing strategies to obtaine a higher price. So, the point is simple, we need a well-managed farm. In the long term, the quality of product is important for a successful marketing and product placement. Advertising without quality is a short-lived thing and the wrong habits. A farmer needs to create its own distinctive product - brand and stable production. This is the path to success.

4. Concept of genetic improvement

Genetic improvement through practical selection has a decisive role in achieving almost all the objectives of animal breeding. It helps rationally based on the law of inheritance and variation. The planning of a selection process enables the inheritance of each individual trait [20]. Achievements of genetics, the law of homologous series of genetic variation, the use of tests for the early detection outcome of breeding objectives, the development of various methods of experimental hybridization, and recombination methods and efficient choice of the most valuable genotypes with desired properties provide a choice of starting material for breeding. In addition, the widespread use of methods of biotechnology and tissue culture cells will significantly speed up the selection process and put it to a qualitatively new basis. This is not a complete list of contributions of genetics selection as the basis of livestock production, however highlighting the fact that the breeding of sheep and goat is unthinkable without the use of genetics as a modern way of selection.

Genetic improvement of sheep and goat in Serbia is carried out in accordance with the breeding programs. This program covers the most important breeds of sheep and goat that are of national interest. Covered by the breeding program, are the most important average production parameters of the population. The last two decades of the last century were marked by massive importation of German sheep breed Wurttemberg. It's a large sheep for meat and wool production.

In terms of Serbia, this breed has shown lower production results in 30% compared to the same population in Germany [21]. New research has shown that crossbreds local indigenous sheep with sheep Wuerttemberg, give similar performance and better quality meat than Wuerttemberg pure breed [22]. The body weight of the indigenous sheep is 55-65 kg, while the body weight of the Wuerttemberg Merino sheep 75-85 kg. If compare the production efficiency of the two populations to metabolic

weight, according to our preliminary research, will be given preference to the indigenous sheep, particularly in the mountainous region of Serbia. Starting from the mentioned, the strategy of breeding programs in sheep and goat breeding of Serbia is focused on the improvement of indigenous breeds, because they are less demanding, and most importantly, the input is lower and their products have higher quality. The situation is similar in goat breeding, if we compare the local indigenous population of goats with modern breeds such as Saanen and Alpine. Our strategy is based on the thesis that all contemporary and larger may not be the best.

5. Conclusion

The strategy of sustainable development and utilization of sheep and goats resources is a broad topic, which is contingent on a number of factors. In the Republic of Serbia, there are two geographically distinct areas, the mountain and plain area. The levels of agriculture and livestock production in these areas are different. Tradition and the concept of sustainability are also different. Because of all this, genetic improvement program is tailored to these two areas. In the mountains puts emphasis on the indigenous breeds and ecological production of lamb meat and milk, while in the lowland areas farmers are oriented to more productive breeds for high production of meat. In addition to the quantity, special attention should be paid to the quality of meat and milk, because the products of sheep and goats have a high price, when produced in unpolluted area. The concept of sustainable development of sheep and goats must devote greater attention to the genetic improvement of the population and the demands of the market.

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