



**USAID** | **SERBIA**  
FROM THE AMERICAN PEOPLE

# **Pešter Dairy Sector Value Chain**

**Author:**

**Dr sci Senad Hopić**

**Belgrade, May 2012**

## Introduction

The USAID Sustainable Local Development Project is a five-year initiative of the United States Agency for International Development (USAID), valued at USD 22 million, whose purpose is to support long-term economic and social development of the cities and municipalities in Serbia. The Project assists selected municipalities to overcome development challenges, improve public services and strengthen local economies through the intermunicipal cooperation.

The key activities of the Project are focused at establishing and improving intermunicipal partnerships. The partners jointly launch and manage development projects, supported by the Project through technical/counseling assistance and grants.

The fifth component of this Project, Improving the business enabling environment, aims at creating more favorable conditions for employment, primarily of young people, and increasing the inflow of investments both on the local and on the intermunicipal/regional level.

One of the priority projects within the intermunicipal cooperation of the city of Novi Pazar and municipalities of Sjenica and Tutin is the Pešter Plain development project - Pešter Development Center (PDC). The Project's goal is to provide more balanced socio-economic development of Southwest Serbia through building human, technical and institutional capacities at the Pešter Plain. The Project consortium consists of the city of Novi Pazar and municipalities of Sjenica and Tutin, and is being implemented by the Sandžak Regional Development Agency (SEDA).

The project implementation is supported by the Czech Development Agency, the Ministry without Portfolio of the Republic of Serbia, EU PROGRES and USAID Sustainable Local Development Project. USAID Project activities, within PDC, are development of value chain and marketing plan for dairy sector.

The document called "Value chain in dairy production" aims to conduct an analysis of the dairy sector in the Pešter region. The analysis includes horizontal and vertical connection in order to identify unused potentials and current problems in the Pešter dairy production. In certain sections the document deviates from the existing value chain definitions and focuses to a greater extent on the primary livestock production. The change in methodology was caused by numerous problems and dangers which exist in this part of the dairy chain, making a direct impact on the other parts of the dairy chain. When it comes to dairy processing, there is a huge variety and number of variations. Most of the dairies were not willing to present the data. These are the main reasons which made it impossible to set up the value chain in accordance with theoretical models.

Based on the conducted analysis, a set of recommendations was given for each part of the dairy chain. Next steps of the local governments, donors and line ministries should be focused on solving the identified problems and on supporting the recommended activities in this document.

## Acronyms

CRS – Center for Rural Development

EU – European Union

IPARD – Instrument of Pre-Accession Assistance for Rural Development

LS – Local government

MPTVŠ – Ministry of agriculture, trade, water management and forestry

PDC – Pešter Development Center

EU PROGRES – Program of European Partnership with Municipalities

PSS – Agricultural Extension Service

RPK – Regional Chamber of Commerce

RS – Republic of Serbia

RSD - Dinar

RZS – State Institute of Statistics

SAD – United States of America

SEDA – Sandžak Regional Development Agency

SFRJ – Socialist Federative Republic of Yugoslavia

SZR – Independent artisan dairy

USAID – United States Agency for International Development

## List of Tables

TABLE 1 – POPULATION AND NUMBER HOUSEHOLDS IN THE INVESTIGATED REGION	16
TABLE 2 – AGE STRUCTURE OF THE POPULATION	16
TABLE 3 – NUMBER OF SETTLEMENTS, CADASTRAL MUNICIPALITIES AND LOCAL COMMUNITIES	17
TABLE 4 – LENGTH OF ROADS, IN KM	17
TABLE 5 – NUMBER OF REGISTERED COMMERCIAL ENTITIES	18
TABLE 6 – NUMBER OF EMPLOYED AND UNEMPLOYED	18
TABLE 7 – NUMBER OF REGISTERED FARMS	19
TABLE 8 – LAND STRUCTURE, IN HA	20
TABLE 9 – NUMBER OF LIVESTOCK HEADS AT REGISTERED FARMS IN THE REGION	21
TABLE 10 – ESTIMATED NUMBER OF COWS AND SHEEP	21
TABLE 11 – PURCHASE OF MILK BY THE DAIRIES IN THE REGION, IN 2009	30
TABLE 12 – REGISTERED DAIRIES IN SJENICA, TUTIN AND NOVI PAZAR	35
TABLE 13 – PRODUCTS MANUFACTURED IN THE DAIRIES IN THE INVESTIGATED REGION	37
TABLE 14 – PURCHASE PRICE OF MILK AND TRANSPORT	39
TABLE 15 – OUTPUT PRICES OF THE MOST IMPORTANT PRODUCTS	39
TABLE 16 – DEFINED NEEDS OF THE DAIRIES	40
TABLE 17 – PRICE AND PACKAGING OF PRODUCTS MANUFACTURED WITHIN HOUSEHOLDS	43
TABLE 18 - DAIRY PRODUCTS MANUFACTURED IN DAIRIES, IN 2009	50

## Contents

Introduction .....	<b>Error! Bookmark not defined.</b>
Acronyms .....	3
List of tables .....	4
Summary .....	7
Summary .....	<b>Error! Bookmark not defined.</b>
1. Characteristics of the investigated region .....	16
1.1. Basic socio-economic indicators .....	16
1.2. Agriculture .....	<b>Error! Bookmark not defined.</b>
2. Value chain in dairy production .....	21
2.1. Livestock production – Farm impact.....	21
2.1.1. Quantity .....	<b>Error! Bookmark not defined.</b>
2.1.2. Structure of dairy farms .....	22
2.1.3. Breeding composition .....	<b>Error! Bookmark not defined.</b>
2.1.4. Raising .....	<b>Error! Bookmark not defined.</b>
2.1.5. Feeding.....	<b>Error! Bookmark not defined.</b>
2.1.6. Health and veterinarian care .....	26
2.1.7. Milking.....	<b>Error! Bookmark not defined.</b>
2.1.8. Milk yield .....	27
2.2. Pešter Dairy.....	27
2.2.1. Milk production.....	<b>Error! Bookmark not defined.</b>
2.2.2. Milk consumption .....	<b>Error! Bookmark not defined.</b>
2.2.3. Milk purchase.....	30
2.2.4. Dairies .....	<b>Error! Bookmark not defined.</b>
2.2.5. Domestic production of dairy products .....	<b>Error! Bookmark not defined.</b>
2.2.6. Market.....	<b>Error! Bookmark not defined.</b>
2.3. Support to dairy sector .....	<b>Error! Bookmark not defined.</b>
2.3.1. Institutional framework .....	45
2.3.2. State subsidies and programs .....	46
2.3.3. Professional organizations .....	46
2.3.4. Laboratories for testing the milk quality.....	47
2.3.5. School system .....	<b>Error! Bookmark not defined.</b>

2.3.6.	Research.....	<b>Error! Bookmark not defined.</b>
2.3.7.	Chamber of Commerce.....	<b>Error! Bookmark not defined.</b>
2.3.8.	Municipalities.....	<b>Error! Bookmark not defined.</b>
2.3.9.	Sandžak Regional Development Agency - SEDA .....	48
2.3.10.	Regional Center for Agricultural and Rural development.....	48
2.3.11.	Agricultural associations and Cooperatives .....	48
2.3.12.	Projects .....	49
3.	Dairy products market .....	<b>Error! Bookmark not defined.</b>
4.	Potentials and obstacles of the dairy sector in the Pešter region .....	53
5.	Possibilities for value chain improvements .....	56
5.1.	Primary production .....	56
5.2.	Milk processing within households.....	58
5.3.	Raw material department.....	<b>Error! Bookmark not defined.</b>
5.4.	Dairies .....	<b>Error! Bookmark not defined.</b>
5.5.	Local governments.....	<b>Error! Bookmark not defined.</b>
	Annex A – List of meetings.....	61

## Summary

Pester Region has great potential for development of animal husbandry and a long tradition in the production of dairy products. Agriculture is one of the most important industries in the region, while animal husbandry is a dominant agricultural subsector. There are officially registered 38.788 head of cattle and 32.659 sheep and goats, but there are significant numbers of heads, especially sheep, that are not registered. The region is a center of sheep production in Serbia. Specificity of the region is the existence of buffaloes (between 500 - 1.000 animals). The center of livestock production is Pester plateau.

Cows and sheep are extensively raised regardless of the size of the farm. Milk production has seasonal character. Average milk production per cow is on the average level of Serbia (around 3.000 kg/average lactation). In general, facilities and food for cattle and sheep are the major production problems in the region.

The estimation made on the basis of official data indicates that the region produces 70.000-75.000 t/year of cow's milk, 750 t/year of buffalo's milk, while about 1.600 t/year of sheep's milk is processed. Sheep and buffalo milk is processed exclusively in the households. Over 50% of cow's milk remains in the household, while around 20% of total milk is sold to dairies. The investigated region belongs to a group of counties with the lowest daily volume of milk purchased by the farm/day and head/day. Around 20% of total milk is processed (mainly cheese) at households for market needs.

Milking and milk storage on farms as well as collection and transport of milk show poor microbiological quality of milk received in dairies. Milk, however, are not paid based on quality parameters but on the basis of fat content and quantities of milk.

There are six active dairies (of 13) in the region. All dairies in the region belong to the category of artisan dairies, are of very small capacity (about 1.000 t / year) and do not have human resources for business development. The main products are pepper in sour cream, mature white cheese (slices) and yogurt. The existing value chain in the dairy production is used up. Dairies are working on the edge of profitability, with the almost all possible savings already achieved (low purchase price of milk, low price of labor, the use of cheapest energy sources, low-cost packaging, low quality of purchased enzymes and rennet. etc.). In addition, small dairies in the future will have significant problems to harmonize their activities in accordance with the new regulations and standards.

Production of dairy products for the market within the household is widespread in the region. The number of these farms cannot be determined, and only ten were registered for the production of cheese. Processing of milk is mainly done in places that do not meet conditions for registration under the applicable Regulations. The dominant products in the market are white cheese and pepper in sour cream. Study for the protection of geographical indications of sheep and cow's cheese is made; however, these products have not yet received a certificate of geographical origin. The main reason is the non-standardized cheese production in the region.

Dairy products are sold in local markets, and the only dairy that exports milk and milk products is **Zornic d.o.o.** Dairy products with their packaging, quality and price are fully adapted to the local market. Dairies in the local market face strong competition, forcing local dairies and dairy farmers to sell products at lower prices, while maintaining the quality. The exception is sheep cheese which is highly demanded.

Activities that pose a significant obstacle to the stabilization of markets are unregulated cross-border trade, home sales of pasteurized milk, non-registered facilities for cheese production within farms and

unregistered purchase and packaging of home produced cheese by some dairies. At the moment a significant number of manufacturing, marketing and organizational problems are solved with these activities. However, it is necessary to emphasize that these activities are not in accordance with existing regulations.

The support system for farmers is weak, while the dairy support system is undeveloped.

The current value chain is weak. In all parts of the value chain there is a number of measures that can raise the level or quality of production as well as the economic efficiency of production. All supporting measures should be separated into three main goals: 1) to support primary production, 2) to support processing of milk in the household, and 3) to increase capacities of existing dairies.

The next steps of local self-governments, donors and line ministries should be directed toward addressing the identified problems and support the activities proposed in this document.

## Summary

Investigated region includes municipalities Sjenica and Tutin, and the city of Novi Pazar, that is the Southwest of Serbia. This region borders with Montenegro to the west and Kosovo to the southeast. According to all economic parameters, the region is placed in the category of the most underdeveloped regions in Serbia, while Tutin and Sjenica belong to the category of devastated areas.

### Agriculture

Agriculture with food industry is one of the most important industries in the region. Agricultural farms (10.821) make up about 29% of all households in the region, while in Sjenica agricultural farms (4.671) are dominant share (68,50%) of the total number of households.

Land property is somewhat bigger than the Serbian average (3,5 ha), however, within the structure of the property, there is little arable land, while pastures and meadows are dominant. Agricultural production is to a great extent defined by the climate, relief, quality and structure of agricultural land. The land of poor quality dominates, and the land structure is dominated by meadows (33, 6% of total agricultural land) and pastures (52, 1%) which are for the most part uncultivated areas. High share of grassland has opted farmers in the past, but in the present too, towards livestock production.

### Livestock breeding

Officially, in the region, 38.788 cattle heads and 32.659 sheep and goats are bred, but there are more heads being bred, considering that certain number of heads, primarily sheep, is not registered at the Ministry of agriculture. Number of animals, especially sheep, in Sjenica and Tutin increases in the period of taking the cattle out to pasture, and decreases in the winter before the animals are taken into the facilities due to the lack of feed in the winter time and lack of accommodation space in the stables.

Sjenica municipality is the fourth in Serbia by the number of cow heads, as for the number of sheep, the investigated region is the center of sheep production in Serbia. Specific feature of this region is raising of significant number of female buffalos (about 500 heads). Sjenica and Tutin are the centers of livestock production, and the largest number of cattle and sheep is raised at the Pešter Plains.

The most households have one to three cows, and average households which supply dairies with milk have two to six cows. Larger producers have about 10 milking heads, but there is a small number of big farms with more than 20 milking heads.

In the investigated region, cows are raised traditionally/extensively, regardless of the farm size. Cattle spends winter months inside the facilities, while during the summer time it is taken out to the pastures and meadows. Dominant breed in the cattle production is the domestic spotted cattle of Simmental type, while in the sheep production the dominant breed is Sjenica "pramenka", as well as the cross-breeds of "pramenka" received by unplanned cross-breeding.

The biggest problem in raising are facilities and feeding of cattle. The majority of facilities does not meet technical-technological requirements. In especially bad shape are the sheep facilities, which in most cases are improvised facilities whose purpose is to merely protect the animals from snow and frosts during the winter period.

Feeding system significantly varies depending on the size and the level of specialization of the farm. The feeding system varies from very extensive to the one in which there is significant share of concentrated, grain-like and high quality feeds. Recently, certain farms have started the process of preparing hayage and silage. However, the feeding is not based on technological standards for certain categories of heads. Meals are not balanced in regard to protein and energy contents, vitamins etc. Existing lawns are

characterized by extremely low yield of grass mass which is the consequence of long-term unplanned usage and constant degrading of lawns. All of this has a more or less negative impact (depending on the specific animal and a meal) on production, and consequently on profitability and cost-effectiveness of the production.

### Milking

Procedures before, during and after the milking point to very low hygiene of milking and bad quality of received milk (number of microorganisms and somatic cells). Manual milking is the predominant at the farms with small number of cows, while in sheep production, the manual milking is exclusively present. At the middle-sized and bigger farms, the milking is done with manual portable milking machines of the lower quality. The milk is mainly milked in the plastic or aluminum cans which are banned in the EU countries, while there are very few steel cans. In this region, there are only few lacto-freeze devices, mainly at the biggest farms, so that the cans with milk are kept in different places on the farm aiming to preserve the optimal temperature during the summer. Significant number of producers who process the milk within the households does not cool the milk, but the milk is immediately cooked, that is milk processing starts instantly.

### Milkiness

The milk production is clearly characterized by seasonality. The highest production of milk is achieved in the summer months, while the period of drying is during late fall and winter. Average milkiness of cows in the standard lactation is low and is about 3.000 kg (it can vary from 2.500-4.000 kg), while in the bigger farms, which are in the process of specialization, the average milkiness per head in the standard lactation is about 4.000-5.000 kg.

Sheep in the milking period give about 40-60 l of milk per lactation. Milking period lasts about 120 days.

### Milk production

Based on the official data on number of heads, herd structure, standard rebuilding rate of herd and average milk production in the standard lactation, the estimate is that annual production of cow milk in the region is 70.000-75.000 t.

The production of sheep milk, used in processing, based on official number of sheep is estimated at about 1.200 t/annually, but the estimate is that additional 1.600 t/annually is produced in the region (production with unregistered heads). Estimated quantity of produced buffalo milk in the region is about 750 t, however, only symbolic quantity (100-200 t) of this milk remains for processing considering that most of it is fed to the calves.

The estimate is that most of cow milk (over 50%) remains in the household and is consumed in the prolonged feeding of the calves and within the household. Households to a great extent produce dairy products for the market (about 20% of the total milk quantity).

The total quantity of sheep and buffalo milk is consumed or processed within the households. Some dairies from Sjenica occasionally purchase sheep milk or cheese, but the quantity of purchased milk or cheese depends on year, and it is not possible to present it as constant trend.

### Milk purchasing

The total quantity of the purchased milk by dairies is about 15.000 t. Averagely 15,9 l milk/daily is purchased from farms, that is only about 3,73 l/day per cow. According to these data, investigated region is in the group of counties with the lowest daily quantity of purchased milk per farm/cow. Dairies purchase milk during the whole year, but the purchase is characterized by great seasonal variations.

There are no purchasing stations in the villages of the region, and the milk is purchased exclusively at the farms directly. The existing purchasing system can neither provide quality milk, nor meet the requirements set in the current regulations.

### Purchasing price of milk

Milk is paid based on the delivered quantity and share of the milk fat in the milk. Average purchasing price of milk is 6,5-7,0 RSD/fat unit, or 27-32 RSD/liter of milk. Term of payment is about 30 days. Farmers do not have contracts with dairies.

There are no dairies in the region which pay based on the quality (protein contents and microbiological quality of milk) of the delivered milk. Also, dairies do not have reward/punishment system for farmers in regard to the milk quality. Basic cause of the bad price policy towards producers is the lack of milk for purchasing and weak financial capacity of dairies which are not able to establish milk quality standards for purchasing and stimulate this process through higher price for quality milk.

### Transportation

Transportation is performed with own or rented trucks (contracted carriers). Vehicles are mainly obsolete, but the bad shape of the village roads is one of the reasons why hired carriers and dairies are not interested in procurement of new trucks. Trucks usually have tanks (1000-3000 l) made of pure steel, but plastic material tanks still can be seen and they should be withdrawn as soon as possible since they do not meet existing regulations.

In comparison with the most of dairies in Serbia, the investigated dairies have relatively short lines of supply (25-50 km). All dairies respect the process of maintaining the cold chain (temperature of milk during the transport must not increase more than 2-4<sup>0</sup>C).

The price of transportation is 2,5-3 RSD/liter, which corresponds with the calculation of big companies where transportation price per liter of milk is 8% of the price for the liter of milk.

### Dairies

The region is characterized by existence of great number of small capacity dairies, which is characteristic for undeveloped, mountainous and traditionally livestock breeding regions in Serbia. Currently six dairies (out of 13) are active, where one group of dairies is dealing exclusively with processing and sales of milk, while the other one conducts business within the larger commercial systems.

All dairies in the region belong to the category of small artisan dairies, and are of extremely small capacity. Most of these dairies has the capacity of 1000 t/annually. Small capacity dairies are exposed to the highest risk of conducting business in the market, they lack in human resources, they are unable to make good business organization and most importantly they are not able to establish good raw material base.

No dairy in the region has the raw material department or complete technological milk quality control. Four dairies employ full-time process engineer. These engineers have not undergone additional trainings and specializations and the process of education and acquiring new knowledge is not in place for them. Dairies Zornić and Lav have sales departments due to the fact that they have other business activities within their companies as well, while in other dairies, procurement and sales activities are performed by the owner of a dairy.

Dairies are separated from the other facilities and represent separate entity, but there are dairies which are located within the house. Production lines are logically positioned, but in certain dairies, due to the lack of space, certain operations are performed in the same room (especially for cheese production). All dairies have fairly new basic equipment. Warehouses have automatic regulation of temperature, but

there are also dairies which keep dairy products and other components (salt, rennet, packaging etc) in the same warehouse. All dairies have introduced HACCP standards.

Dairies in the region process milk into the small number of products. The production program mostly include production of pepper in sour cream (five dairies), white cheese (four dairies) and yogurt. Cheeses belong to the category of mature, white, sliced cheese. Cheeses are mostly full-fat, although lately dairies start to separate part of fat for production of kajmak (cream cheese) and other dairy products, so that they deliver cheeses with 25% fat to the market. All dairies try to produce so called Sjenica cheese, but each dairy produces Sjenica cheese according to its own recipe. In most cases, cheese is packaged in the cans of 5 and 10 kg, although there are dairies which have smaller packaging of 1.5–2.5 kg of cheese.

Three dairies in the region produce pasteurized milk, yogurt and soul milk in different packaging. Dairies which produce pasteurized milk, yogurt and soul milk have daily transportation of products. Similar transportation system is present in the dairies which have its own retail chain. Dairies which produce cheese and pepper in sour cream transport their products once to twice a week.

Existing value chain in the dairy production is used up to the maximum and does not leave any space for additional savings, that is achieving added value. Dairies operate on the edge of profitability, whereby almost all savings have already been accomplished (low purchasing price of milk, low labor force cost, usage of less expensive energy sources, low-cost packaging, low quality enzymes and rennets etc.).

In the conducted survey, dairies have emphasized that the priority in the dairy production development is to increase milk production. The biggest need of dairies themselves is hiring quality process engineers who could develop new products or improve the quality of the existing ones. Dairies generally are not interested in getting help or assistance with the market, considering that all dairies currently have safe markets.

### House production of dairy products

Manufacturing dairy products for the market within the household is a common practice in the region, while in certain parts of the region this type of milk processing is dominant. It is not possible to determine the number of farms which process milk, and only about ten of these farms is registered for milk processing. Most of the farms, however, is not registered for milk processing which is why they must sell their dairy products to dealers. Small number of farms, however, exclusively process milk within the households, while most of them constantly or occasionally deliver milk to the dairies. These farms produce cheese, while the surplus of milk is delivered to the dairies.

Milk processing is mainly performed in the auxiliary rooms, separated parts of stable, kitchen, store-room and the like. Mostly kitchen dishes are used for the processing. Products are stored in the pantries and cellars with other products such as onion, potato, household items... These rooms do not meet minimal requirements for registration according to the current regulations.

In spite the great range of products manufactured within the household, the dominant products in the market are cheese and pepper in sour cream. Study for the protection of geographical indications of sheep and cow's cheese is made; however, these products have not yet received a certificate of geographical origin.

Dairy products are manufactured in a traditional way, however households apply different technological procedures in the production process. Also, products are not standardized even within the farm and depend on the time of year (pasture quality), milk quality etc. There is a trend in the region of adding milk of different kind, that is certain proportion of cow milk is added in the sheep milk, and vice versa. These proportions are not fixed and they depend on the time of year, milkiness, etc.

In contrast to the other regions in Serbia, the trend of selling raw milk to the regular customers in the urban environments is widespread in the investigated municipalities. This process is not in accordance with national regulations and minimal sanitary standards.

### Market

Existing milk and dairy products market is very unstable. The existing market will face a number of disturbances and problems in the future. Significant obstacles in stabilization of the market are activities which to the certain extent, or generally, are not in accordance with existing regulations and standards, for example: unregulated cross-border trade of dairy products; sales of home pasteurized milk; unregistered production of cheese and other milk products; collection of milk for other dairies and purchasing and packaging of home made cheese by certain dairies. Currently majority of existing production, organizational and market problems are solved by before mentioned activities, however with full implementation of adopted regulations these activities will disappear which will be the significant problem for producers and dairies in the region.

Dairies which produce pasteurized milk and fermented dairy products sell them at the local market, while dairies which produce cheese and pepper in sour cream mostly sell their products at the more distant markets, such as Belgrade. Dairy products, through packaging, quality and price, are fully suited for the local market, which makes dairies sell their products at lower prices, while fully preserving the product quality at the same time. Dairies which sell part or complete production through their own chain of retail stores are in the best position. The only dairy which in this moment exports constantly is dairy Zornić d.o.o. which sells about 50% of its production in the market of Kosovo, Montenegro and Bosnia and Herzegovina.

Majority of households which produces cheese has no problem with sales of their products. Sheep products are especially demanded and certain households even take orders for for this product. The biggest buyers of dairy products are dealers. Other buyers are regular customers, dairies, local stores and green markets.

### Support to dairy sector

Existing laws and regulations in the dairy sector are almost completely in accordance with the EU legislation (Directives EU no. 89/362/EEC and 92/46/EEC), but they only partially apply in practice. Significant number of farms and small artisan dairies still does not operate in accordance with the existing regulations. These farms and dairies will encounter significant problems in harmonizing their operations with new regulations and standards in the future.

The biggest support to the dairy sector is provided through the measures of the Ministry of agriculture. Currently the most important support measure is certainly stimulation of 5 RSD/l of delivered milk for the farms which quarterly deliver more than 3.000 liters of milk (during the whole year). In 2011, the Ministry, in cooperation with the local Funds for Agricultural Development, launched the activity of purchasing and distribution of imported quality breeding heads. In 2012, procurement of 250 heifers for Sjenica and Novi Pazar respectively, and 100 heifers for Tutin is planned. Funds in the amount of 80% are provided by the Ministry, and 20% are local governments' share. These funds are distributed in the form of grants. In spite the fact that the state supports the process of registration of heads, very few heads are registered in the region.

Agricultural extension services (PSS, registration services, veterinarian offices etc.) are present in the region, but are mainly focused on the implementation of measures defined in the state programs and activities, and much less on helping farmers in the field.

Regional organizations which are clearly focused through their activities on the dairy sector development are SEDA and Regional Center for Agricultural and Rural development.

Generally, farmer support system is not sufficiently developed in the investigated region, while dairy support system does not exist.

### Possibilities for value chain improvement

Existing value chain is weak. In all parts of the value chain there is a significant number of measures which can raise the level or quality of production, as well as the economic efficiency of the production.

### Primary production

Basic goal in livestock production is establishment of specialized, milk producers, and the basic goals of the primary production are as follows:

- Increase the number of heads in breeding
- Increase the production per head
- Improve the milk quality
- Efficient systems of support for farmers
- Establishment of raw material department
- Establishment of milk collection stations

### Milk processing within households

Households which sell dairy products in the market are most certainly the weakest link in the value chain of milk processing. For this category of households it is necessary to promote and encourage delivery of milk to the dairies as the safest and economically most efficient method of sales of milk in the long-term.

One group of households cannot sell the milk to dairies. These households need to be assisted in the process of:

- meeting the basic sanitary requirements for milk processing
- registration for milk processing within the household and
- standardization of production.

This group of households manufactures famous traditional products. These products need to be protected through the producers' associations, and then, with the help of local governments and internationally funded projects, these producers need to be supported when entering the market, and products need to be promoted in the market. This especially relates to the sheep cheese production and dairy products manufactured from the buffalo milk.

### Dairies

Paying for milk based on the quantity of delivered milk and contents of milk fat is not a good basis for cost-effective production and manufacturing of quality products. It is necessary to change the milk payment system in the future in such a way to encourage purchasing of quality milk. Basic measures which can improve the dairy operations in the future are:

- Better organization of milk collection process – Establishment of collection stations;
- Technological improvement of dairy operations which primarily includes standardization of production, improvement of the dairy products' quality and procurement of equipment which would increase the dairy products' quality and create prerequisites for development of new dairy products;
- Introduction of new products;

- Branding and promotion of local, traditional products, including the protection of the geographical origin of the product;
- Better organization of operations within the dairy with a goal of increasing the economic efficiency of the production;
- Establishment of the market-like operations and thinking – Strengthening the market positions of the dairies;
- Investigating possibilities for entering new, foreign markets;
- Established cooperation between processors – regular meetings at the level of regional group;

## 1. Characteristics of the investigated region

### 1.1. Basic socio-economic indicators

The region includes municipalities Sjenica and Tutin, and the city of Novi Pazar. These three local governments cover the area of 2.540 km<sup>2</sup>, which represents 2,9% of the territory of RS. The region is located in the Southwestern part of RS and borders with Montenegro to the west and Kosovo to the southeast.

According to the latest, but still unofficial data from 2011 census, the region's population is 148.784, or 4.764 inhabitants more compared to 2002. The population of these three local governments represents 2,09% of the total number of Serbia's population.

**Table 1 – Population and number of households in the investigated region**

Administrative unit	Population	% of region's population	Number of households	Household size
Serbia	7.120.666		2.497.187	2.97
Novi Pazar	92.766	62.35	23.584	3.93
Sjenica	25.248	16.97	6.818	3.70
Tutin	30.770	20.68	6.977	4.41
Total	148.784	100.0	37.379	

Source –First results of 2011 census, RZS

Considering that 2011 census data are still being processed, the 2002 census data will be used hereinafter.

The region is predominantly populated with Bosnians who represent the majority in all three municipalities (Novi Pazar-78%; Tutin-95%; Sjenica-75%).

**Table 2 – Age structure of the population**

Administrative Unit	Age structure, %			Working population (15-64)	Average age, in years
	Under 15 years of age	15-64	Over 65 years of age		
Srbija	16.34	67.12	16.54	5.032.805	41.24
Novi Pazar	25.77	65.66	8.63	56.410	33.37
Sjenica	23.63	64.13	12.24	17.938	36.02
Tutin	28.16	63.89	7.95	19.201	30.71

Source: Statistical almanac, Municipalities in Serbia, 2010., RZS

Population's age structure is significantly more favorable compared to the average of RS. The region is characterized by significantly higher share of young population and much lower share of older population compared to RS.

Educational structure of the working population is characterized by high share of population with the lower levels of education (no education at all, incomplete elementary school, completed elementary school). The share of the population with higher level of education is low, so that for example in Tutin municipality only 1,9% of population has higher education than elementary school. It is indicative that there are many illiterate people. The share of illiterate people is higher than share of population with higher level of education.

Average population density in the region is 58 inhabitants/km<sup>2</sup>, but if we exclude the city of Novi Pazar, the region has extremely low population density. Average population density in Tutin is 40 inhabitants/km<sup>2</sup>, and in Sjenica only 24 inhabitants/km<sup>2</sup> which is far under the average of RS (88 inhabitants/km<sup>2</sup>).

**Table 3 – Number of settlements, cadastral municipalities and local communities**

Administrative unit	Settlements	Cadastral municipalities	Local communities
Serbia	6.157	5.820	4.620
Novi Pazar	99	99	26
Sjenica	101	53	12
Tutin	93	58	25

Source: Statistical almanac, Municipalities in Serbia, 2010., RZS

The region is characterized by existence of large number of settlements (293), whereby each local government has approximately 100 settlements. This data points to the fact that there are many scattered/dispersed villages with many hamlets.

**Table 4 – Length of roads, in km**

Administrative unit	Length of roads, in km	Paved roads, in km	Paved roads, %
Novi Pazar	761	193	25.36
Sjenica	545	124	22.75
Tutin	830	140	16.87
Total	2.136	457	21.39

Source: Statistical almanac, Municipalities in Serbia, 2010., RZS

Undeveloped road structure is certainly one of the region's biggest problems. There are 2.136 km of roads constructed in the region, but only 457 km of roads are paved, that is 21,4% of the total road length. The biggest share in the road structure belongs to the local roads (73,7%), which are mainly unpaved, that is only 8,7% of local roads are paved. There are plans for construction of corridor 11 which would go through municipalities of Tutin and Sjenica. This highway should have a big impact on improving the region's communications.

The investigated region is one of the most underdeveloped regions in Serbia. Novi Pazar belongs to the third category of local governments rated by the level of development (achieves 60-80% of the state average), while municipalities of Sjenica and Tutin are placed in the fourth category (they achieve less than 60% of the state average). In addition to that, these two municipalities are placed in the category of devastated areas in RS.

In the previous period there were no big (foreign or domestic) investments, and by the level of investments, the observed local governments are far under the average of RS. The biggest investments, of small values, mainly come from diaspora.

**Table 5 – Number of registered commercial entities**

Local government	Companies	Entrepreneurs
Novi Pazar	792	3,953
Sjenica	164	527
Tutin	170	1,001
Total	1,126	5,481

Source –Local Economic Development office, 2011.

There are 1.126 companies and 5.481 entrepreneurs registered in the region, but in reality there are far less commercial entities, considering that table 5. includes legal entities which are not business entities (for example, local governments, local communities, different sport and cultural/artistic clubs, Red Cross etc.). The largest number of commercial entities is located in Novi Pazar, which is expected considering the population. However, generally there is a small number of registered commercial entities in the region. Predominantly there are companies and entrepreneurs which operate in the sectors of trade, services and processing industry. Basic activities in the area of processing industry are textile and food processing, but also there are companies dealing with the production of furniture, shoes, primary and secondary wood processing.

Additional problem in the economy of these municipalities is the lack of big companies. In the investigated municipalities, only one big company operates at this moment, **Sanatex d.o.o.** from Sjenica (600 employees), while only six other companies employ more than 200 workers.

**Table 6 – Number of employed and unemployed**

Administrative unit	Employed	Number of employed per 1000 inhabitants	Unemployed	Number of unemployed per 1000 inhabitants
Serbia	1.889.085	258	730.372	100
Novi Pazar	18.026	187	20.970	217
Sjenica	3.270	118	5.190	187
Tutin	3.303	103	6.280	197

Source: Statistical almanac, Municipalities in Serbia, 2010., RZS

Unemployment rate is extremely high, and the number of unemployed is higher than the number of employed. Index value of the number of employees per 1.000 inhabitants is significantly lower in all local governments than the average of RS, and the lowest one is in Tutin (103). On the other side, index value of the number of unemployed per 1.000 inhabitants is almost double in the investigated local governments compared to the RS average. High level of unemployment was to a great extent caused by closing down of big, state-owned companies which were development leaders of these local governments. It should be said that data shown in table 6. are from 2009, and that in the last two years, as the consequence of economic crisis in Serbia, unemployment rate additionally increased.

The region's economy is greatly influenced by the proximity of the borders with Montenegro, Kosovo and Bosnia. Also, the region is characterized by existence of many natural beauty locations and cultural-historical monuments, but only recently tourism and tourist attractions have started developing in these municipalities.

## 1.2. Agriculture

There are 10.821 agricultural farms registered in the region, that is 2,4% of all registered farms in Serbia (about 455.000 registered agricultural farms in Serbia). Registered agricultural farms represent about 29% of all farms in the region, while in the Sjenica municipality these farms are dominant in the total number of households (68,50% of the total number of households).

**Table 7 – Number of registered agricultural farms**

Administrative unit	Individual farms	Companies	Entrepreneurs	Cooperatives	Total	% of total households in municipality
Novi Pazar	3.518	8	1	2	3.529	14.96
Sjenica	4.662	7	1	1	4.671	68.50
Tutin	2.641	17	0	0	2.658	38.09
Total	10.821	32	2	3	10858	

*Source – Ministry of Finance, Treasury Department, 2011.*

There is a significant number of households in the region which deal with agriculture, and are not registered in the Ministry of Agriculture.

Agricultural production in the region is mixed and extensive. Land property is somewhat bigger than the Serbian average (3,5 ha), however, within the structure of the property, there is little arable land (pastures and meadows are predominant). Often the structure of individual farms include forests. The land consolidation was not done in the past, so that the land within the individual farms is divided in great number of smaller plots which are more or less away from each other.

Agricultural production is to a great extent defined by the climate, relief, quality and structure of agricultural land. The land of poor quality dominates (from IV to VIII quality grade). The land structure is dominated by natural lawns, that is meadows (33,6% of agricultural land) and pastures (52,1%). Yields of feed from these lands are low, and produced green mass/hay is of low quality.

**Table 8 – Land structure, in ha**

Administrative unit	Agricultural land	Arable land	Orchards	Vineyards	Meadows	Pastures
Novi Pazar	36.245	8.521	1.600	0	11.768	14.356
Sjenica	80.297	7.917	65	0	25.983	46.332
Tutin	39.703	3.968	298	0	14.713	20.724
Total, in ha	156.245	20.406	1.963	0	52.464	81.412
Total, in %	100	13.06	1.25	0.00	33.58	52.10

*Source: Statistical almanac, Municipalities in Serbia, 2010., RZS*

Region's arable land covers 20.406 ha (13,0% of agricultural land). The arable land is primarily used for crop farming (barley, wheat, oat, rye, etc.) and for production of fodder crops. Climatic conditions are limiting factor for the corn production, so that the corn is grown only on smaller pieces of land and it is not predominant farming culture like in most of Serbia. Yields of crop cultures per unit of area are significantly lower than the average in RS. In the crop production, there are no market surplus, because the production is aimed at cattle feeding on the farm.

Fruit and vegetable production is based on small plots of land, and mainly in those parts where climatic and land conditions for fruit or vegetable production exist (lower regions, river valleys, quality land, etc.). Very few farms has market surplus and it is sold at the local market. The production of industrial plants, herbs and spices is not present in the region.

## 2. Value chain in milk production

### 2.1. Livestock production – Farm impact

The first and the most important factor in the dairy chain is the farm. The farm impact includes several factors which directly influence quantity, quality and price of milk.

#### 2.1.1. Number of heads

In this region, the livestock production includes primarily cattle and sheep breeding, considering that number of pigs, poultry and goats is symbolic.

**Table 9 – Number of livestock heads at registered farms in the region**

Administrative unit	Cattle	Sheep and goats	Pigs	Horses, mules and donkeys	Poultry	Beehives	Fish in ponds	Other animals
Novi Pazar	7.770	11.617	469	64	6.626	5.374	20.070	
Sjenica	21.084	6.854	120	52	613	758	20.000	83
Tutin	9.934	14.188	128	160	6.617	4.655	60	5
Total	38.788	32.659	717	276	13.856	10.787	40.130	88

Source – Ministry of Finance, Treasury Department, 2011.

The table 9 shows data on numbers of livestock at the registered agricultural farms. It is necessary to note that in the observed municipalities more livestock heads are raised, but significant number of heads is not registered in the Ministry of agriculture. For example in Sjenica three largest sheep farms raise about 4.500 heads of sheep, and only about 6.800 heads are officially registered in the municipality.

Municipality of Sjenica is ranked fourth in Serbia by the number of cows, that is right behind the big centers of Belgrade, Šabac and Kragujevac. With “official” 33.000 heads of sheep and goats, the region is the center of sheep production in Serbia, and it is far ahead of other sheep centers such as Stara Planina, Svrljig, etc. Specific feature of the region is raising of significant number of female buffalos.

**Table 10 – Estimated number of cows and sheep**

Administrative unit	Cows	Sheep - In winter	Buffalos
Novi Pazar	6.500	11.000	500
Sjenica	22.500	20.000	
Tutin	6.800	10.000	400
Total	35.800	41.000	

Source – Veterinarian stations Tutin and Novi Pazar, Center for rural development Sjenica, 2012.

Number of livestock heads (especially sheep) in Sjenica and Tutin grows in the time of taking the cattle out to pasture, and it is reduced at the time of winter when cattle is taken inside the facilities. Main reason for these seasonal trends is the lack of feed in winter and small capacities of stables.

Centers of cattle production are Sjenica and Tutin, and the largest number of cows and sheep are raised at the Pešter Plains.

Number of livestock heads in the region has been reducing for the last thirty years, which is the trend characteristic for the entire Serbia. It is the result of loss of big markets during the 90's, and unregulated market relations at this moment (price disparities, unsafe markets, late payments, etc.). However, from 2011, local governments in cooperation with Ministry of agriculture perform the procurement and distribution of breeding heifers. The plan is to distribute about 600 heads to the producers, which would significantly increase and improve the livestock situation in these municipalities.

### **2.1.2. Structure of the dairy farms**

#### ***Cattle breeding***

The most households have one to three cows, and this category of households is the most common in all three municipalities. Average households which supply dairies with milk have two to six cows. Larger producers have about 10 milking heads, and the highest number of these farms is located in the Pešter region. However, there is a small number of big farms with more than 20 milking heads in the region and they are mostly located in Sjenica.

#### ***Sheep raising***

Center of the sheep production is in the villages of the Upper Pešter. There is a significant number of farms in these villages with over 100 heads. The biggest sheep farms are in Sjenica, and the owners of these farms are legal entities. These herds have more than 1.000 heads of sheep during the season.

#### ***Buffalos***

In Novi Pazar and Tutin approximately 500 buffalos are bred, but farms which raise buffalos have one or two heads. Somewhat more heads are bred in in Novi Pazar and Tutin.

### **2.1.3. Breeding composition**

Dominant breed in the cattle production is the domestic spotted cattle of Simmenthal type which represent more than 90% of the total number of cattle heads in the region. The productivity of the domestic spotted cattle of Simmenthal type has been significantly reduced due to uncontrolled cross-breeding with the low-productive breeds such as "Buša" and different cross-breeds of "Buša" and Symmental. At the bigger farms, which started the process of specialization, genes of red holstein are introduced (25 and 50% of holstein blood share) into the population of domestic spotted cattle, although in Novi Pazar there are farms with cows of pure red holstein. The presence of small number of black and white holstein cows is recorded in Tutin. Up to recently, there were domestic "Buša" in this region, but for the most part it has melted into the domestic spotted cattle of Simmenthal type.

In the sheep production the dominant breed is Sjenica "pramenka", as well as the cross-breeds of "pramenka" received by very different and unplanned cross-breeding.

#### 2.1.4. Raising

Production parameters are mainly worse compared to the technological standards.

**Reproductive features** – The first impregnation of heifers is done at the age of 14-17 months. Interval of insemination, service-period and interval between deliveries are important factors for achieving optimal reproductive power of cows and high milk production. Optimal average duration of service-period for cows of combined type of production is about 80 days, which together with the duration of pregnancy (285 days) makes the interval between giving birth to calves one year. In practice, it can very often happen that, due to the bad nutrition and shape, larger number of insemination per conception, disturbed genital cycle and reproductive organs diseases, service-period lasts longer. The consequence of that is longer interval between giving birth (13 to 14 months), longer lasting lactations (11-12 months), reduction of average milk production in standard lactation and smaller number of total lactations.

**Duration of raising and number of lactations** – Production life of cows depends on production conditions in the farm and level of production. In smaller herds cows are raised somewhat longer (10-12 years). In this period, depending on the quality of raising, cows give birth six to eight times and have as many lactations. In larger farms, cows of Symmental breed are raised 8-10 years (giving births 6-8 times, with 6-8 lactations).

**Reproduction** – The prevailing method of cow reproduction in Novi Pazar is artificial insemination. In Sjenica, natural insemination of cows is present only in remote villages, while this method of reproduction is still significantly present only in Tutin. In sheep raising, natural insemination is the only method reproduction.

During the reproduction, no attention is paid to selection, that is selection of bull semen or bull reproduction quality. Veterinarian stations have weak selection of bull semen.

**Facilities** – Cows for optimal milk production, in addition to certain feeding, need optimal microclimatic conditions in facilities. Most of the facilities (more than 95% of farms) in the region do not meet mentioned requirements. Stables are located next to houses, they are mainly old, with low ceilings, with small windows or without them and without vertical ventilation channels. There are facilities which became stables by reconstruction of other buildings (warehouses or old houses), and they also do not meet basic zoohygienic conditions. Average stable area per head is 6-10 m<sup>2</sup>/head, which is the minimum or under the technological minimum for cow raising. In these stables it is not possible to introduce machinery for work processes. On certain number of new facilities/stables (which were built without project documentation), the same mistakes were made like for the stables built in the previous period. The only difference, which additionally worsens microclimatic conditions in the new facilities, are concrete ceilings which, together with non-existing or inadequate ventilation or thermo-insulation, cause condensation of water vapor in the winter time and increase of relative air humidity in the facility. Newly-built facilities are constructed based on tradition and old knowledge, and not on a basis of technological standards.

Sheep facilities are in especially bad shape. In most cases those are improvised facilities which only aim to protect animals from snow and frosts during the winter period.

Auxilliary farm facilities do not exist or are improvised which directly impacts the quality of nutrition and production parameters.

**Raising** – In the investigated region, cows are raised traditionally/extensively, regardless of the farm size. Cattle spend winter months in the facilities, tied, although, when there are nice winter days, it is

taken out near the house. Sheep are in the system of free raising inside the facility during the winter months.

In summer, livestock is taken to meadows and pastures. In the evening cows are taken back to facilities for milking, and in the morning, after milking, they are again released to the pastures. In the remote villages of Pešter there is a practice of keeping livestock outside during the night as well..

### 2.1.5. Feeding

Feeding system significantly varies depending on the size and the level of specialization of the farm. The feeding system varies from very extensive, based on green mass (in the summer) and hay without significant addition of concentrated feeds, to the system in which there is significant share of concentrated, grain-like and high quality feeds.

#### *Lawns*

Big areas under the natural lawns in mountainous regions have two-fold usage. In spring, when the yield is relatively high, they are used as meadows and they are mown. In less productive, summer, period, they are used for pasture.

Pastures in the region have low yield (4-10 t/ha) and bad quality of grass mass (unsatisfactory florist contents with relatively small share of valuable grass mass) which is the consequence of many years of unplanned usage and constant degrading of lawns. Pastures are used for grazing, partly natural meadows (only after mowing) as well as meadows which are suitable for mowing. Land improvement measures are not implemented on the pastures. Duration of grazing period lasts, depending on a year, five to six months.

*Meadows* – In the structure of meadows, areas with natural meadows are dominant, compared to more quality and productive sown meadows. Natural meadows are located on the lower quality soil. Average hay yields in the low lands are in the range of 2-5 t/ha, while they are much lower in the mountainous areas, and they are about 1,5-3 t/ha. Produced plant mass is of middle to low quality. Natural meadows are not cultivated, and usually yield one swath per year.

Sown meadows (grass mixtures) are based on quality land, so their quality and productivity are higher (5-8 t/ha of hay). However, degradation of sown meadows is very frequent. The most frequent reasons for sown meadows degradation are: inadequate choice of grass mix, inadequate lawn care and longer utilization of sown lawns than optimal, which is why they gradually turn into natural lawns. Number of swaths varies depending on the age of lawn and climatic conditions during the year. Most oftenly these lawns yield three swaths in the early years, and two swaths in the later years.

Mowing is usually done much after the optimal time, which produces bigger yield of plant mass, but also hay of lower quality and less nutritive value. Animals unwillingly consume this kind of hay, which also comes from meadows of bad phytocenological structure, and that has a bad effect on productivity.

Produced green feed from meadows is almost completely used for preparation of hay, while small quantities are used for feeding animals in the form of green plant mass. Hay is baled on most of the farms, but the traditional storage of hay in stacks is still very much present. Hay is usually of low quality (late swath, grass mass of poor quality, great losses during the hay storage, etc.). Lately, the trends of constructing eaves for hay and baling of hay have become widespread.

Preparation of hayage from meadows practically is not present, except at some producers with larger number of cows. In Novi Pazar and Tutin, preparation of corn silage has started in the small number of

farms in recent years, while in Sjenica, about fifteen larger farms have started preparing hayage and silage made of peas-oat and sweet peas-oat. Silage of plant mass is performed in provisional silo trenches. Different extension services promote usage of silage and hayage. Usage of silage and hayage in nutrition of cows has unjustifiably been neglected.

**Arable land** – The most common is production of bulky feed, and before all perennial plants (clover and some alfalfa). Greater areas under these cultures are present in the farms with five or more cows. In the farms with less heads, areas under these cultures, as well as quantities of produced feed are insufficient for satisfactory productivity.

For one head of cattle, which averagely consumes about 10 kg of grass mass/100 kg per body mass, it is necessary to have from 0,5 ha of intensively grown lawns to more than 5 ha of natural grass areas. In the investigated region, due to the lack of cultivated grass areas, bad production results are present in the milk production. A number of adequate measures for improvement of grass areas usage efficiency and for productivity increase can be recommended in this segment of livestock production.

### **Concentrated feeding**

Relatively high and profitable milk production cannot be achieved without quality bulky feed and different forms and quantities of concentrated feeds (grain feeds, secondary products of food industry and full and additional mixtures and premixtures).

Specialized farms for milk production have their own production of crops, primarily barley, oat, wheat and rye, and they only purchase protein feed (usually livestock flour), additives with minerals and vitamins, and corn (for mixing with other crops) in the market. These farms have improvised mixers (100 kg of capacity) in which cattle feed is prepared.

Farms that do not have their own production of crops, in certain stages of production, purchase corn and/or ready-made concentrates.

There is no significant corn production in the region, so that the corn is purchased in the market. Ready-made concentrated mixtures for cow feeding are not used much in the farms. In cases when they are used, usually full feed mixtures are purchased - concentrate for cows in lactation (most frequently with 16 and 18% of raw proteins), and full feed mixtures for calves' feeding. In addition to corn and ready-made concentrates, livestock flour is also purchased very much, while mixtures with vitamins and minerals and mineral feeds are little used in cattle feeding. Insufficient usage of these mineral and vitamin additives and feeds is especially present in the small farms.

***Cattle feeding is not based on technological standards for nutrition of certain livestock categories, but on the basis of their own knowledge.***

***Lack of feed during the winter period is one of the limiting factors for production increase.***

***Meals are not balanced in regard to protein and energy contents, they are lacking when it comes to contents of certain protein fractions, and also they often lack certain macro and micro elements, as well as vitamins. All of this has a more or less negative impact (depending on the specific animal and a meal) on production – milkiness of cows, health, reproductive performances and duration of animal usage. All mentioned factors impact the profitability and cost-effectiveness of the production.***

### **2.1.6. Health and veterinarian care**

The biggest health care problems in the investigated region are clinical and subclinical mastitis. Among other health problems of cows which significantly impact milk production, the most important are sporadic digestion disorders.

Factors, which were spotted when analyzing milk production conditions, are also problems with irregular fertility and cows' deliveries. These problems can often result in lasting sterility and removal of a head from the herd. Reasons for periodic sterility may be very different (various infections of the genital tract, cysts on ovaries, inactivity of ovaries due to weak nutrition and shape - "hungry sterility", scars on the uterus cervix which were created after damaging the cervix during the previous hard delivery). Problems with extremities and presence of ecto and endo parasites are sporadic.

Veterinarian interventions are rare. Veterinarians are often called for hard delivery, mastitis, indigestions and pareses.

### **2.1.7. Milking**

Milking and milking procedures are very important factor in the milk production process. Preparation for milking, milking process itself and procedures after milking significantly contribute to quality and quantity of received raw material.

Cows are milked two times in Novi Pazar. At Sjenica and Tutin farms, cows are milked three times during the period of high milkiness, and then two times when milkiness reduces.

Manual milking is predominant in the farms with small number of cows. Middle and big farms practice milking with small (4x1) manual portable milking device of mainly low quality. There are no farms with stationary or semi-stationary milking systems in the region.

Sheeps are milked three times in the beginning of the milking period, but in the period prior to drying, sheeps are milked twice. Sheeps are milked in the period from beginning of May to the end of August. Manual milking is the only method of milking in sheep raising.

The milk is mainly milked in the plastic or aluminum cans which are banned in the EU countries, while there are very few households with steel cans. In this region, there are only few bigger farms which have lacto-freeze devices, so that milk is kept in the cans up to the time of delivery. The cans with milk are kept in different places on the farm aiming to preserve the optimal temperature (cool places, pantry, wells, refrigerators, tubs with water, etc.). Significant number of producers who process the milk within the households does not cool the milk, but the milk is immediately cooked, that is milk processing starts instantly.

Important factors which impact the udder inflammation and production of low quality milk or bad milk are: improper milking (too short or too long milking), defective milking devices, bad milking hygiene, too much pressure in the milking system, bad hygiene of cows and stables, bad microclimate in the stable, bad nutrition, inadequate milk storage, etc.

Procedures before, during and after the milking indicate very low hygiene of milking and bad microbiological quality of received milk. On the other side, dairies demand quality and hygienically correct milk, considering that bad quality milk reduces the shelf-life of dairy products and that high quality dairy products cannot be produced from low quality milk.

## **Milk quality**

The procedure with milk after milking consists of primary processing in the farm itself and secondary processing in the dairy. Milked milk must be taken out of the stable as soon as possible into the improvised dairy with lacto-freeze which has regulated the outflow of waste waters. This improvised dairy must have tiles on the floor and walls (suitable for detailed washing and disinfection). Usually this room is used for keeping, washing and disinfecting all parts of the milking system, milk cans and other equipment. Cleaning agents must not be kept in the improvised dairy.

As few microorganisms as possible should enter milk. If milk is not cooled down to 4–6°C immediately after milking, it becomes ideal environment for growing and reproduction of bacteria, which disturb the structure and quality of milk.

### **2.1.8. Milk yield**

The milk production is clearly characterized by seasonality. The highest production of milk is achieved in the summer months, while the period of drying is during late fall and winter.

Average milk yield of cows in the standard lactation (305 days) is about 3.000 kg (it can vary from 2.500-4.000 kg). Average milk yield of cows in the standard lactation in the bigger farms, which are in the process of specialization, is about 4.000-5.000 kg. Milk yield of the Symmental cow population in the investigated region is somewhat lower than average in RS.

The milking period for sheep lasts about 120 days from May-September. In this period 40-50 l of milk is milked (0.3-0.5 l/day).

## **2.2. Pešter dairy**

### **2.2.1. Milk production**

Based on the official data on number of heads, herd structure, standard rebuilding rate of herd and average milk production in the standard lactation, the estimate is that annual production of cow milk in the region is about 70.000 t. The estimate of the local extension services is that number of cows increases during the season, as well as that certain number of heads, for various reasons, are not in the records of the Ministry of Agriculture. Based on these assumptions it could be concluded that additional 5.000-10.000 t of milk are produced in the region, however, in further calculation, official data of the Ministry of agriculture have been used.

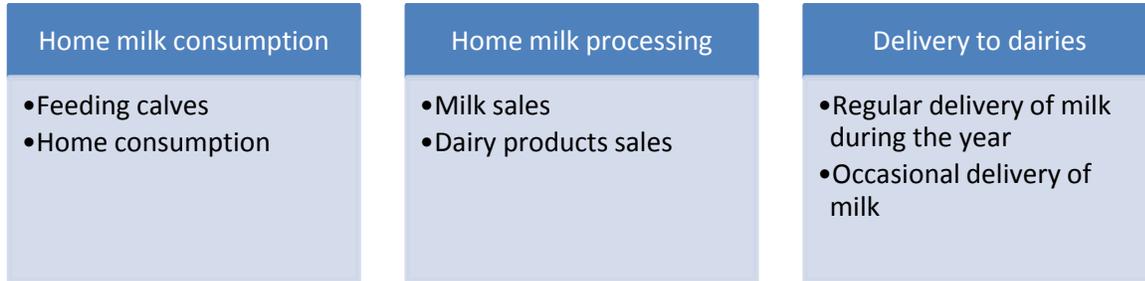
The production of sheep milk, used in processing, based on official number of sheep is estimated at about 1.200 t/annually. This value should be accepted as minimal production of sheep milk in the region. Estimate is, however, that the production of sheep milk is for about 30% higher, that is about 1.600 t/annually.

Estimated quantity of produced buffalo milk in the region is about 750 t, however, only symbolic quantity (100-200 t) of this milk remains for processing.

## 2.2.2. Milk consumption

### *Milk consumption channels*

**Diagram 1 – Milk consumption channels**



Most of farms in the region have three up to three cows (over 90% of farms). Farms with small number of cows mainly do not have market surplus. Market surplus of milk appears during the season and in this period farms sell milk to dairies or process it themselves. Milk production in these farms is not economically profitable and number of these households will be reduced in the future.

Middle-sized farms with three to ten cows have market surplus during the whole year. Most of these farms deliver milk to dairies all year round. Different to other parts of Serbia is that in these farms lower milk production per cow is achieved, and significantly higher quantity of milk remains in the farms (own consumption and cheese production).

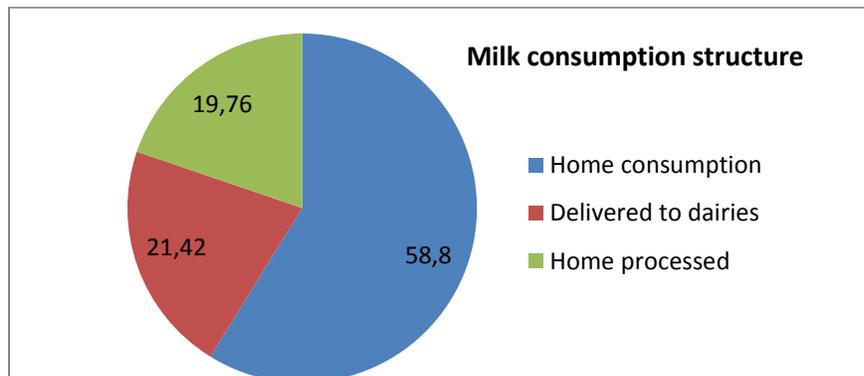
Big farms with more than ten cows have started the process of specialization and they deliver all their milk to dairies. There are very few of these farms in the region.

### *Milk consumption structure*

When calculating the structure of consumption, in the graph – Milk consumption structure, official data on milk production and milk purchasing by dairies were used, technological standards in feeding calves and estimated data on household milk consumption received from the interviews conducted in the field.

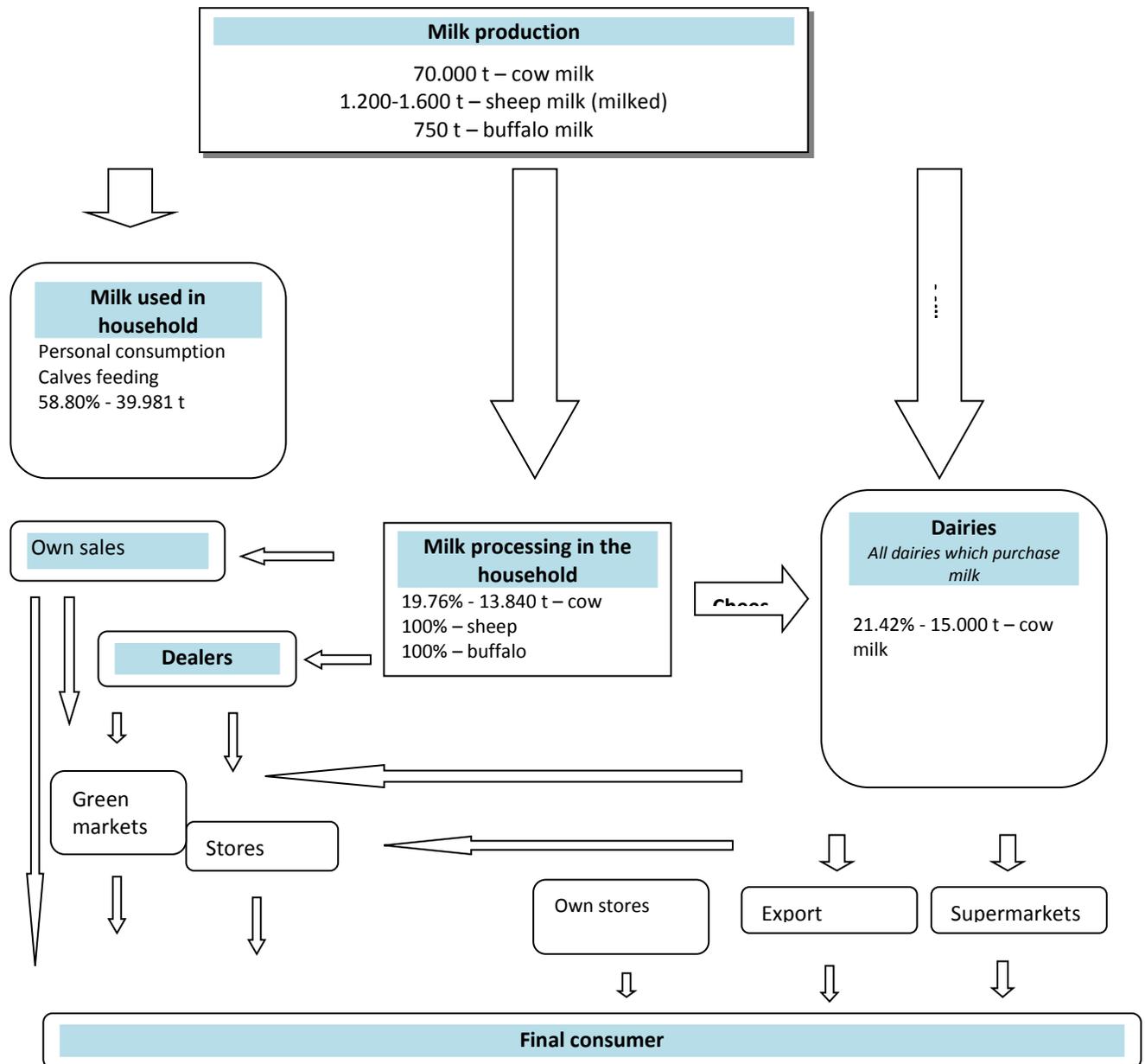
Complete quantity of sheep and buffalo milk is used or processed in the households. Certain dairies from Sjenica purchase sheep milk and cheese, but the quantity of the purchased milk and cheese depends on a given year, and it is not possible to show it as regular trend.

**Graph 1 – Milk consumption structure**



## Value chain

Diagram 2 – Value chain



## Home milk consumption

Most of produced milk in Serbia remains in the farm (about 70%). It is estimated, however, that more milk remains (about 80%) in the farms in the region compared to average in Serbia. Farms keep milk for various reasons and the most important are:

- Very important element of milk consumption is duration of calves' nursing. Standards recommend milk feeding for 60 days, with six liters of milk used for feeding daily. This milk feeding system is not in use in the investigated region. Calves are fed with milk 60-90 days, and

average quantity of consumed milk is more than 10 liters per calf daily (12-15 kg/day). This parameter of milk consumption represents 41,14% of milk production per cow in standard lactation (depending on cow productivity and duration of calves' "fattening").

- The quantity of unpurchased milk includes the milk which is consumed in the household. In small mixed farms, with one to two cows of low milk yield, there is no market surplus of milk. Feeding calves with milk and consumption within the household are basic channels of milk consumption in this biggest category of households.
- In the developed dairy regions, almost all milk is purchased by dairies. On the other side, in the investigated region, there is still strong tradition of cheese, cream cheese (kajmak), etc, production. Within the household, this type of production can consume up to 50% of milk production in certain region.
- Cheese production within the household is also very much present in areas where sheep raising is developed. Thus, part of cow milk is consumed for production of "sheep cheese".
- It can be noted that farmers deliver milk only in those regions where dairies regularly pay for that milk. In regions where payments are late, and where only basic price is paid, production of dairy products within households is much more present.

***Estimate is that about 41.130 t of milk remains within farms annually, or more than 50% of the total milk production in the region. Most of it is consumed for calves feeding (28.800 t), but significant quantity is consumed for nutrition within the households.***

### 2.2.3. Milk purchasing

#### *Purchasing*

Total purchased milk by dairies in the investigated region is about 8.000 t, while the total purchased milk by all dairies is about 15.000 t/annually.

Table 11 shows data on milk purchase in 2009, considering that was the last year in which almost all farmers who had delivered milk received premiums, so that there were reliable records on milk purchase structure in the region.

**Table 11 – Milk purchase by dairies in the region, 2009.**

Dairy	Purchasing, annually.	Farms	Cows	Structure of farms from which milk is purchased, cows				Milk delivered annually	
				1-3	4-5	6-12	12+	Per farm (l)	Per head (l)
Zornić d.o.o., Tutin	3.022	579	2,993	233	233	163	0	20.61	3.99
Beni-komerc, Sjenica	1.154	145	788	56	56	52	0	27.30	5.02
Etno-Produkt d.o.o., Sjenica	997	171	395	20	20	4	0	19.66	8.51
FASS d.o.o., Sjenica	839	124	363	23	23	6	0	20.03	6.84

Dairy	Purchasing, annually.	Farms	Cows	Structure of farms from which milk is purchased, cows				Milk delivered annually	
				1-3	4-5	6-12	12+	Per farm (l)	Per head (l)
Biomlek d.o.o., Sastavci	658	118	341	10	10	2	0	17.76	6.14
Sandžak-Komerc, Sjenica	619	113	606	33	33	29	0	27.89	5.20
Sjeničanka ad, Sjenica	429	102	340	35	35	10	0	17.04	5.11
zz Simlek, Deževa	196	29	57	2	2	0	0	20.35	10.35
<b>Total</b>	<b>7.914</b>	<b>1.381</b>	<b>5.883</b>	<b>412</b>	<b>412</b>	<b>266</b>	<b>0</b>	<b>5.730</b>	<b>1345.2</b>

Source: Ministry of agriculture, 2010.

In addition to above mentioned dairies, in the investigated region milk is also collected by:

- **Milkop**, Raška – **Milkop** is one of the region's biggest milk purchasers with more than 10 t of purchased milk a day.
- **Ljin**, Raška, purchases milk in certain villages of Novi Pazar and Sjenica.
- **Finagro**, Raška, purchases milk in villages of Novi Pazar.
- **Moravica**, Arilje, occasionally purchases milk (depending on needs) in certain villages of Sjenica.
- **Valeta** dairy purchased milk in Sjenica, but it closed down in 2011.

**Zornić** i **Milkop** dairies are the biggest milk purchasers in the region. Dairies are characterized by small milk purchase. Only two dairies purchase more than 1.000 t/annually, while the purchase of all other dairies in the region is lower than 1.000 t/annually. These dairy capacities and quantity of purchased milk by dairies indicate that all parts of value chain, including dairies, are extremely weak.

Dairies purchase milk from 1.381 farms (10% of total number of registered agricultural farms in the region) which raise 5.883 cows (about 20% of total number of cows in the region).

Averagely, 15,9 l of milk/day is purchased from farms, or only about 3,73 l/day per cow, which is much lower than Serbian average. According to these data, investigated region is in the group of counties with the lowest quantity of daily purchased milk per cow/day, that is the lowest quantity of milk purchased per farm/day.

Most of farms have up to five cows. There is a significant number of farms with 6-12 cows. There are no big farms with more than 12 cows. Stated indicators clearly show bad structure of milk purchasing which reflects in existence of many farms from where the milk is purchased, small quantity of milk per farm, etc.

Dairies purchase milk all year round. Milk purchasing, however, is characterized by big seasonal variations. Extreme seasonality in milk production is significant limiting factor in dairies' operations.

Certain dairies purchase cheese, and not milk, in the field. Cheese purchasing is not done during the whole season, but in certain years.

Very important data is that milk purchasing by certain dairies depends primarily by possibility/impossibility of sales of dairy products.

***Dairies purchase about 15.000 t of milk annually which is about 21.42% of estimated quantity of milk in the region. Most of it is purchased by the dairies in the region, that is 7.914 t, while the rest is purchased by dairies from surrounding municipalities.***

### **Price**

Payment – Milk is paid based on delivered quantity and share of milk fat in milk.

Milk quality – No dairy makes payments based on the quality of delivered milk (contents of proteins and microbiological quality of milk).

Price – Average purchasing price of milk is 6,5-7,0 RSD/fat unit, or 27-32 RSD/liter of milk.

Time of payment for milk is about 30 days.

Stimulations – Certain dairies stimulate producers who deliver most quantities of milk by paying additional RSD/l of delivered milk.

Reward or punishment system – It does not exist

Contracts with farmers – They do not exist

Dairies have established smaller or larger groups of farmers who regularly supply them with milk, however, there are no contractual relations between dairies and farmers, which at the moment suits both farmers and dairies, but it creates insecure business environment. The practice has shown that this relationship is not sustainable in the long run, which is why big dairies in Serbia have already established a network of regular suppliers.

Farmers, but dairies too, are not happy with this method of control and payment. Farmers do not know what the quality of their milk is, do not have guaranteed sales, they are not stimulated to improve the quality of milk and do not get better price for better quality milk. On the other side, dairy gets low quality milk. Low quality of raw milk significantly impacts the quality and shelf-life of the final product.

Larger dairies, which care about the quality of milk, introduced the system of punishment for delivery of milk with water, antibiotics or large quantity of bacteria. The system of punishment, however, cannot properly function when there is a lack of milk, so that local dairies purchase all milk offered, and it is interesting that some dairies knowingly purchase low quality milk in order not to lose suppliers. Thus, dairies make damage to themselves.

Basic reason for the bad price policy towards the producers is weak financial capacity of dairies which cannot raise the purchasing price of milk. Additionally, dairies get low quality milk and thus have low quality products, which prevents them to raise the prices of final products in the market.

***It is necessary to start giving premiums for delivered quality milk in the upcoming period and to establish minimal standards in purchasing to be respected by all dairies.***

### **Milk collection and purchasing stations**

There are no purchasing stations in villages of the region. Milk is collected only at homes.

Except for certain villages in Upper Pešter, dairies purchase milk from all villages and regions where there is milk.

Dairies **Ljin** and **Milkop** from Raška purchase most milk in Novi Pazar, and also cover parts of Sjenica and Tutin municipalities. In Tutin, most milk is purchased by **Zornić** dairy which also covers good part of Upper Pešter area (Sjenica and Tutin municipality).

Sjenica dairies are of small capacity, and each dairy has its region where it collects milk. In most cases those are two to six villages which are in the territory of municipality, in the area of Lower Pešter. These dairies do not purchase milk outside of municipal borders. Dairies **Lav** and **Zornić** have their own farms, and they get most of milk from their own farms.

Current price and demanded quality of milk allow collection at homes. With strict implementation of the Rulebook on necessary standards in milk production, this purchasing system will definitely collapse. Prescribed milk quality is not achievable with this method of purchasing. In addition, abandoning this system of purchasing will reduce space for manipulation with quantity and price of milk by all actors in the chain.

There is small number of lacto-freeze devices in the field, mainly of small capacity (up to 500 l). Milk is delivered in cans. There is a widespread idea and initiative to increase number of lacto-freeze devices which should be at purchasing stations for a village or part of a village. It must be noted that in the situation when there is no regular and serious milk quality control in the field, this system has serious deficiencies. The most important one is that one producer with low quality milk can spoil the quality of milk of all producers who deliver their milk into the same lacto-freeze device.

***When establishing purchasing stations, all hygiene and milk quality control procedures must be respected.***

***The upcoming period must bring changes in the area of milk collection method in order to provide constant supply of raw material and to improve milk quality.***

### ***Transportation***

Transportation of milk must not cause lowering of milk quality, and temperature of milk during transportation must not be above +8 °C.

Transportation is done with own or rented trucks (contracted carriers), and number of hired trucks, depending on a dairy, varies from one to eight. Small dairies like having contracted carriers because costs of management, organization, sales and operations are lowered. Part of the raw material department work is transferred to drivers.

Vehicles are mainly obsolete, but the bad shape of the village roads is one of the reasons why hired carriers and dairies are not interested in procurement of new trucks. Contracted carriers use trucks for other purposes, transport of goods to the green market, rent of services, construction, etc.

Trucks usually have tanks (1000-3000 l) made of pure steel, but plastic material tanks still can be seen and they should be withdrawn as soon as possible since they do not meet existing regulations. Dairies in the region do not have tank vehicles (characteristic for big dairies)

In comparison with the most of dairies in Serbia, the investigated dairies have relatively short lines of supply (25-50 km). All dairies respect the process of maintaining the cold chain (temperature of milk during the transport must not increase more than 2-4°C).

The truck on the collection line, depending on dairy, collects milk from 30-100 producers, and in most cases tanks for milk purchasing are 70-80% full. Interesting data is that, different from other regions in Serbia, there are dairies whose tanks are only about 50% full. It is very important that transportation of milk is done with well-filled tanks in order to prevent churning of milk and decomposition of milk fats in milk.

Vehicles are washed after finished transportation, but no dairy has introduced the process of washing efficiency control (taking swabs from inside of tank, rubber hoses, valves and other parts).

The price of transportation is 2,5-3 RSD/liter, which corresponds with the calculation of big companies where transportation price per liter of milk is 8% of the price for the liter of milk. Basic calculation showed that the costs of collection are about 1,0 RSD/l, which corresponds to international calculations. Carrier's earning is added to this price, about 0,5-1,5 RSD/l. Real price of transport is somewhat higher when taken into account costs of technical maintenance, vehicle wear and tear, accomodation and protection. These costs are covered by carriers from their earnings.

***Transportation costs can be lowered by establishing regular producers and purchasing stations. Thus daily milage is lowered and better operational performance per truck is enabled.***

#### ***Increase in productuion – purchasing***

In contrast to other regions in Serbia, dairies in this region have very favorable situation since there is a significant milk production. Region's dairies, however, do not help farmers, do not do anything to organize farmers, do not provide education, extension services, development of action, construction and other plans. Dairies will have to change this approach in the future in order to increase milk purchasing and increase milk production in farms.

Well-organized dairies in Serbia started the process of farmer support several years ago. In most cases these dairies helped farmers specialize in production, and for that purpose they provided projects, gave guarantees for bank credits (silo combines, construction of new facilities, equipment and the like.) or procured and gave loans to farmers for their needs (import of heifers for repoduction). In case of dairies procuring equipment, machinery, heifers, etc. for farmers, these farmers return these funds through delivered milk.

Special problem in the region is lack of adequate raw material department. Industrial dairies in Serbia have raw material departments which control milk at "purchasing stations", are present in the field and controls milking as well. These dairies have notebooks with objections and lists for defining problems at the places of milking. Thus dairies constantly control every farm.

#### **2.2.4. Dairies**

There are about 200 registered dairies in Serbia. This number has varied from 195 to 240 in the last several years, with the trend of reducing the number of dairies. The region has six active, registered dairies. Number of dairies in the region, as well as in Serbia, is not constant, that is every year some dairies close down and some new ones start their business.

### Structure

All dairies are privately owned. Dairies can be divided in two groups. The first group consists of dairies which deal only with purchasing, processing and sales of milk, while the other one consists of dairies which conduct their business within bigger commercial systems (stores, slaughterhouse, farm, etc.).

### Capacities

There are 13 dairies in the region, and six of them are operational.

**Table 12 – Registered dairies in Sjenica, Tutin and Novi Pazar**

O.n	Dairy	Municipality	Status	Capacity, l/day	Annual capacity, t
1.	Zornić d.o.o.	Tutin	Operational	10.000	3.650
2.	Simlek z.z.	Novi Pazar	Not operational	3.000	1.095
3.	Lav d.o.o	Sjenica	Operational	2.000	730
4.	Fass d.o.o.	Sjenica	Operational	2.800	1.022
5.	Šanac	Sjenica	Operational	200	73
6.	Sjeničanka a.d.	Sjenica	Operational	2.000	730
7.	Beni komerc	Sjenica	Operational	10.000	3.650
8.	Korzo	Sjenica	Not operational	1.500	548
9.	Sandžak commerce	Sjenica	Not operational – under repair	5.500	2008
10.	Nerko	Tutin	Not registered		
11.	P.T.U.P Etnoprodukt	Sjenica	Not operational	4.000	1.460
12.	SZR Tisovac	Sjenica	Not operational	2.000	730
13.	SZR Biomlek	Sjenica	Not operational	800	292
	<b>Total</b>			<b>43.800</b>	<b>15.988</b>

Source – Local Economic Development Office, 2011.

The region is characterized by large number of small capacity dairies, which is typical for undeveloped, mountainous and traditionally livestock breeding regions in Serbia. Namely, in regions with big production of milk (vicinity of Belgrade, Vojvodina, Posavina, etc.) there are usually few dairies, and purchase is done mostly by dairies from former Danube Food Group (DFG). In regions with lower milk production (Pčinja, Pirot, Zlatibor counties), there is no purchase by industrial dairies, and there are more dairies which are of small capacity.

According to professional classification, all dairies in the region belong to the category of small artisan dairies. All registered dairies are of very small processing capacity and there is no dairy in the region with higher capacity than 5.000 t/annually (minimal acceptable standard in our conditions is 10.000 t), and nine dairies have the capacity of under or about 1.000 t/annually. Existing dairies operate with high level of utilization. Small dairies are exposed to big risks of conducting business in the market, have no human resources, cannot make good organization of work and what is most important, do not have

possibilities for organization of milk purchasing. These are basic reasons for decline of the small dairies in all of Serbia. The region of Novi Pazar, Tutin and Sjenica is an example for these statements considering that eight dairies are not operating at the moment.

Currently, the renewal of dairy within **PIK Pešter**, Sjenica is announced. This dairy could make a big change in the dairy sector, since the plan is to establish high production capacity dairy which would very much rely on milk received from its own herd.

### ***Packaging and raw material***

Basic inputs in dairy business, in addition to milk, are packaging and enzymes/rennets. Costs of packaging and packing are the second biggest financial cost for the local dairies. Dairies, however, do not analyze these costs, nor there is clear records on the structure of these costs. Dairies are not familiar with characteristics of enzymes/rennets which are procured in the market.

Different product range of the local dairies dictates procurement of very different packaging, so it is impossible to group these costs.

### ***Management***

There is no dairy in the region with raw material department, while carriers are usually in charge of testing the milk quality in the field.

Existing dairies employ from two to 22 workers. Out of six operational dairies, four have process engineer as a full-time employee. Process engineers have not attended additional trainings and specializations. They are not part of the process of regular education and acquiring of new knowledge in the area of dairy production (seminars, literature, etc.), which is the limiting factor in the process of development of new products and quality improvement of the existing products. Sales department exists in dairies which are part of bigger companies dealing with other business activities too, while in other dairies, procurement and sales activities are performed by the owner of dairy.

***These data indicate simple organizational structure of the existing dairies which needs to be improved in the future.***

### ***Quality testing***

In the investigated region, milk is still purchased without control. Besides organoleptic examination done by a driver or purchaser, milk is additionally alcohol tested. Alcohol test is done in dairies or at the purchasing place. Purchasers, who purchase milk for small dairies, do not perform this test regularly.

If the milk meets the requirements, it is poured in the milk weighing device where exact quantity of delivered milk is determined. Milk quantity is recorded in the raw milk purchase log, and milk is poured into the tank. In big dairies in Serbia, purchaser takes average milk sample every day for antibiotic residue testing. At the small dairies, milk sample is taken in the dairies. Small dairies are testing the sample in the processing plant, while in the purchasing system of big dairies testing is done at each purchasing station.

Acceptance of milk in a dairy is done at the acceptance ramps, where the quantity of milk, its temperature and quality are determined.

Region's dairies do not valorize contents of other components, primarily proteina and dry matter. Also, level of milk pollution by other substances which lower the milk quality is not evaluated. Microbiological

quality of milk is controlled once to twice a month based on the milk sample. Microbiological quality controls is done by the laboratory of the Veterinarian Institute in Kraljevo.

There is no complete technological milk quality control in the region, and small dairies mostly do not pay too much attention to technological quality control of milk. Big dairies, based on laboratory results of milk, implement special programs of control and education of farmers. These dairies stimulate producers who produce milk with small number of somatic cells and microorganisms. Milk with under 100.000 microorganisms and 400.000 somatic cells in ml of milk belongs to the category of superior class, and it is specially stimulated. In addition to this class, dairies accept three more classes of milk (I, II i III class of milk). Stimulation is given for milk with 3,70% of fat and 3,15% of protein.

### **Working area**

Dairies cover small space/area. Most of the region's dairies are separate units, although there are dairies which are located within a house or a farm. Dairies have separate lines for acceptance of milk and delivery of products. Access roads have been regulated. Almost all dairies are fenced, or will be in a short period of time.

Production lines in all dairies have logical layout, but in certain dairies, due to the lack of space, some operations are performed in the same room (especially for cheese production).

All dairies have basic equipment (acceptance vessel, homogenizator, separator, pasteurizator, tub, etc.), which is fairly new. All vessels in production are of pure steel. Dairies, however, do not have modern equipment which would increase the product quality or enable production of new dairy products.

Warehouses have automatic regulation of temperature. Certain dairies have more warehouses, depending on the production program, but there are dairies which have one warehouse where they store, in addition to the dairy products, other components as well, such as salt, rennets, new packaging, etc.

Internal hygiene of the working areas is at the satisfactory level. All dairies have auxilliary rooms (toilets, dressing rooms, laboratories...). Floors and walls are covered with ceramic tiles. Solid waste is taken by the city utility company to the municipal landfills, while waste water is stored in cesspools which are regularly emptied.

### **Certificates**

All dairies have HACCP standard. Bigger dairies have ISO 9001 standard as well. Certain dairies have or will introduce Hallal standards in dairy production. Three dairies have export number, but other dairies are in the process of getting the export number.

### **Products**

Basic characteristic of dairy products and milk production in the investigated region is the low level of dairy products processing. Region's dairies process milk into small number of products, and production range is very similar to the products manufactured within the households. The production program mostly includes pepper in sour cream, white cheese and yogurt. There is no product which is manufactured by special producer specification in the region.

**Table 13 – Products manufactured in dairies in the investigated region**

<b>Products</b>	<b>Packaging</b>
Yogurt	Plastic cups of 0.2 l, plastic bottles 0.5 and 1 l, Tetra Pak 1 l
White sliced cheese	Depending on the customer needs
Sour milk	Plastic cups of 0.2 and 0.5 l

Pasteurized milk	Plastic bags of 1 l
Whey	Plastic bottles of 1 i 2 l
Sour cream	Plastic cups of 0.2 l, containers of 1 l
White crushed cheese	Depending on the customer needs
Cream cheese (kajmak)	Depending on the customer needs
Pepper in sour cream	Plastic boxes of 1 to 5 kg
Yellow semi-hard cheese	Different packagings of 0,4 to 1 kg. Vacuum packaging

*Source – Interview with dairies, 2012.*

The Rulebook defines 13 products which are categorized as sour cream. The most common product of the local dairies is pepper in sour cream which is produced in five dairies. Reason for production of pepper in sour cream in almost all dairies in the region is tradition, but it is necessary to note that production of pasteurized sour cream requires the least technological level of processing. Pepper in sour cream is packaged in plastic cans of 1-5 kg.

The second most important dairy product is cheese. Four of region's dairies are registered for production of cheese from steamed dough. All cheeses belong to the category of mature, white, sliced cheeses. Level of maturity of these cheeses depends on a dairy. Cheeses are mainly full-fat, although lately dairies have started separating part of fat for production of cream cheese (kajmak) and other dairy products, so that they sell cheeses with 25% of fat in the market. All dairies try to produce so called Sjenica cheese, but each dairy produces Sjenica cheese according to its own recipe. In some cases, this so called Sjenica cheese is not even standardized within one dairy. dairies have very different cheese packages. In most cases, cheese is packaged in the cans of 5 and 10 kg, although there are dairies which have smaller packaging of 1.5–2.5 kg of cheese. Yellow and crushed cheeses, which belong to the category of cheese which do not mature, are produced in two dairies respectively.

Three dairies in the region produce pasteurized milk and fermented dairy products (yogurt and sour milk). Pasteurized milk is packaged in the plastic bags of 1 l. Yogurt is packaged in cups of 0.2 l, or plastic bottles of 0.5 and 1 l. Only **Zornić** dairy has started production of yogurt in Tetra Pak packaging of 1l. The most common packaging of sour milk is the cup of 0.5 l. Other types of fermented dairy products such as sweet and aromatized yogurts, fermented dairy products with probiotic bacteria and similar products are not produced in the region. There is no production capacity in the region for specialized products such as sterilized milk, powder milk, butter (and complex butter-like products), etc.

### **Branding**

All dairies have labels on their products and their own brand. Certain dairies work for big supermarket chains deliver products in big packaging. The brand is not visible on these products in the stores since products are sold in bulk.

Logo design and label is created in the beginning of dairy operation and it is not subject to change over time. Nevertheless, some dairies have changed their logos and labels with the support of various projects. Common conclusion for the investigated dairies is that logo/brand does not affect their market success, but that other factors have much higher impact, primarily price and product quality.

### **Distribution**

All dairies transport their products to the customers, but the transport dynamics is very different. Dairies which produce pasteurized milk, yogurt and sour milk have daily transportation of products. Similar transportation system is present in the dairies which have its own retail chain. Dairies which produce

cheese and pepper in sour cream transport their products once to twice a week. In certain situations, transport dynamics is determined by customer needs.

Dairies do not have calculations of transport costs for the dairy products.

### Services

Region's dairies do not have development departments which would make market assessments, create business plans, research the market and work on business networking. All dairies get feedback from the market in regard to sales of products, prices, competition, but there are no information on the structure and affinities of the consumers of their products.

### Prices

**Table 14 – Purchasing prices of milk and transportation**

Cost	Price, RSD
Purchasing price of milk, kg	27-32
Purchasing price of cow cheese, kg	250-300
Purchasing price of sheep cheese, kg	400-450
Transport, liters of purchased milk	2.5-3

Source – Surveyed dairies in the region, 2012 .

Cheese prices are usually contracted in euros, so that variations relative to the shown data are possible.

Raw material procurement is about 50% of the total costs of dairy operations. Other costs include procurement of packaging, labor force and energy costs.

**Table 15 – Output prices of most important products**

Product	Price, RSD
Milk, 1 l bag	48
Yogurt 1 l	62
Yogurt and sour milk, 0.5 l	34
Yogurt, cup 0.2	13
Pepper in sour cream, kg	250-260
Cow cheese, kg – packaged in a can	300-350
Skimmed cow cheese, kg – packaged in a can	220
Crushed cheese, kg	140
Sheep cheese, kg - packaged in a can	400-500

Source – Surveyed dairies in the region, 2012.

**Based on prices of output products it is clear that value chain in production is used to the maximum and it does not leave any space for additional savings, or achievement of added value. Dairies operate on the edge of profitability, whereby almost all savings have already been accomplished (low purchasing price of milk, low labor force cost, usage of less expensive energy sources, low-cost packaging, enzymes and rennets etc.). In the existing price structure the only realistically possible solution is to increase the production.**

## Needs

A survey was conducted, and dairies defined different priorities in their development process (table 16).

**Table 16 – Defined needs of dairies**

Area of development	Level of importance	Note
Milk production increase	Very important	Dairies are unanimous that this is the most important goal in future development Focus is on the milk quality
Milk purchase	Very important	
Human resources capacity building	Very important	Process engineers are primarily needed
Processing, quality	Important	
Processing, new product	Important	
Processing, better organization	Important	Certain dairies are interested in this segment
Sales – market	Important	
Production increase	Not important	Dairies can do this without help from the projects
Marketing	Not important	Dairies do not see any interest in these areas
Feedback from the market	Not important	

*Source – Surveyed dairies in the region, 2012.*

Dairies' largest needs are in providing sufficient quantities of raw milk and think that support to dairy production development should be primarily focused on primary production.

Dairies themselves have the biggest need in the lack of quality process engineers who could work on the new product or improve the quality of the existing products. Only one dairy was interested in organizational improvement of operations.

Dairies generally are not interested in receiving help or assistance for their market appearance, since all dairies have secure markets at this moment.

### 2.2.5. Home production of dairy products

At the region's farms there is a significant production of dairy products for the market. In certain villages and parts of this region, this form of milk usage is dominant compared to its delivery to dairies. The most important reasons for production of dairy products within the households are:

- strong tradition of manufacturing dairy products within a farm,
- dairies do not cover all the villages with their purchase and
- bad terms of purchase.

#### Area

Production of dairy products from cow milk is widespread in all three municipalities. Estimate is that the fewest of these households are located in Novi Pazar, and the largest number of them is in Sjenica.

Dairies do not purchase sheep and buffalo milk so that the entire processing is done within households. Dairy products from buffalo milk are produced in some Tutin and Novi Pazar villages, while sheep dairy products are mostly manufactured in the area of Upper Pešter, that is Sjenica and Tutin municipalities.

This type of production is primarily developed in areas where dairies do not purchase milk because of:

- bad road infrastructure

- small quantities of milk
- taking the cattle out to the mountain pastures.

On the other side, in the region of Upper Pešter, significant number of cows and especially sheep is being raised. Famous Sjenica cheese is produced in this region, as well as significant quantity of sheep cheese. It is estimated, however, that significant quantities of milk are processed within households as well.

### ***Producers***

It is not possible to determine the number of farms where milk is processed. Most of farms with cows and sheep produce dairy products. Only few farms, however, exclusively process milk for market, while most of farms regularly or occasionally deliver milk to dairies. These dairies, based on estimated needs or received orders produce cheese, while deliver the surplus of milk to dairies.

The trend of milk processing within households has been abandoned in the larger farms in Serbia. Big dairies are interested in these farms, they regularly pay for milk, additionally stimulating and helping operations of these farms. On the other side, these farms' interest is to deliver milk, thus relieving themselves from additional work on processing, sales, collection, etc. Agricultural households from Pešter are, however, different from agricultural households from most of Serbia. These households have more members and they are much younger than those in Central Serbia and Vojvodina. Within households there is work force which can process milk, so that many larger farms in Pešter do not deliver milk to dairies, but process its own milk themselves. Nevertheless, even in this area, there is a trend of larger farms abandoning cheese production and gradually transfer to sales of milk to dairies.

### ***Processing rooms***

There are about ten households in the region which are registered for milk processing in accordance with the current regulations. Most of households which process milk, however, is not registered for milk processing. Thus, producers are not able to sell dairy products legally, so they must sell their dairy products to dealers. It is not possible to estimate number or capacities of processing facilities within agricultural households in this region.

Milk processing is mainly done in side rooms, separate parts of stable, in the kitchen, pantry, etc. These rooms do not meet minimal requirements for registration according to the current Rulebooks, that is do not have sufficient height, no tiles, no flat and smooth floor and walls, no running water, very often no electricity. Kitchen dishes are usually used in the milk processing (no specialized equipment for milk processing). Auxiliary rooms do not exist (dressing rooms, toilettes).

There are farms in the region where milking is done at the pastures during the summer. These farms process milk immediately after milking, and milk is not cooled nor kept. Milk processing in these farms is done under very extensive conditions.

Products are stored in special rooms where temperature is not regulated. In most cases dairy products are stored in pantries and cellars with other products such as onion, potato, household items.

### ***Products***

Basic products manufactured within household are:

- milk – cow and buffalo
- white mature cheese (different phases of maturity)- sheep, cow, buffalo
- new white cheese – primarily cow
- no-fat cheese (after removal of milk fat which is used for manufacturing cream cheese-kajmak) – primarily cow, but also buffalo and sheep

- crushed white cheese
- cream cheese (kajmak) – cow, sheep and buffalo
- butter – cow and buffalo
- pepper in sour cream – cow and sheep

Most of dairy products are seasonal products. Sheep cheese is manufactured from May to mid August. Most of herds of cows also have seasonal character, considering that most of milk quantity is received from May to October, while milk quantities are reduced after that.

In spite of big product range, dominant products in the market are cheese and pepper in sour cream. It is not possible to determine the structure of milk processing into dairy products, considering that milk processing within households is done depending on current needs, customer demands, milk quality, etc. In Serbia, approximately 80% of milk which remains in a household is used for cheese production, so the assumption is that similar relationship is also present in the Pešter region.

Study for the protection of geographical indications of sheep and cow's cheese is made; however, these products have not yet received a certificate of geographical origin.

Investigated farmers claim that there is no mixing of different types of milk, however, it is indicative that in big sheep farms there are always couple of cows, while in big cattle farms there are always small number of sheep. This structure of livestock farms clearly shows that dairy products are produced by mixing milk in different proportions.

In contrast to the other regions in Serbia, the trend of selling raw milk to the regular customers in the urban environments is widespread in the investigated municipalities. Milk is sold in green markets, traditional sales points in these municipalities, and there is a trend of household delivery of milk. This form of milk sales is not allowed by existing regulations.

### **Quality**

In the region there are no data on quality of milk which is used for production of traditional dairy products in households, nor final dairy products testing.

Low level milking hygiene in these households results in milk of lower bacteriological quality. Process of keeping/cooling of milk after milking is short term. In many cases, milked milk is not cooled, but it is immediately processed. Situations in which milk, after milking, rests (ideal conditions for development of microorganisms), and only then enters the processing is very dangerous and directly impacts the quality of future product. Keeping/cooling of milk and dairy products is done in an improvised way, which additionally lowers the milk and final dairy products quality.

All dairy products are produced in a completely traditional way, however, households apply different traditional technological procedures in the production process. In certain situations these differences are big and directly impact product quality and structure. Also, products are not standardized even within a farm and depend on time of year (pasture quality), milk quality, etc. There is a trend in the region of adding milk of different kind, that is, certain proportion of cow milk is added for production of sheep cheese, and vice versa. These proportions in dairy production are not fixed and they depend on the time of year, milk yield, etc.

## Prices and packaging

**Table 17 – Price and packaging of products which are produced within households**

Products	Type	Packaging	Price, Novi Pazar green market, kg
White sliced cheese – mature	Sheep	Plastic cans, 5-10 l Traditional barrels	500-550 RSD – NP green market 3.5-6 E – household
	Cow		300-400 NP green market 2.5-3 E – household
Milk	Cow	Plastic bottles	50-60 RSD
	Buffalo		150 RSD
Cream cheese - Kajmak	Cow	Plastic vessels or wrapped in plastic bags	500-600 RSD – NP green market
	Sheep		700-800 RSD - NP green market
	Buffalo		900-1000 RSD - NP green market
Butter	Cow		800-1000 RSD - NP green market
	Buffalo		1000-1200 RSD - NP green market
Pepper in sour cream	Cow	Plastic cans of different size, od 1-5 kg	250 RSD - NP green market
	Sheep		250-300 RSD – NP green market
Yellow semi-hard cheese	Cow	Vacuum packaging 0.4 kg	600-700 RSD – NP stores

*Source – Data collected during the field work, 2012.*

Products are sold unmarked, that is without producer's label. Method of cheese packaging primarily depends on customer. When sold in wholesale, cheese is sold in traditional barrels, although the dominant method of cheese sale is in plastic cans of 5-10 kg.

Cheese price varies very much depending on the producer. The lowest price is when sheep cheese is bought by dairies. In this case, price of sheep cheese is about 3.5, and cow about 2.5 EUR/kg. Dealers buy sheep cheese at 4-4.5 EUR/kg, while the highest price is when cheese is sold in cans (4.5-6 EUR/kg).

### Distribution

Dealers buy dairy products at producer's home. Some regular customer (relatives, friends, etc.) also come to get products at producer's home. However, products are transported to some customers' home. Transportation price is mainly calculated in the product price, since the delivered products are slightly more expensive than when bought at producer's home.

### 2.2.6. Market

Existing milk and dairy products market is very unstable. The existing market will have number of disturbances and problems in the future. Significant problem in stabilization of this market are numerous activities which do not exist in other parts of Serbia and which to some extent or fully are not in accordance with existing regulations and standards. Most important potential problems are:

- Unregulated trade of dairy products with Kosovo, Montenegro and Bosnia and Herzegovina,
- Sales of home pasteurized milk by producer,
- Production of cheese and other dairy products in households which are not registered for that production,
- Collection of milk for other dairies, that is resale of milk,
- Purchase of home made cheese and other dairy products by certain dairies.

At this moment many of existing productional, organizational and market problems are solved by above mentioned activities, but with full implementation of already adopted regulations these activities will disappear which will be a significant problem for producers and dairies in the region.

### **Dairies**

Dairies which produce pasteurized milk and fermented dairy products sell them in the local market, and mostly in Novi Pazar. Market is to a great extent defined by shelf life of these products. These dairies supply many customers (100-110) in the investigated region. These are usually stores, green market, bakeries, restaurants and the like.

Dairies which produce cheeses and pepper in sour cream sell their products in remote markets. One of dairies sells its products to big supermarket chains like **Merkator** and **Maxi**, while the other dairy decided to sell its products to a great number of smaller customers, primarily restaurants. In both cases, delivery is done in big, so called “factory” packaging. These dairies have strong competition in the market. Cheese and pepper in sour cream are dominant products of small dairies and agricultural households, so that there are products of different quality and price in the market. This makes the local dairies sell the products at lower prices, with an attempt to preserve the product quality as much as possible.

Dairy products are by their packaging, quality and price fully suited to the market, however, dairies encounter number of problems in the market which reflect in strong competition, high rebates, payment delays, etc. That is why dairies like **Lav** i **Zornić** which sell part or complete production through their own retail chain are in the best situation.

Only dairy which at this moment has regular export is **Zornić** dairy, which about 50% of its production sells in the markets of Kosovo, Montenegro and Bosnia. **Zornić** dairy does not deal with big customers in Montenegro and Kosovo. Structure of customers is similar like in the investigated municipalities (small stores, bakeries, etc.).

**Basic problem of surveyed dairies is quantity and quality of purchased milk. All dairies state they could purchase much more milk and that they have the market in case of increase of production.**

### **Households**

Most of households which manufactures cheese and other dairy products has no problems with sales of their products. Sheep products are especially demanded and some households take orders for this product. Basic markets in this category are:

**Dealers** – Biggest buyers of dairy products are dealers. Different buyers are defined as dealers:

- buyers who directly sell products in the local market (green markets and stores),
- buyers who resell or sell products in the Belgrade market
- buyers who resell or sell products in the Montenegro, Kosovo or Bosnian markets.

Dealers mostly purchase in the areas which are not covered by regular milk purchase by dairies, and that is in Upper Pešter area. Common characteristic of all dealers is payment on the spot.

**Regular customers** – In this region there is a tradition of buying dairy products from the known producer, so that the sale of dairy products to regular customers is very important sale channel in the investigated region. Regular customers include friends, relatives, owners of small restaurants and stores, families from the city, even families who live abroad. Many farms sell dairy products this way. Sales is

done periodically, at the customer request. Regular customers are the most important market for the small farms which have small quantities of products for the market. Price of dairy products for this customer category is somewhat higher than the price offered by dealers.

It is interesting that, up to few years ago, a significant quantity of dairy products ended up in EU countries. Families who live in EU ordered big quantities of dairy products which were transported by regular bus lines. This type of dairy products sale was much reduced in the last few years due to strict border controls in EU. Significant quantities of these products were sold in Bosnia and Montenegro in similar fashion, but here demand was reduced due to increased supply of dairy products in the market.

**Dairies** – Dairies are important purchaser of dairy products, primarily white sliced cheese. Purchase by dairies is not regular and it depends on market supply and demand. In addition to these small dairies, small dairies from Montenegro are present in the market.

**Stores** – A few producers are registered for milk processing in the farm. These households directly sell dairy products to the local stores. Most common products are mature white sliced cheese and pepper in sour cream, however, the offer can include cream cheese - kajmak, even butter. Certain households, due to the lack of their own dairy products, have started purchasing dairy products from the unregistered households. These households are no different from small artisan dairies by its structure.

**Green market** – Each municipality has its own green market day of the week. On the market day, among other things, dairy products are sold. Space for dairy products sale within green markets are small and inadequate to the existing sanitary standards. Small quantities of dairy products is sold in green markets. Green market with biggest offer is the one in Novi Pazar, however, even in this green market, only about 20 producers, mostly unregistered for milk processing, sell their products there. They offer all products manufactured within their households. Much smaller green markets are in Sjenica and Tutin where the offer of dairy products is symbolic.

## 2.3. Support to dairy sector

### 2.3.1. Institutional framework

Production and processing of milk is to the greatest extent authority of the Ministry of agriculture, trade, water management and forestry (MPTVŠ). Milk production is directly or indirectly dealt by almost all sectors in the Ministry, Veterinarian Department and General inspectorate. This area is institutionally defined by laws, bylaws, state regulations. The most important laws which regulate milk production are:

- **Law on livestock breeding** – “Official Gazette RS”, no. 41/09
- **Law on food safety** - “Official Gazette RS”, no. 41/09
- **Law on veterinarian activities** - “Official Gazette RS”, no. 91/05 and 30/2010 – This law regulates, among other things, veterinary-sanitary control and requirements for production and sales of products of animal origin.

Basic by-laws which define milk quality and dairy products production and control are:

- **By-laws on the quality of milk products i starter cultures** (“Official Gazette RS”, no. 33/2010 and 69/2010) – This by-laws prescribes requirements in regard to the quality of milk product intended for consumption and starter cultures for milk products.
- **By-laws on raw milk quality** (“Official Gazette RS”, no. 21/2009) – This by-laws prescribes the level of quality which must be achieved by milk at the time of purchase, as well as the method of milk quality testing.

Existing laws and regulations in the dairy sector are almost completely in accordance with the EU legislation (Directives EU no. 89/362/EEC and 92/46/EEC). However, existing regulations only partially apply in practice. Big and mid-sized dairies and farms have harmonized their operations with the existing legislative framework, but significant number of farms, especially mi-sized and small, as well as small artisan dairies still does not operate in accordance with the existing regulations. These farms and dairies will encounter significant problems in harmonizing their operations with new regulations and standards in the future. Additional problem in operations will be opening of the market for agricultural products, which can cause important changes in the existing milk and dairy products market.

### **2.3.2. State subsidies and programs**

Ministry of agriculture supports agricultural development since 2005. In the previous period, there were different support measures which directly or indirectly related to dairy sector (subsidies for delivered milk, support for equipment and modernizing livestock farms, procurement of machinery, digging wells, etc.)

At this moment, the most important support measures are:

- stimulation of 5 RSD/l of delivered milk which can be achieved by registered farms which quarterly deliver 3.000 l of milk. There are few farms that get state subsidies, since milk is mostly processed within household.
- support to registration of livestock heads in the amount of 25.000 RSD per registered head of cattle.
- procurement and distribution of heifers for reproduction in order to increase and improve livestock herd. This measure is implemented in cooperation with local Funds for Agricultural Development. In 2012, the procurement of 250 heifers for Sjenica and Novi Pazar respectively and 100 heifers for Tutin is foreseen. Ministry provides 80% of funds, while local governments contribute 20%.

### **2.3.3. Professional organizations**

#### ***Agricultural extension service (PSS)***

PSS functions according to the *Law on agriculture and rural development* („Official gazette of RS“ no. 41/2009) and associated by-laws which define activities of PSS. Important for livestock breeding are:

- Organization of data base, educational activities, publishing technical publications and other forms of information on technological innovations;
- Counseling – consulting activities and transfer of knowledge;
- Activities of selection and reproduction in livestock breeding and
- Organization of agricultural exhibitions and fairs.

PSS is located in Novi Pazar and with its activities cover municipalities of Novi Pazar, Tutin and Sjenica. There are five employees in PSS, out of whom one is an expert in livestock breeding activities. The service was established in 2010 and it still has no big influence on livestock production in the region. Activities of PSS are to a great extent defined by orders received from the Ministry, as well as by financial funds received from the Ministry.

### ***Livestock registry service***

Program for development and improvement of livestock breeding in RS for the period 2008-2012 was defined in the Regulation on creating the Program for development and improvement of livestock breeding in RS for the period 2008-2012.

Institute for livestock breeding Belgrade-Zemun is responsible for livestock in Central Serbia. Institute for livestock breeding operates through the regional breeding centers. Regional breeding center in the investigated region is actually PSS in Novi Pazar.

Basic registrations are performed by primary breeding organizations. In the investigated region, several primary breeding organizations have been registered in the last several years, but these organizations have small number of registered livestock heads. Especially small number of registered heads are in municipalities of Sjenica and Tutin. Livestock registry service performs number of activities and the most important are selection fairs and milk yield controls.

### ***Veterinarian stations and dispensaries***

Veterinarian stations are present in all local governments of the region. The most important activities of the veterinarian stations are marking of livestock and implementation of measures from the Program of health care, prescribed by the Ministry. In addition to veterinarian stations, veterinarian dispensaries also exist in all municipalities. Veterinarians are the basic source of information for the farmers in the field. Veterinarian services, however, can be significantly improved.

### **2.3.4. Laboratories for milk quality testing**

Dairies are obligated to milk quality control based on the By-laws on raw milk quality. There are many authorized laboratories in Serbia, which gives freedom to dairies to conclude contracts with laboratories based on their own interests. All dairies in the region test the milk quality in the laboratory of the Veterinarian Institute from Kraljevo.

### **2.3.5. School system**

Serbia has 12 accredited faculties and about 60 high schools which completely or partially cover area of agricultural production and food industry. In Sjenica there is a dairy class in one of the high schools, however, high schools are generally criticized in Serbia for not producing human resources needed in the economy and agriculture. Students primarily lack practical knowledge, as well as the knowledge in the area of business planning.

### **2.3.6. Research**

In Serbia, scientific work in the area of livestock breeding and dairy production is done by scientific-research institutes and universities. In the region, however, there is no cooperation with scientific-research institutes, nor scientific-research or technological projects are being conducted whatsoever.

### **2.3.7. Chamber of Commerce**

Regional Chamber of Commerce from Kraljevo covers municipalities of Sjenica, Tutin and Novi Pazar with its activities. Those activities are focused on providing and organizing technical assistance for the

purpose of improvement of operations, but local dairies have not had any cooperation with RPK Kraljevo so far.

### **2.3.8. Municipalities**

In all local governments, the Funds for Agricultural Development were established. In the last two years, funds were directed in the procurement of heifers for reproduction (see 2.3.2.).

### **2.3.9. Regional Development Agency of Sandžak - SEDA**

SEDA was established in 2002 as the Regional Agency for SME Development. Since 2009, SEDA has transformed into Regional Development Agency which covers Novi Pazar, Sjenica and Tutin. SEDA is very active partner in implementation of numerous international projects out of which many are related to the development of agriculture. SEDA is partner to Czech Development Agency, as well as to EU PPROGRES project. Both projects have significant activities in the area of agricultural development, dairy production included.

### **2.3.10. Regional center for agricultural and rural development**

In 2011, the Regional center for agricultural and rural development was opened. Center has regional character. It was established with the funds of Sjenica municipality and Office for sustainable development of the underdeveloped areas. At this moment, the Center has one full-time employee. Basic goals of Center's establishment and operation are:

- To improve knowledge and skills of the agricultural producers,
- To provide technical assistance aiming to improve operations of processing facilities,
- To establish a brand, with trade mark for certain number of products with geographical indication of origin,
- To organize exhibitions and fairs.

The Center is in the beginning of its work, so that real effects of its activities are expected in the upcoming period.

### **2.3.11. Agricultural associations and cooperatives**

In the region there are no agricultural cooperatives which belong to the farmers and which work for the farmers' benefit. Existing agricultural cooperatives operate as commercial companies, have small number of founders and members, and have no ambitions to unite or educate farmers. These cooperatives do not help farmers in the field.

Agricultural associations are trying to take over the role of cooperatives. There are many agricultural associations in the region which were established in the previous period as the result of project activities of various donors. These associations, however, are not functional.

At this moment, there is at least one active agricultural association in each of the local governments. These agricultural associations are not financially sustainable, but they are financially supported by the local governments. Activities of these associations are limited by the level of funding provided by the local government for their operations. In spite of numerous flaws, these associations have an important role in

development of agriculture in their local communities, because they facilitate certain operations for farmers, provide education, information in the field, etc.

Agricultural association was established in Sjenica with a goal to gather all significant milk producers in the municipality. This association wants to be the holder of Sjenica cheese production, which is the product with protected geographical origin. The Association, however, is not active at this moment.

### **2.3.12. Projects**

At this moment, there are four internationally funded programs which support dairy development in the region:

- EU funded PROGRES program aims to construct and equip laboratory for milk quality testing in Sjenica.
- Czech Development Agency supports equipping farms with lacto-freeze devices and establishment of machinery park in the territory of Sjenica and Tutin municipality.
- USAID Sustainable Local Development Project is supporting analysis of value chain and marketing plan for milk and dairy products.
- USAID funded Agribusiness Project supports agricultural production and food industry through the process of education, assistance with market appearance and certification of processing capacities.

***In the investigated region, farmer support system is not sufficiently developed, while dairy support system does not exist at all. In the upcoming period, activities for improving knowledge levels, institutional development and connecting all factors included in the dairy chain must be carried out.***

### 3. Dairy products market

#### Market segment

Production of milk and dairy products meets the needs of the Serbian market, whereby little quantity of milk and dairy products are left for export. Basic products in the market are milk (66% of total production), fermented dairy products (27,8%) and different kinds of cheeses. Cheeses are less produced in dairies and they are of different quality.

**Table 18. Production of dairy products in dairies, 2009.**

Product	Final product, t	Share in total production, %	Unprocessed milk, t	In the share of the unprocessed milk, %
Pasteurized milk	401,731	48.5 %	290,658	29.7 %
Yogurt and sour milk	209,981	25.3 %	135,646	13.9 %
UHT milk	144,942	17.5 %	97,148	9.9 %
Sour cream	20,714	2.5 %	112,401	11.5 %
Soft cheeses, incl. white cheeses	13,781	1.7 %	89,574	9.2 %
Ice-cream	10,792	1.3 %	2,159	0.2 %
Hard cheeses, incl. caciocavallo	7,220	0.9 %	68,592	7.0 %
Sliced cheese	4,873	0.6 %	32,159	3.3 %
Butter	3,006	0.4 %	65,252	6.7 %
Sweet creams	2,848	0.3 %	11,022	1.1 %
Semi-hard cheeses	2,566	0.3 %	13,679	1.4 %
Fresh cheese, whey	2,280	0.3 %	20,525	2.1 %
Full cream made of powder milk	2,076	0.3 %	8,036	0.8 %
Processed cheese	1,494	0.2 %	9,857	1.0 %
Other creams	287	0.0 %	3,263	0.3 %
Cream cheese (Kajmak)	76	0.0 %	821	0.1 %

Source – Table taken from Dairy sector study, 2010

Dairy products market has been developing in the last few years. This can be seen as increase in number of products in the market and improvement of dairy products quality.

Dairy products are mostly sold in the domestic market. Existing production structure, in which milk, yogurt and sour milk production is predominant, indicates that most of dairies is focused on the local/municipal market. Industrial dairies sell products through supermarket chains and less through stores, bakeries and the like.

Basic products which are manufactured within households are cheese and cream cheese (kajmak). These products are exclusively sold in the green markets (directly or through dealers) or to known buyers who demand dairy products produced in certain regions (such as Kraljevo kajmak, Sjenica cheese, Svrlijig belmuž, etc.).

#### Trends

Basic trends in domestic market are:

- Increased consumption of sterilized milk compared to pasteurized, and especially fresh milk;
- Increased consumption of fruit yogurts and cereal yogurt;
- Increased demand for different types of cheeses and dairy creams (including kajmak);
- Partial diversification of production completed, and it can primarily be seen in production of products with different shares of milk fat;
- Strong trend of consumption of cheeses with production origin;
- More intensive consumption of whey for production of crushed cheese which is important raw material for bakeries and similar industries.

In the upcoming period, the following can be expected:

- Further increase of milk quantities delivered to dairies compared to milk processed on a farm;
- Stricter milk and dairy products quality control in all parts of dairy chain;
- Stricter implementation of regulations – registration of households for cheese production;
- Modernization of all parts of dairy chain, from farms to dairies;
- Optimization of dairy operations – organizational strengthening of dairies;
- Reduction of number of dairies;
- Increased export and import of milk and dairy products;
- Increased level of marketing activities, primarily promotional activities of producers in megamarkets and supermarkets.

### ***Consumer habits***

In the Serbian dairy product market, the following is expected:

- Slight increase in consumption of dairy products/inhabitant/year;
- Increased share of dairy products in the total consumption of animal products;
- Increase of the number of different dairy products in the market;
- Higher focus on and valuation of traditional dairy products;
- Higher significance of branding – Customers will make brands more significant;
- Consumer habits will change towards products of higher value;
- Higher consumption and growth of demand for highly processed products with less milk fat;
- Forming of consumer opinion based on marketing activities – greater significance of primarily promotional and educational activities of producer;
- Higher demand for dairy products by the service sector (bakeries, restaurants, and the like);
- Higher demand for dairy products by the food industry;
- Increased share of dairy products to be sold through supermarket and megamarket chains compared to other types of sales.

### ***Competition***

#### **Dairies from Serbia**

In Serbia there are about 185 active dairies, out of which most of dairies belong to the category of artisan dairies. Approximately 30 dairies has processing capacity larger than 10 t/day and purchase about 80 - 85% of total quantity of purchased milk. Small dairies purchase and process between 3 and 10 t/day, but in this category most of dairies purchase less than 5 t, which is the economic minimum in EU. Small dairies purchase only 15-20% of milk. Experiences from other EU countries indicate that most of small dairies will not survive in the future, because they will not have economical possibilities to harmonize their operations according to EU requirements and standards.

### **Import of milk and dairy products**

Process of EU accession will have significant consequences on dairy sector development. On one side, dairies will have to operate in accordance with EU standards, while at the same time it is expected for the process of agricultural products import liberalization to continue. Expected opening of the market will certainly increase competition in the Serbian market of dairy products, and it is realistically to expect that not all in the dairy chain will be able to survive process of joining EU.

### ***Regional markets***

Serbia has a sufficient in dairy products trade in the amount of 30 million USD/year. Value of dairy products trade is fairly low, but it has significant trend of increase since 2006, that is after Montenegro's declaration of independence. The biggest export of dairy products is achieved to Montenegro, and the rest is exported into the neighboring countries (CEFTA) Bosnia, Macedonia, Croatia and Albania. Basic export products are milk, cheeses, ice-cream and fermented dairy products representing 91% of total export of dairy products.

Serbian dairy sector will, to the greatest extent, export dairy products to the markets of surrounding countries. Markets of surrounding countries are similar to the Serbian market and all characteristics of the Serbian market relate to the surrounding countries' markets. Basic difference can be seen in current prices of dairy products. With the exception of UHT milk in Serbia, prices of other dairy products are slightly or significantly higher than in Serbia.

These markets are particularly interesting for small dairies which are focused on production of white cheese and *caciocavallo*, since markets of the countries in the region has strong trend of consumption of white, mature, sliced cheese. In addition, similar to Serbian market, consumers in these countries traditionally pay attention to the geographical origin of dairy products and value products that cannot be found in the EU countries' markets, such as sheep products. Mentioned trends offer significant development possibilities for the dairies in the region, although only dairy ***Zornić d.o.o.*** exports dairy products at this moment.

## 4. Potentials and obstacles to dairy sector in Pešter region

Local key actors believe that the biggest problems in dairy chain are:

- Production of livestock feed
- Procurement of agricultural inputs and fertilizers
- Lack of machinery
- State measures which change every year
- Lack of security in purchasing
- Low price of milk in purchase and low price of dairy products
- Great number of contractors per one line of milk purchasing
- Low quality products in the market
- Bad state of infrastructure – water, power, roads, etc.
- Farm reconstruction – bad facilities, auxiliary facilities and premises
- Low level of knowledge

The greatest needs in the dairy production development process are:

- Increase of the livestock herd
- Increase of the number of lact-freeze devices in the field
- Increase of the milk production and milk quality improvement in purchase
- Reconstruction of the existing or construction of new facilities
- Improvement of livestock feed production
- Raising the level of knowledge in all parts of dairy chain
- Improvement of dairy products marketing
- Establishing agricultural school

### SWOT analysis in the value chain of dairy products

<b>Strengths</b>	<b>Weaknesses</b>
Great number of cows and sheep in breeding	Low milk yield per head in standard lactation
Region of Pešter has the largest number of sheep in Serbia	Traditional production present – few farms with modern technological solutions
Tradition of the region in dairy production	Bad microbiological quality of the delivered milk
Great number of young agricultural households	Great seasonality in milk production
Exceptional natural prerequisites for livestock breeding development	Most of households is not registered for milk processing
Existence of brand – Sjenica cheese	Lack of funds
Significant quantity of milk being produced in the region	Production is not standardized
Short lines of dairy supply	Dairies are of small capacity
All dairies have HACCP	Dairies have modest and similar production program
Dairies have secure markets	Grey market is very strong
	Low level of knowledge in all parts of dairy chain (production, technology, sales, marketing)

Opportunities	Threats
Intentionally funds programs of economic development	Harsh climatic conditions in winter
Programs of rural development funded by the Ministry	Infrastructure is not improving in the rural areas (roads, water, power)
Systematic and organized increase in production and product quality	Migrations of young people to urban environments
Branding of products from Pešter	Opening of markets towards EU and import of cheap dairy products from abroad
Valorization of small productions– dairy products from sheep and buffalos	Dairy production development in some of the competing regions (Stara Planina, Nova Varoš, Svrljig...)
Training and specialization programs	Merging within the dairy sector which results in closing down small dairies
Availability of favorable funds for agricultural production development	Abolition of state subsidies for milk
Development of export programs – Cross-border cooperation	Strict implementation of existing regulations

Region of Pešter is characterized with natural predispositions for livestock breeding development. There are vast pastures and meadows which are traditionally used for livestock production, and that production is traditionally important source of income for the households. Significant number of cows and sheep are raised on Pešter compared to other parts of Serbia. According to the number of sheep, this region is the center of sheep production in Serbia. Existing livestock herd is a good basis for systematic and organized development of livestock production. Many households traditionally are active in livestock breeding, whereby there are more agricultural households and they are younger compared to other parts of Serbia.

Currently, there are six active dairies in the region, and they have no problems with purchasing milk nor selling their products in the market.

Traditionally in this region, famous Sjenica cheese, pepper in sour cream and other products are manufactured and are very demanded and valued not only in Serbia, but in former Yugoslavia markets as well. These products are produced both in dairies and within households, and as a rule, they have no problems with sales.

Traditional production in the region of Pešter, however, encounters many problems and challenges. There are big farms in the region, but there is a symbolic number of specialized livestock farms in which modern technological solutions are applied. In spite of rich pastures and meadows, in certain years there is a lack of bulky feed, and concentrated feed must be purchased. Facilities serve as improvised accommodation of livestock during the winter months and do not meet minimal zootechnical conditions. Breeding composition is not paid much attention. Most of the farm work is done manually and level of machinery is symbolic. All above mentioned results in low milk yield of heads per standard lactation, and low level of milk yield is also present in many farms with larger number of heads. Tradition in production, but also harsh climatic conditions in winter, determine the system of breeding, so the seasonality in milk production is very much present compared to other parts of Serbia.

Hygiene of milking and microbiological quality of milk are not paid much attention. Milk is milked manually or with small milking devices mainly into plastic or aluminum cans. There is a symbolic number of lact-freeze devices in the field, and the process of storing and cooling of milk is improvised and depends of a farm. Procedures before milking, as well as the procedures during and after milking

are not in accordance with existing regulations and standards. Microbiological controls of milk quality are occasional, and do not represent basis for education of farmers and milk quality improvement.

Farms dealing with production of cheese are not registered and thus forced to do business with dealers. In most of these farms there is no possibility for equipping the premises for milk processing according to current hygienic-sanitary requirements. Additionally, in many farms cheese is produced in at pasture facilities called katuni, which makes it even harder to register the cheese production process. The cheese production itself is not standardized. It varies from farm to farm, but there is also difference in produced cheese within one farm. Cheese quality depends on pasture, time of year, adding other kind of milk, etc.

Dairies are of small capacity and they purchase limited quantity of milk in the field. Purchased milk is of low quality, which directly impacts the production program of existing dairies. They have limited range of products which can be produced from low quality milk, and they are primarily white sliced cheese and pepper in sour cream, and to a lesser extent yogurt. Dairies lack knowledge. They need process engineers, sales persons, marketing experts, organizers... In addition, dairies need equipment for modernizing production and new products manufacturing, and what is most important, all dairies are financially weak and cannot improve their operations without new, additional, funds.

Dairies and households which sell dairy products currently have secure markets. However, price of products is relatively low, and it is lower compared to competition. Big dairies took over the market of milk, yogurt, specialized cheeses, etc. In the market of these products, price parities have been established, while the market was divided between big dairies. Small region dairies work with products which are produced by all small dairies in Serbia. This is unsafe market, subject to big shocks in case of any disturbances. Prices of final products are low, there are delays in payments and there is always a possibility that some of big dairies will enter this market in the future.

Additional danger for dairy industry at Pešter is opening markets for agricultural products. This can have double negative effect. On one side, significant import of dairy products is expected compared to previous period, while on the other side big dairies will attempt to expand additionally and make merging of the existing dairy sector, which will result in closing down many small dairies.

When the implementation and control of the existing regulations starts producers and dairies will face big problems. Considerable funds will be necessary for meeting all prescribed standards related to primary livestock production, milk quality and controls.

It is almost certain that dairies and producers will not be able to respond quickly to market trends and requirements of milk quality standards without significant assistance. It is necessary to apply to all programs and projects of economic development in the upcoming period, from cross-border collaboration to bilateral assistance programs. The Ministry of agriculture can provide very important assistance in this process through program of rural development measures or by directing funds from IPARD funds into Pešter dairy production development. Prerequisite for any kind of assistance is systematic and organized approach to raising production and product quality, whether in the direction of building human resources, or in the direction of technological modernization of production. All development programs in the future, also, must have component of protection of geographical origin of the local products, and especially for famous Sjenica cheese. However, branding process must not be only based on the protection of geographical origin, but also on assisting with serious market appearance of quality standardized product from Pešter which will be significantly different by its characteristics from other products in the market. Region of Pešter in this part has significant advantages since it is the only location in Serbia where there is production of sheep cheese and buffalo milk products.

## 5. Possibilities for value chain improvement

Existing value chain is weak. In all parts of value chain there is a significant number of measures which can improve the level or quality of production as well as economic efficiency of production.

### 5.1. Primary production

In the near future, keeping the “social approach” to small, mixed households should not be expected. With possible reduction of milk premiums and increased requests for quality raw material, only producers who operate on economical principles will survive. That is why the most important goals in the future is to increase the number of specialized households. Basic goals in primary production are:

#### Increasing the number of breeding heads

Increasing the number of heads in breeding should be done through continuation of program for procurement of quality heifers and reproductive material. This process must be managed by the state and local governments, while farmers need to be provided with favorable credits and/or grants for enhancement of the livestock herd. It is necessary, however, to note that simple enhancement of the livestock number cannot result in quality dairy production development. This measure must be followed by enhancement of production per head, as well as process of specialization of livestock farms.

#### Enhancement of production per head

Average production of about 3.000 l milk per lactation indicates traditional/extensive production. It is possible to make improvements in all aspects of livestock production: selection and reproduction, raising, accommodation, nutrition, production of bulky feed and health care with certain additional, not very big investments. For that purpose, all activities which aim to specialize farms in the direction of dairy livestock development are recommended, and especially in the mid-sized and big farms.

Elaborating on each individual area would require much time and space, however, the fastest production results can be achieved by improved cow nutrition. Optimal animal nutrition, with well-formulated meals, is the basic prerequisite for intensifying production, increasing the production and enhancement of economic efficiency of milk production.

In the upcoming period, certainly most attention must be paid to:

- Creation of standards for nutrition of different cattle categories, based on existing feeds. Farmers need to be introduced with existing standards, but also all service which are in contact with farmers;
- Promotion of further expanding of silage and hayage production process;
- Encouraging better utilization of lawns;
- Establishment of demonstration farms – The easiest way to educate farmers is to show them results achieved in the neighboring farms. That is why, demonstration farms are recommended as the most practical way of education. These farms must be carefully located throughout the region. These farms should not be the biggest or the smallest farms, but farms which should show to other farms in the region that small investments can result in significant improvements in production. They should point to different possibilities and optimal methods in utilization of grass areas, production of silage and hayage, optimal nutrition of cattle, quality milking, proper selection and reproduction of cattle, optimal technological solutions in breeding, quality facility

for livestock breeding ... Demonstration farms would be constantly monitored by extension services and available to other farms in the process of education and knowledge transfer.

- Development of standard projects for livestock facilities, auxiliary facilities, silo facilities, etc. – Livestock breeding facilities are, in addition to livestock feed production, the biggest problems in the livestock production. It is necessary to develop standard projects for farms with capacity of 10, 20, and more heads in the upcoming period, with the assistance of some program. These projects must be available to farmers, and all services from municipal governments to dairies should have these projects and offer them to farmers who are interested in construction or reconstruction of facilities. Farmers, also, must be financially stimulated to do reconstruction, expansion or construction of facilities for livestock breeding.
- Machinery procurement – Lack of agricultural machinery is the limiting factor for improvement of livestock feed production. Combine for hayage/silage is most frequently mentioned as the machinery that should be procured. Same as in procurement of heads for reproduction, it is necessary to enable favorable conditions for machinery procurement in line of livestock feed production. Small producers are not able (nor there is an economical justification) to procure a combine, so it is recommended for them to unite in order to procure a combine, and to create machinery rings. Each municipality should have a complete machinery ring which would be owned by an association, and which would, under favorable financial terms, help farmers who cannot provide machinery for their work processes. Prerequisite for establishing machinery rings is defining:
  - o the machinery in the machinery ring,
  - o groups of farmers or regions for work
  - o work procedures
  - o financial terms of utilization of machinery from the machinery ring
- Infrastructure improvement – local roads quality improvement, solving the farm water problem, bringing electricity to pastures and improved facilities, and the like.

### Milk quality improvement

When producing quality milk, farmers must be guided by the following:

Environment – Cow needs clean, bright, comfortable, and well-ventilated room, in order to stay healthy and reach optimal production of milk.

Milking - Milking (manual or machine) must satisfy all hygienic requirements, with the respect of milking procedure. Milking machines must be functional and regularly serviced. Procedure of dry milking is recommended. Milking equipment is regularly washed and disinfected in order to achieve low microorganisms contamination of milk.

Servicing the equipment – Milking equipment must be serviced at least twice a year, in order to spot and eliminate deficiencies on time, while rubber parts must be replaced. Faulty equipment can cause mastitis.

Veterinarian program – Health control of the milking animals is defined by the program of measures. Veterinarian should control the health of udder twice a year with precisely defined mastitis prevention program, cow insemination program and the like.

Cooling of milk – Milk should be cooled to the temperature of 4–6°C, at least two hours after milking.

**For the quality milk cooling process it is necessary to encourage procurement of lacto-freeze devices.**

### Efficient systems of farmer support

Activities of the extension service, veterinarian dispensaries and stations and registry service must be modernized, while experts employed in these institutions should be sources of information and innovations in the field. In order to have quality information, ideas and innovations, it is necessary for employees in these organizations and institutions to go through the process of education and learning about new and modern techniques of production. At the same time, material and technical prerequisites must be created so that representatives of these services are available for the farmers.

In the process of dairy production development it is necessary to strengthen the existing and establish new associations of agricultural producers. Producer associations must exist on the local/village, municipal and regional level. In that context, special significance should be given to the Regional Center for Agricultural Development whose operations should be supported and organizational capacities strengthened.

Very efficient farmer support measure is airing agricultural shows on the local TVs.

## 5.2. Milk processing within households

Households which sell dairy products in the market are certainly the weakest link in the milk processing value chain. For this category of households, it is necessary to promote and encourage delivery of milk to dairies as the safest and in the long term the most efficient method of milk sales.

For one group of producers, milk sales to the dairies is not possible, so that these farms should be assisted in the process of:

- meeting the basic sanitary requirements for milk processing
- registration for milk processing within the household and
- production standardization.

This group of households manufactures famous traditional products. Through the producer associations, these products need to be protected, and then, with the help of local government and internationally funded projects, these products need to be supported in the market appearance, packaging and product promotion.

This especially refers to the production of sheep cheese and dairy products from buffalo milk.

## 5.3. Raw material department

All big dairies in Serbia have raw material departments which are in charge of communication with farmers in order to increase the level and quality of milk production. Existing dairies in the region are financially weak and have no possibilities for quality work with farmers. That is why it is necessary to establish a single raw material service in the region, which would be available to all dairies and which would be operating commercially. The role of this service would be to:

- Educate farmers,
- Identifies causes of weak or reduced production,
- Attempt to find methods for increasing the scope and improving the quality of production,
- Find sources of contamination of raw material which comes to dairy,

- Control the implementation of recommended routines of milking, cooling and transportation of raw milk,
- Control the regular service of milking and cooling devices and transportation vehicles,
- Control the state of the ceratin herd and
- Report to the state authorities about the problems in the field.

The goal of this service would be to reduce and prevent losses which appear in the milk production and purchase process.

## 5.4. Dairies

Valuation and payment of milk based on the quantity of delivered milk and contents of milk fat in milk is not good basis for economical production and quality products. Milk fat is highly variable component which does not show the real value of milk. It is necessary to change the milk payment system in a way to encourage purchase of quality milk from the farmers. In order to achieve that, it is necessary to:

- Inform dairies about different models/procedures of transferring from the existing milk payment system to new payment models
- Establsih regular and thorough control of milk quality and inform farmers on received results and new payment system,
- Establish new milk payment system based on protein and fat contents, bacteria and somatic cells count and antibiotic control.

Basic measures which can improve the operations of dairies in the upcoming period are:

- Increase the level of information for the processors;
- Better organization of milk collection process– establishment of collection stations;
- Technological improvement of dairy operations which primarily includes:
  - o production standardization,
  - o dairy products quality improvement,
  - o procurement of equipment which would improve the quality of dairy products and create foundations for new dairy products development;
- Introduction of new products;
- Branding and promotion of traditional products including the protection of geographical origin of the product;
- Better organization within a dairy in order to increase the economic efficiency of production;
- Strengthening of dairies' market positions which includes introduction of new packaging, materials, logos, business planning, strategy development for certain products, etc.;
- Researching the possibilities for enetering the new, foreign, markets;
- Established cooperation between processors – regular meetings on the level of regional group.

### Collection stations

Milk is best and fastest cooled in the milk cooling tank and that is why milk should be placed into lacto-freeze device immediately after milking. Number of lacto-freeze devices in the field must be quickly increased. Producers who do not have lacto-freeze device (and have no financial justification for its procurement) should bring the milk in shortest time possible (in about 2 hours) to the collection station and put it in the milk cooling tank (lacto-freeze device). Establishment of collection station includes:

- Document which should define it – where, how, when and why should be the collection station established
- Appearance and equipment needed for the facility which will be used as the collection station according to EU standards
- Definition of terms for cooperation between farmers who will deliver milk at the collection station
- Definition of work procedures at the collection station in accordance with the current regulation
- Equipping the collection station with lacto-freeze device and other necessary equipment and tools, especially equipment for washing
- Establishment of procedures for milk quality control
- Establishment and regular data management
- Education and training of staff/farmers who will work in the collection station.

In spite of some reservations expressed by dairies and farmers towards establishment of these collection stations, there are numerous models of efficient collection stations operations in Serbia.

## **5.5. Local governments**

Local governments can improve the dairy sector, and basic measures in that direction are:

- Encouraging investors to come – incentive for starting big farms and dairies of big capacity
- Developing a dairy production development project based on this document, whose implementation would be provided through measures of support to rural development provided by the Ministry of agriculture, or IPARD funds;
- Providing constant information exchange between actors included in dairy development;
- Organization of livestock events, exhibition and fairs;
- Establishment of guarantee and revolving fund in order to provide easier access to funds in the process of production improvement;
- Permanent promotion of traditional products from Pešter.

## Annex A – List of meetings

O.n.	First and last name	City	Position
1.	Zlatko Jusufović	Sjenica	Coordinator of the USAID Sustainable Local Development Project
2.	Samir Kačapor	Novi Pazar	SEDA
3.	Bajro Aljović	Tutin	Municipality Tutin
4.	Amela	Novi Pazar	Municipality Novi Pazar
5.	Miloš Lukić	Belgrade	Institute for livestock breeding
6.	Vlada Pantelić	Belgrade	Institute for livestock breeding
7.	Ivan Pavlović	Belgrade	Veterinarian Institute
8.	Tomislav Topalović	Belgrade	MPTVŠ
9.	Edin Kalač	Novi Pazar	USAID Agribusiness Project
10.	Enver Daca	Novi Pazar	Veterinarian station, Novi Pazar
11.	Redžep Ličina	Novi Pazar	Veterinarian station, Novi Pazar
12.	Smail Ejupović	Novi Pazar	PSS, Novi Pazar
13.	Ismet Saitarić	Novi Pazar	Union of Agricultural Producers, Novi Pazar
14.	Esad Hodžić	Sjenica	Regionalni Center for Rural Development
15.	Sead Bukvić	Sjenica	Local Economic Development Office
16.	Elvis Melović	Sjenica	Cattle Farm
17.	Nikola Marić	Sjenica	Dairy Beni commerce
18.	Smajo Ljumić	Sjenica	Dairy Fass
19.	Ismet Džudžević	Tutin	Municipality Tutin
20.	Ramo Arslanović	Tutin	Veterinarian station, Tutin
21.	Zornić Murat	Tutin	Dairy Zornić
22.	Jusuf Dacić	Sjenica	Farmer – sheep farm
23.	Fikret Tucak	Sjenica	Farmer – mixed farm
24.	Mulaz Brulić	Sjenica	Farmer – cow farm
25.	Samir Latić	Sjenica	Farmer – cow farm