

# Dairy cattle breeding and production in small farms in Serbia

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## Abstract

In the total agricultural production in Serbia, livestock production represents the most important field with an approximate share of 40%, while the contribution of cattle production in the total livestock production is approximately 45%. However, during the last few decades cattle breeding and production in Serbia has been facing numerous problems, especially the problem of small farms and small number of animals per farm. According to official statistical data, in Serbia there are less than 1.100.000 head of cattle, out of which there are around 700.000 cows and heifers. The average milk production of recorded cows of the Simmental breed is around 4200 kg (fat 3.91%), while that of black-white and HF breed is around 6200 kg (fat 3.73%). This research analyzes the number of cattle and the dairy production in Serbia. The emphasis is on the problems of small farms with not more than 10 cows, as well as on the opportunities to improve the production. The case study refers to the influence of dairies on milk producing farms.

*Key Words: cattle, bulls, dairy production, breeding, small farms, cattle show.*

## Introduction

Serbia is situated in the middle of the Balkan peninsula and has an area of around 88.360 square kilometers. In the total area of Serbia, which is around 8.800.000 ha, the agricultural area covers around 5.100.000 ha, out of which 83% - that is around 4.250.000 ha - is cultivable. In Serbia, 17.3% of the total population are farmers. The distribution of the population working in farms in Serbia is as follows: animal production (43%), crop production (42%), production of vine and grapevine (12%), and other crops (3%).

However, for the majority of the population, agricultural production represents only an additional source of income. People do not consider their future in agriculture as their main activity, but as an activity that helps them to add a source of income to their personal budget. Besides, due to the very bad social and economic situation of the population of Serbia, the contribution of agriculture to the gross public income is over 20%, while the average rate in developed countries is between 1.5 and 4%.

On the other hand, agriculture traditionally represents one of the most important fields of production in Serbia. In the total agricultural production in Serbia, livestock production represents the most important field with a contribution of approximately 40%, while cattle production represents approximately 45% of total livestock production. However, during the last decades cattle breeding in Serbia has been facing numerous problems, especially the problem of small farms and the small number of animals on the farms. The average farm size is around 3 ha, separated into several parts, as a result of numerous agricultural policies in the past. As regards the property of land, 87% of land is private property, while the rest is of state

and public property. The size of properties in Serbia and in the EU countries is shown in Table 1.

**Table 1.** Farm size in Serbia and in the EU.

Farm size	Distribution	
	Serbia	EU
Up to 5 ha	77%	57%
From 5 to 10 ha	17%	13%
More than 10 ha	6%	30%

In general, two large geographical regions can be distinguished, which determine the character of agricultural production in many ways. These are:

1. Vojvodina, that is the north plain part of Serbia, and
2. Central Serbia, which is mainly a hilly and mountainous area.

Vojvodina has all the characteristics of an intensive agricultural area, while in central Serbia, besides intensive production, a semi-intensive as well as a semi-extensive agricultural industry exist.

### **Cattle breeding and milk production in small farms in Serbia**

As Serbia is divided into two large geographical areas, the plains and the mountainous parts, cattle production is organized according to this division. Intensive milk production is mainly found in Vojvodina, while in the central parts of Serbia there is a combination of milk-meat production with emphasis on milk or on meat production; the latter is more often in the mountainous parts of Serbia. On the other hand, farms engaged in beef production produce also a certain amount milk, at least for their own needs. Smaller farms, or farms with not more than 10 head of cattle, can be found more often in central Serbia than in Vojvodina, although there are no precise reports on the distribution of cattle on the farms.

In general, two breeds are dominant in cattle production in Serbia, and they are bred in two different production systems. The Simmental breed is the dominant dual purpose breed, together with the Domestic Spotted cattle of Simmental type, while the most common of the specialized breeds is Holstein-Friesian, together with the European Black and White cattle. The other specialized breeds, independently of the type of production (meat or milk), are negligible in number. The most common cattle production systems in Serbia are the intensive and the semi-intensive system (Bogdanovic *et al.*, 2005).

According to the official statistics, there are 1.080.000 head of cattle in Serbia, out of which around 700.000 are cows and heifers. During the last 30 years, a decrease has been registered in the number of cattle of all categories, which is more or less reflected in dairy production.

In the last 30 years, the maximum number of cattle was registered in the mid 1970s, when there were over 2.600.00 head of cattle. On the other hand, the minimum numbers have been registered during the last few years. In comparison to the beginning of the analyzed period (1975), in 2005 there was around 40% of the starting number of cattle in Serbia. Moreover, if we compare with the year 1990 (as the last relevant year before the stormy events in the area of ex Yugoslavia), the decrease is today a little higher than 40%, meaning that today there are around 58% of cattle in comparison to the beginning of 1990s.

The reasons for such decrease are numerous: first of all, there are economic motivations that caused extensive emigration towards the urban areas or affected the transition from

agriculture to other kinds of production. Table 2 presents the numbers of cattle as well as the total milk production in Serbia.

**Table 2.** Number of cattle and milk production in Serbia (1975-2005).

Year	Number of cattle in Serbia (000)		Milk production (million lit.)
	Total number of cattle	Cows & pregnant heifers	
1975	2.649	1.370	1.516
1980	2.367	1.284	1.716
1985	2.250	1.242	1.847
1990	1.979	1.145	1.759
1995	1.776	1.082	1.758
2000	1.272	843	1.566
2001	1.186	812	1.576
2002	1.177	801	1.580
2003	1.162	790	1.576
2004	1.102	742	1.579
2005	1.079	720	1.602
1975/2005	40.73%	52.55%	105.67%
1990/2005	58.72%	62.88%	91.07%

As regards dairy production, it should be noted that, unlike the number of cattle, it is not characterized by a serious negative trend. However, these data should be considered with certain reserve. That is, milk production, which is reported on a yearly basis, is based on the data received from the dairies, while the milk used for feeding the young calves is not taken in consideration, neither is the milk used for personal needs on farms and used for dairy products.

When dairy production is compared with the farm surface area, a totally different trend is noticed. That is, milk production on 100 ha of arable land was around 40 tons in 1975, around 48 tons in 1990, and slightly lower in 2005 – around 47 tons. The main reason for this gap between the absolute number of cattle and milk production in Serbia lies in the gradual replacement of the domestic cattle breeds with imported breeding stocks, as well as in the increased efficiency of production on farms.

The intensification of cattle production was the main result of the replacement of domestic cattle breeds (Busa and Podolian) with imported ones (Simmental or HF). The more intensive breeds pushed out the low productive breeds, resulting in a reduction of their number. At the beginning of the twentieth century, the autochthonous breeds of cattle, called Busa and Podolia, represented 83% of the total number of head of cattle (68% the former and 15% the latter). However, the actual composition of the national cattle herd in Serbia is as follows: 35% of pure Simmental, 50% of Domestic spotted cattle of the Simmental type or the domestic Simmental breed, 5% of black-white cattle with various percentages of HF genes, as well as pure Holstein-Friesians, and 10% of primitive breeds and crosses.

(Petrovic *et al.*, 2002).

In the majority of cases, milk production in private farms is based on either Simmental or Black-White breeds with different levels of HF genes. In several other large state farms, the HF breed is prevailing. The average number of cows on small farms is less than 5, although the number of farms with 5 or more cows is gradually increasing, as well as the number of middle-size farms with more than 25 animals.

It is characteristic that the Simmental breed is mainly bred on small- and middle-size farms, while on large farms with more than 50 cows, and on the rest of the state farms, the black-white and HF breed is mainly bred. The production systems found on the farms are mainly adapted to the breed being bred. The first insemination generally takes place at the age of 15 months approximately, so that the first calving takes place at the age of two years. The average duration of the productive life of the Simmental breed is between 6 and 7 years, while that of the black-white and HF cows is around 5 years.

## **Dairy production recording, breeding goals and important cattle shows**

Although there are numerous associations of cattle breeders, apart from the national association, the control of cow productivity in Serbia is still directly financed by the Ministry of Agriculture. The Ministry selects on a yearly basis the organization that will control the productivity of cows in a certain area for that year. The data from the productivity control are reported to one of the two national selection centers, in Zemun and in Novi Sad. The data from the farms of Vojvodina are sent to the Institute for Animal Breeding in Novi Sad, while the data from the farms of central Serbia are sent to the Institute for Animal Husbandry in Zemun, next to Belgrade.

According to the estimations, 6.5% of the total number of cows and heifers is controlled for production traits, mainly the milk yield. Controls are performed mainly according to the ICAR instructions for dairy control and include the traits of milk yield, the percentage of milk fat and proteins. The number of somatic cells is still not registered on a regular basis, but only on certain time intervals and on large farms, mainly upon the initiative of the large dairies.

The average milk yield of recorded and controlled cows of the Simmental breed in the year 2005 was around 4200 kg (3.91% fat), while that of Black-White and HF was around 6200 kg (3.73% fat). Recently, breeders - especially on small farms - have been more interested in crossbreeding Simmental with red Holstein, aiming at the improvement of dairy production. However, according to the official breeding program, F1 progeny from this kind of crossbreeding can not be registered for the breeding stock.

The new future breeding program for cattle will have a big influence on the development of dairy production on small farms. Taking into consideration that the Holstein-Friesian and Simmental breeds are different as to the production purpose, as well as in the phenotypic expression of certain traits, two different breeding goals will be defined. The Holstein-Friesian breed will be utilized to achieve sufficient quantities of milk according to the quality standards requested by the European Union, while as regards the Simmental breed, the main aim will be the optimal relation between the production of high-quality milk and beef, emphasizing the production which is economically more profitable in concrete economic husbandry conditions (Bogdanovic *et al.*, 2005). This is particularly important for the breeders on small farms, because in the majority of cases they raise the Simmental breed. Besides, although primarily oriented towards dairy production, they are also interested in using or selling the male calves as beef animals.

Cattle shows in Serbia have a relatively long tradition and an important place among breeders' activities. Every year, about 25 cattle shows are held and about 1500-1600 cows, first-calving cows and heifers are evaluated. Beside the shows of regional character, an international cattle show is organized every year during the International agriculture fair in Novi Sad, but the participants are mainly breeders coming from medium and large farms, as well as from state farms. The regional shows are more important for the small farms. The main goal of each show is to evaluate the current condition of the genetic potential and to give recommendations for further cattle breeding. The evaluation of cows is based on the

controlled dairy production, external characteristics and origin, while for the estimation of first-calving cows, besides the external characteristics and origin, the starting milk production is also used for evaluation. Heifers are evaluated also on the basis of dam milk production. Participation in these cattle shows represents an important incentive for small farmers to make additional efforts in order to present better cattle on the future shows.

## **Influence of dairy plants on the improvement of dairy production in small farms**

Dairy plants, especially those of small and medium capacity, can have a significant impact for the future development of dairy production in Serbia. Large dairy plants, with a daily capacity of several hundreds of tons of raw milk, are mainly oriented towards large farms and intensive production. However, the source of raw material for small and medium dairy plants are mainly the small and medium farms.

Today in Serbia there are over 200 dairy plants of different capacities. The majority of them are trying, in different ways, not only to provide the sufficient quantity of milk for processing, but also to 'bind' the breeders by helping them to buy milk cooling equipment, to increase their herd size, and sometimes even by helping them financially, through loans or funding for building new barns.

By intensifying the demands in terms of quality and microbiological integrity of raw milk, dairy plants gradually favour those breeders who can fulfill these demands more easily. On the other hand, the breeders are becoming more specialized in dairy production, focusing all farm capacities on this production.

Although the problems of small cattle farms in Serbia will certainly still exist for long in the future, certain steps are made forward in order to change the present situation. Turning small breeders into commercial family farms, structuring breeders' associations in such a way so as to increase the level of the production, constant efforts in providing high-quality breeding animals, and continuous work on breeders' education are some of the requirements that must be met so that dairy production on small farms can become more profitable and economically sustainable.

### **Case Study – Dairy plant “Granice”, Mladenovac, Serbia**

One of the most promising private dairy plants of medium capacity is the dairy plant “Granice”, in Mladenovac town, situated around 50 km from Belgrade. The dairy plant started to operate almost 15 years ago as a family shop for dairy products. Production capacity in the beginning was no more than a few hundred kilograms of raw milk. The products produced in the beginning were mainly liquid yogurt and white cheese. The main raw material was then provided by small farms from the neighbouring villages, which had approximately 1-2 cows. Initially, the owner of the dairy plant could not offer to the breeders anything more than a fair business relationship, that is the regular payments for the delivered goods. As time passed, this collaboration became known to other farmers as well, thus increasing the number of contracts signed with breeders and raising the quantity of raw milk bought on daily basis. However, the majority of farmers were still raising a small number of animals.

With the increase of the quantity of milk for processing, the area where the milk was purchased also increased. Today, the dairy plant “Granice“ buys milk in the region that covers more than 150 km. With the increase of milk processing capacity, the need arose for bigger farms that could provide larger daily quantities of raw milk. The management of the dairy

plan decided to help the medium size farms become larger, and the smaller farms become medium, particularly those that wished to specialize in milk production.

The first actions undertaken by the dairy plant included the purchase of milk cooling equipment and the definition of a better price of milk for those farms who distributed more than 200 kg of milk per day. This encouraged the breeders to increase their production and the number of cows. The increase in the number of cows encouraged breeders to pay special attention to the choice and quality of the bulls for insemination; so they started to use bulls of higher breeding value and of course more expensive. The improved genotype of animals raised on farms necessitated certain changes in the husbandry technology, including investments in the barns and adaptation of the feed system to the milk yield of cows. What is more, this development brought changes also in crop raising, resulting in the gradual predominance of those species of plants that are necessary for cattle feeding.

The next step taken by the management of the “Granice” dairy plant was a certain financial aid to the breeders who increased their volume of the production. The aid was destined for the purchase of new animals and for building new or reconstructing the existing stalls and barns. In this way, the breeders were encouraged to undertake more serious investments so as to increase not only the quantity but also the quality of the distributed milk.

The result of this approach, aiming at providing sufficient quantities of raw milk for processing in the dairy plant “Granice”, was that along with the development of the dairy plant, the small farmers also developed and their production still makes up the main source of raw milk. While 15 years ago the majority of farmers raised 1-2 cows, nowadays the majority of them raise 3-5 cows.

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