

## Factors for Constant Cow Milk Supply

The main factors influencing the milk supply chain in central region of Afghanistan  
(Logar and Kabul)



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management specializing in livestock production chains

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## **ABBREVATIONS**

AI	Artificial Insemination
CSO	Central Statistics Organization
DPU	Dairy Processing Unit
FAO	Food and Agriculture Organization
ILRI	International Livestock Research Institute
KDU	Kabul Dairy Union
LSTP	Livestock Skills Transforming Project
MAIL	Ministry of Agriculture, Irrigation and Livestock
MCC	Milk Collection Center
MoPH	Ministry of Public Health
MoT	Ministry of Trade
NWFP	North West Frontier Province
PRT	Provincial Reconstruction Team
SWOT	Strength, Weakness, Opportunities and Threats
USAID	United States Aid for International Development

## ABSTRACT

The main theme of this research is to find out “*factors for constant cow milk supply*” in central region of Afghanistan. The study was carried out in two areas, Muhammad Agha district (Logar province) where milk are produced from farmers, and Kabul (capital city) where DPU and selling points are present. The objective was to investigate main factors responsible for fluctuation in milk supply and recommend possible way to increase the milk supply.

The research investigated the current milk supply chain and main hindrance in the constant milk supply chain. For investigation of all influential factors, certain actors from producer to dairy seller were surveyed, interviewed and observed. Survey questionnaires were distributed among randomly selected forty dairy farmers in Muhammad Agha districts. One Milk collector, two cooperative representative, one DPU manager, three dairy retailer were interviewed for all other additional factors in the milk supply chain. Similarly six family farms, one MCC, one DPU and three retailing points were observed for any additional information.

Data collected from the survey was analyzed quantitatively to find age of farmers, number of animal they have, land size, veterinary and extension facilities and feeding and water availability. It was revealed that in average, farmer has age of 41 years, 1.85 dairy cows per farm, in average every farmer has 2.6 Jirib land, all farmers have family farm, 55% of farmers have never been in school, 60% farmers have local breed, 63% farmers use natural service/insemination for breeding, 80% farmers said that semen is available, 77.5% farmers said that veterinary facilities are available, more common diseases are FMD and seasonal diseases like fever and flue. There are almost no extension services and no financial support for the farmers. 65% farmers are using both grazing and at house feeding system for the dairy cattle. Most commonly available feed items are alfalfa, clover, hay and straw.

The result indicates that several suggestions were given by farmers for constant milk production like 82.5% farmers suggest financial support for farmers, 70% farmers mentioned extension services and training for farmers, 62.5% farmers acknowledged for evening milk selling facilities, 55% farmers mentioned trained veterinary staff. Similarly some other suggestions were also given by farmers like on time treatment, rehabilitation of irrigation systems, breeding facilities, feed at low price, equipment for milking and increment in milk price.

It can be concluded that main problem of the MCC and DPU is the non-availability of cold chain. Similarly, DPU has problem of marketing for its products and low processing capacity in term of equipments. The supply of dairy products to selling points is not on time.

Therefore, there should holistic efforts and intervention to support the whole chain specially the farmers to overcome all the hindrance factors.

**Keywords.** Small dairy farmers in Muhammad Agha district, milk supply chain, Guzargah DPU.

## **CHAPTER ONE INTRODUCTION**

### **1.1 Background**

#### **1.1.1 Brief description about Afghanistan**

Afghanistan is a landlocked country located in the central of Asia having borders with China, Pakistan, Central Asian countries and Iran. The total area of Afghanistan is 647,500 Kilometer squares. The population of Afghanistan is about 30 millions. Afghanistan is a land of arid deserts and mountain valleys, having extreme weather conditions ranging from intensive heat to intensive cold. The incomes of eighty percent population of Afghanistan depend on agriculture and livestock production.

#### **1.1.2 Current livestock status in the country**

Main Livestock products are meat, milk and poultry which are important source of food and cash income for communities. Dairy products play an important role in the diet of Afghans, and rural families try to keep at least one cow to get milk for the family. In the past, the sale of dairy products was at regional level and mainly around bigger cities. But due to growing in population, the demand for milk and dairy products has been increased which result in import of dairy products from neighbors countries.

Currently Afghanistan have 2.1 million dairy cows, 8.7 million sheep herd and 7.3 million goats and the average production of milk is 500-1000 L/year/cow (low) to 1000-1500 L/year (high). National production is 2.1 billion liters per year cow milk, about the same for sheep/goat milk and 8.1 tones of camel milk. Milk production is increasing by 3200 hectoliters per year and per capita consumption of milk in Afghanistan is 0.1 kg per day (shah 2009).

#### **1.1.3 Dairy production in Afghanistan**

Dairying is still in initial stage of development in Afghanistan and it attracts the more farmers and interest of government and development partners.

Milk is produced by small holder farmers in rural areas in Afghanistan while some intensive production system of milk is present around peri-urban areas. Farmers have 1-3 dairy animals producing 5-10 liters of milk per day. Farmers are using their milk for their own consumption while the surplus milk is sold to the neighbors, cooperatives or milk collection center or the dairy plant or private vendors (FAO 2010).

In Afghanistan, people prefer in winter to consume fresh milk, while in summer, they like to have yoghurt and fresh milk. Mostly people consume milk during breakfast while yoghurt in lunch and dinner time.

In rural areas especially in mountainous area, the surplus milk is processed for production of "Quroot" on the based of sour yoghurt and wheat flour, and ' Maska' (ghee) which both are

non perishable. Other tradition dairy products are 'Toorweey or dogh (whey)', 'kaimak' (cream), and Paneer (cheese)

The price, a farmer receives for these products at 9.45 Afs/ liter (0.20 USD per liter) of milk (based on 3.5 kg maska and 8.5 kg quroot from 100 liter raw milk). This is much lower than the farmers receives who are supported by FAO. Those farmers receive average prices of 13 Afs/kg (0.28 USD) raw milk (Bonnier 2007).

There is some small scale milk processing unit in some area but the capacity is not more than 500 liter per day. Those processing units are run by farmers and traders where milk is bought from neighboring farms. These forms of processing units are producing traditional dairy products mentioned above and run by the surplus milk of the farmers.

Farmers are selling their surplus milk where they find an attractive market, but this kind of selling is without proper quality control system and hardly has any form of packaging. This is cheapest source of dairy products for the urban population.

Milk collection schemes were developed by FAO and some other organizations, in combination with simple processing facilities. There are some large and medium scales DPUs in Kabul, Balkh, Kundooz, Jalalabad, Herat, Ghazni and wardak cities. These schemes have attracted the interest of the famers (to produce more milk and sell to processing units through milk collection centers) but these schemes remained quite limited in scale, because of slow development and late provision of needed equipments. Insufficient financing of these schemes was also big factor for its limitation. Mainly these processing units are producing pasteurized milk, yoghurt, cream, chaka, butter and cheese.

Some study shows that a large market for fresh milk product is available in Afghanistan which reflects high consumers demand for fresh milk and other dairy products. However the slow speed of livestock recovery and the lack of modern processing and marketing arrangement revealed that demand still far outstrip supply (Spooner 2007).

According to Halbach and Ahmad 2005, Study of opportunities to rebuild Afghanistan livestock sector conclude that there is significant national, regional and international market available for processed dairy products. Some products such as yoghurt from Ghazni, have a nationwide reputation.

## **1.2 Research problem**

Despite high investment and development in the dairy sector since 2001 in Afghanistan, milk supply is not at constant level through out the year. The milk is produced by rural farmers which are supported by some organizations and there are few numbers of DPUs in some provinces including Kabul which are being supported by different international and national organizations. Since all these supports, there is always fluctuation in quantity of milk supply in different month of the year to meet the demand of the people in Kabul.

According to study of Bonnier 2007, that recently more processing equipments have been purchased for the DPU in Kabul while in Mazar-e-sharif a new dairy plant has been

established but the quantity of milk being collected in the DPUs show strong fluctuations in different season of the year. Spring and summer seasons are considered traditional calving period and more milk is produced during these two seasons so DPU can manage their activities and staff. During these two seasons more feed is available. In winter there is shortage of milk because so many cows are dry and feed limited. There are so many other factors lead to fluctuation in supply of milk that to be assessed and addressed but needs much more investment.

### **1.3 Objectives of the research**

1. To identify the main factors (at least three) responsible for fluctuation in milk supply.
2. To recommend possible way (at least three) to increase the milk supply.

### **1.4 Main research questions**

#### **1. What is the current status of milk supply chain in central region (Logar and Kabul)?**

- i. What is the milk chain structure in central region, Afghanistan?
- ii. What are the roles of actors in the milk chain?
- iii. Who are the supporters and influencers and what roles do they have in milk chain?

#### **2. What is the milk production flow in the area throughout the year?**

- i. What is the on farm production of milk?
- ii. Where the milk goes after production during different seasons of the year?
- iii. Why farmers are selecting different milk supply channel in different season of the year?

#### **3. What are the main hindrances in milk supply chain?**

- i. What problems faced by small holders in milk production?
- ii. How many dairy farming systems available in the area?
- iii. What is the current condition of DPU in term of facilities and technology?
- iv. What problem faced by processing unit for getting milk from dairy farmers?
- v. What problem faced by retailer shop during milk supply?

#### **4. What are the possible ways to maintain the milk production constant throughout the year?**

- i. What are necessary for the farmers to increase and maintain their milk production through out the year?
- ii. What steps are necessary for the DPU to get more milk and maintain the processing capacity?
- iii. What the government and other organization can do help different actors of milk supply chain in maintenance of milk production and processing?

## 1.5 Explanation of terms

**Insemination;** is the introduction of sperm into the reproductive tract of dairy cow

**Artificial Insemination;** is the process by sperm which has been frozen and thawed is placed into the reproductive tract (Uterus) of dairy cow for the purpose of impregnating the dairy cow by using means other than sexual intercourse or Natural service/Insemination.

**Natural service/ Insemination;** Insemination which takes place through sexual intercourse is known as natural service or NI.

**Breeding;** is the reproduction that is, producing of offspring.

**Calving;** is physiological process in which dairy cattle gives birth to a calf.

**Chilling;** is the status of dairy product on 4 °C temperature.

**Dairy farmer;** farmers who sell the milk in formal or informal milk chain in the area.

**Dairy cooperative;** is an association of small dairy farmers to take initiative in mold their own destiny in dairy production.

**Dairy union;** Certain number of dairy cooperatives working together and establish a dairy union so the cooperatives are associated under a dairy union.

**Extensive dairy production system;** is a dairy production system that uses small inputs of labour, fertilizers, and capital relative to the land area. Nomadic herding is an extreme example of extensive farming, where herders move their animals to use feed from occasional rainfalls.

**Intensive dairy production system;** is a dairy production system characterized by high inputs of capital, labour, or heavy usage of technologies such as pesticide and chemical fertilizers relatively to land area.

**Family rearing;** is referred to that kind of dairy farming where landless dairy farmers are rearing one or two low productive cattle maintained exclusively on grazing on common property land or private land with little or negligible purchased inputs.

**Grazing;** generally describes a type of predation (hunting) in which cattle feeds on plants such as grasses in open area or field.

**Improved breed;** is type of animal improved genetically and proved for the high production and reproduction activities.

**Local breed;** is type of animal originated in that area long time ago and present in the area still and used by the farmers for production.

**Jirib;** The jirib is an Afghan measure equaling 2,000 square meters of land.

**Labour hour;** is that time when a farmer spend in farm management during the day

**Lactation;** The process in which milk is produced.

**Lactation number;** The number of those periods in which cattle gives milk after calving through out its life. One lactation period is a time of one lactation during cattle gives milk from one calving to before next calving.

**Market Information;** access to accurate information about market prices and conditions can help producers avoid exploitation by buyers and negotiate a fair price.

**Quroot;** is dried yughrut and it round and oval shape.

## CHAPTER TWO LITERATURE REVIEW

### 2.1 Value Chain

A value chain represents getting products from producer to consumer through involvement of many activities. All the activities in value chain are conducted by specific and different actor in a sequence. There are different actors including farmers, traders, processors and retailers. Each link in the chain adds value to the product (KIT, Faida Mali and IIRR, 2006).

The value chain approach responses to the factors and actors that verify if the product meet market and consumers demand with regard to volume, packaging, quality, and speed of delivery. Generally value chain contain three or more than three actors: Milk producers, collectors, processors, wholesalers, retailers and consumers.

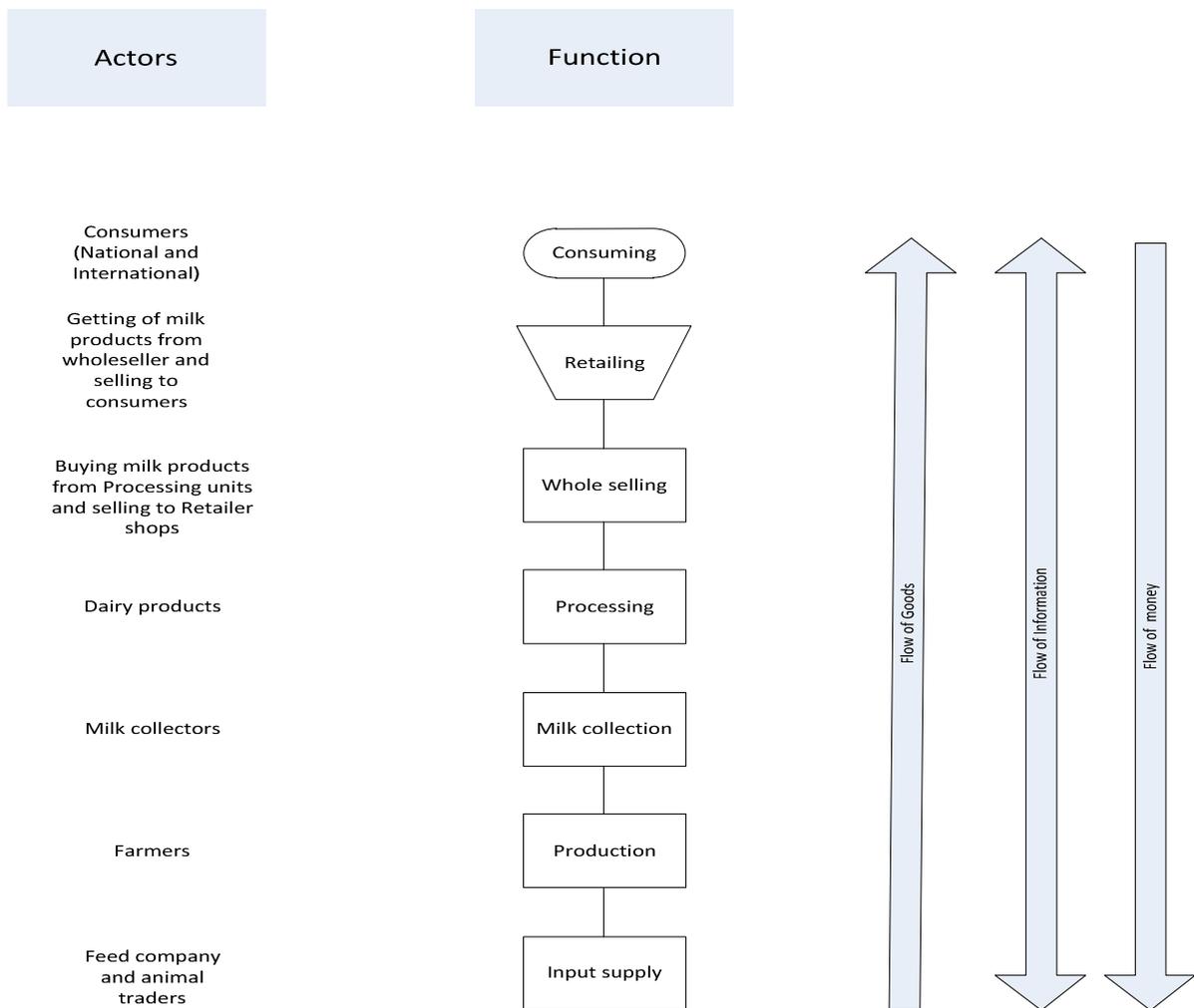


Figure 1 The Milk chain

## 2.2 Farm management

Smallholder milk producers are facing two main issues i.e. access to market and technical awareness and deficient resources. As small holder milk producers have small quantity of milk for sell that is why they can not get proper benefits and to bargain for a good price of their produce. In the mean time, changing technical and behavioral ways in large population of small holders is a major challenge for any firm working in the field of livestock (Afzal 2010).

Udo et al 2007 mention that availability of good feed (forage/roughage and concentrate feed) is a main challenging factor for milk production through out the year, especially when good breeds have been introduced.

A study of Land'O lakes 2007 in Parwan province shows that for enhancement in production of cows, a breeding program is necessary to be initiated. It was revealed in the study that farmers are poor and would not be able to pay for AI so improved cross breed bull recommendation is feasible and easy way for genetic improvement of local cows.

In the new strategy for the pro-poor dairy development in Assam-India, an action plan was prepared to promote dairy production at farm level and through different management ways like improvement of animals such as improvement of fodder crops and feed technology, cross breed, and by providing access to livestock services. It was also mentioned in the action plan to provide small holder dairy farmers access to reliable market to have more benefits from selling of milk (ILRI 2007).

Khan and Usmani in 2005 studied and concluded that rural small holder production system is more common dairy production system in NWFP, Pakistan. Farmers are satisfied about performance and profit of milk production. Keeping in view the poor production environment, profit can be further increased if farmers are educated about certain livestock management and economic importance. The negative gross margin or loss of local cattle can be controlled and upturned through cross bred cattle in the area which could be used for dual purpose both for draught and milk production.

Policy making is very important for the development of dairy sectors in Pakistan. The dairy sector mostly operates in rural areas on non-commercial basis in the unorganized sector. The organized sector processed of the dairy industry is only a small fraction of the total milk production of the country. That is why Pakistan imports powdered milk to meet the demand of the people despite it is a largest milk producer country (Burki et al 2004).

In most of the Asian countries, the characteristics of dairy industries are small herds, poor genetic potential of animals, low quality of forages and feeds, vulnerability to diseases, inappropriate market, lack of technical staff in dairy sectors, high environment stresses, reproductive problems and high udder abnormalities, low farm management, poor extension services and lack of commercial rations (Sarwar et al 2002).

The dairy industry is the sector with the highest degree of protection due to the economically vulnerable position of small milk producers. Milk is also known as white gold so it can be used to make a number of varieties of high quality products. The high cost of milk as a raw material has required a high modern and technical processing industry. The special nature of milk

(perishable) leads to the requirement of firm and complete quality rule and regulation and to a high transports cost (flavey 1999).

Cattle is very important for Afghan farmers both for milk production and land cultivation, although farmers are using machines for Agriculture operations. Cattle are managed differently, milking cow are kept in confinement. Different type of feed is offered to milking cow in different season of the year. Alfalfa and other green and fresh forages are given to milking cow during spring and summer season while in winter seasons, cow are fed straw and hay. Supplementary feeding is also provided like cotton seed cake, barely and corn (Ulfat-un-Nabi and Muzaffar 1999).

The supply of adequate amount of fodder is the key element for ideal milk production. Due to seasonal variation, animals faced to scarcity of fodder, leading to lower production which ultimately results in heavy economic loss to the owner. So the possible solution is to preserve the surplus fodder (Anwar et al 1991).

### **2.3 Calving**

Javed et al 2004, mentioned that generally the production of cows calving in fall is maximum, it is because of low environmental temperature and availability of good quality feed and forages. The cows that calved in spring season are producing low milk compare to cows calving in fall while the cows calving in hot dry and humid hot seasons were poorest producers. The cows calving during summer seasons are facing insufficiency of food and severe dry and humid season in last trimester of gestation and also were facing with dry and second insufficiency of fodder period (Nov-Dec) as they approached peak production.

### **2.4 Milk production**

According to Rota 2010, in developing countries, most livestock produced by small holders pastoralists and farmers and marketed by private entrepreneurs who acting as a marketing chain, collect, regroup and distribute the livestock and livestock products to end market. There are a lot of economical and institutional hindrances to livestock and livestock products marketing like transportation costs, quality standards, uncoordinated and inadequate livestock products market information which make slow the progress of livestock sector development with absolute negative impact on the small holders' producers and other who depends on the sector for their livelihood.

In Afghanistan, Milk is produced in different size of farms and by farmers from different cultural setting i.e pastoralists, agro-pastoralists, sedentary small holders, landless farmers and share croppers. Most dairy farmers operate diversified mixed or subsistence farming systems in different part of the country. There is simple relationship between traders and buyers in the whole sale and retailer of milk supply chain structure. Middle man is playing important role in the selling of livestock products from the farmers. Mostly the milk is processed and value added in farms and produce cheese, yoghurt, curd, butter and ghee and marketed to local consumers in the village and in near by towns directly (Walton 2008).

According to Tariq et all 2008, Sale of milk is a regular source of cash flow for small scale dairy farmers. The livestock that they have is an important asset for them. Livestock of the

farmers act as a blank check in the time of need. Small holders do not have easy access to financial services and support. In the absence of financial services like insurance, credits and subsidies, they do not have any financial recourse in a time of emergency such as break of livestock disease or mortality.

Mainly family farms with low capacities of production are the source of milk production in Serbia. Marketed milk share is increased during last few years but lack of cooperative among the farmers make worse their market position which lead to their low economic position ( Rode 2008).

Study in Bangladeshi shows that economic efficiency of milk production is increased more under cooperative system and farmers are enjoying the selling of their milk to an ensured market under cooperative marketing channels (Ashrafuzman 1995).

## **2.5 Milk collection**

According to Zia 2007, the processing units are collecting milk from farmers in far rural areas which led to diffusion of milk supply in Punjab province, Pakistan. The struggle resulted in price wars in collection zones and some major corporation like Nestle has established additional milk processing units in the area. There are some other factors like lack of cold chain, fragmented farms, and distance to dairy farmers affect milk processing units to operate at optimal capacity.

## **2.6 Milk processing**

At the current time, modern technology and equipments are not being used for milk processing. Currently some international organization like FAO wants to equip the Guzargah dairy plant with modern technology. Currently, in this dairy plant, open flame pasteurization process is conducted and also butter is processed in a clothes washing machine. Similarly dairy operation in Parwan province have three collection centers, one has started testing, pasteurizing and cooling milk. In this time, milk is sold in the nearby bazaar. During winter month, there is not collection of milk due to lack of production (Warner 2006).

## **2.7 Market for dairy products**

Series of activities are necessary to develop local market for milk and dairy market including comprehensive consumer research study on afghan dairy market, farmers and processors associations to represent them and also regular policies for the betterment of dairy sector (Land O'Lakes 2006).

## CHAPTER THREE METHODOLOGY

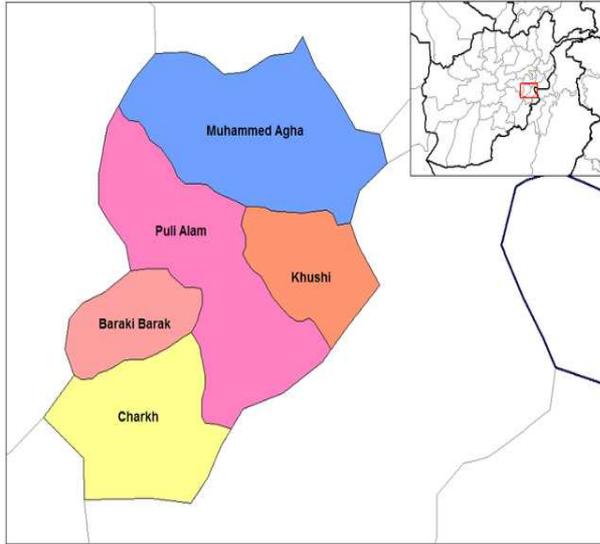
### 3.1 Study Area

The research was carried in two central provinces of Afghanistan (Kabul and Logar). The survey was conducted among farmers, interview with Milk collector and cooperative representatives in Muhammad Agha district of Logar province while the interviews with dairy plant manager, dairy retailers, and cooperative department's head were conducted in Kabul where DPU is located. Kabul is the main capital city of the country and highly populated. Kabul is the central city of the Kabul province which is located in central region of the country and has border with Kapisa in north east, Laghman in the east, Nangarhar in the southeast, Logar in the south, wardak in the southwest and Parwan in the northwest. The total area of the province is 4585 km<sup>2</sup>. More than half (56.3%) of the province is mountainous or semi mountainous terrain while more than one third of the area is made of flat land (37.7%)

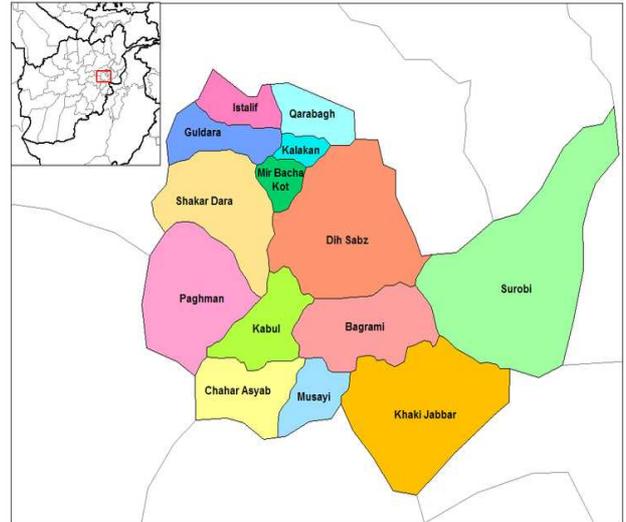
Total population in the province is 2.4 million and there are estimated 78.5 thousand households in the province. About 19% of the total population of Kabul is living in rural areas while the remaining 81% lives in urban areas. 47% rural household, 85% Kuchi household and 4% urban households are having livestock or poultry. The most common livestock are cattle, sheep and goat.



Figure 2 Map of Afghanistan



**Figure 3** Map of Logar province



**Figure 4** Map of Kabul Province

Logar province is located to the south of Kabul and is surrounded by Nangarhar, Paktya, Kabul, Wardak and Ghazni provinces. The province covers an area of 3955 km<sup>2</sup>. Logar has a total population of 322704 and there are 44209 households in the province and households on average have 8 members.

More than one-third (37%) of the province is mountainous or semi mountainous terrain while more than half (58%) of the area is made up of flat land. Three quarters (72%) of the population of Logar lives in rural districts while 28% lives in urban areas. Eighty five percent of rural households in the province own livestock or poultry. The most commonly owned livestock are sheep, cattle, camel and poultry.

### **3.2 The Research methodology**

The research have quantities and qualitative approach and based on interviews, survey, Observation, professional literature and country and regional documents from different sources. The primary data for the research was collected through Interview, survey and observation.

#### **a. Interview**

Interviews were conducted with two cooperative representatives, one milk collector, dairy unit's head, three retailers and 2 other supporter and influencers in the milk chain in Kabul. In total, 9 stake holders were interviewed for the issue in milk processing in dairy unit. The interviews were conducted through a prior managed checklists to response all the research questions.

## b. Survey

The data about milk production was collected from 40 individual dairy farmers through prior made questionnaire. The survey was conducted among the dairy farmers in Muhammad Agha district of Logar province. The farmers were selected for the survey with the help of DPU and milk collector but main criteria for selection of the farmers was based on number of cows they have.

Forty small dairy farmers were surveyed around MCC. The survey questionnaires were addressing the issues related to milk production and problem faced by small dairy farmers in the milk chain. The view of the small dairy farmers about the factors responsible for fluctuation in milk production and their need/solution to overcome these factors were asked

A structured questionnaire was used to collect the background information about individual dairy farmers, about their age (age group in milk production) and level of general education. Some other information about land size, number of dairy cattle own by every farmer was also collected. As the survey was conducted with prior made questionnaire so the questionnaire had open and close types of questions.

## c. Observation

Through observation, 6 livestock farms (randomly selected based on the number of animals-small, medium and large) were examined for their status of farm and animals. Similarly one milk collector, one processing and 3 retailing points were observed for their status and function/activities.

Table 1 Summary of interview and survey participants.

No	Actors/stakeholders in milk chain	Interview	Survey	Observation
1	Farmers		40	6 farms
2	Cooperative representative	2		
3	Milk collector	1		1 milk collector place
4	Processing unit's staff	1		1 processing unit
5	Retailer/selling points	3		3 retailing points
6	Influencer and supporters	2		
	<b>Total</b>	<b>9</b>	<b>40</b>	<b>11</b>

## d. Other source of Information

Literature review

Data from literature was collected according milk production and milk chain.

Documents from country and region was also used for support of the data and verification.

Table 2 Summary of information/ Data and their sources

Sub Q.	Information/Data	Source of Information
1.1	Milk chain structure	Field study
1.2	Roles of actors in the milk chain	Field study
1.3	Supporters and influencers and their roles in milk chain.	Field study
2.1	On farm production of milk	Survey with dairy farmers
2.2	Milk channel after production during different season of the year.	Survey with dairy farmers. Interview with cooperative.
2.3	Selection of different milk channel by farmers in different season.	Survey and interview
3.1	Problems faced by small holders in milk production.	Survey of dairy farmers
3.2	Dairy farming systems	Survey of dairy farmers
3.3	Current condition of DPU in term of facilities and technology.	Interview with DPU's staff.
3.4	Problem faced by processing unit for getting milk from dairy farmers.	Interview with DPU's staff.
3.5	Problem in retailer shop.	Interview with dairy retailer.
4.1	Necessary things for the farmers to increase and maintain their production through out the year	Survey of farmers. Interview with cooperative.
4.2	Steps are necessary for the dairy unit to get more milk and maintain the processing capacity.	Interview with staff of DPU.
4.3	support of government and other organization with different actors in milk supply chain in maintenance of milk production and processing.	Interview with different stakeholders in milk chain.

### 3.3 Analysis of the data

The collected data was arranged according to questions and sub questions and then coded and analyzed using statistical package for Social Science (SPSS) or Excel sheet and the data was presented in graphs, tables and cross tabulation. SWOT and Value chain mapping analysis also have been done for the chain.

### 3.4 Time schedule

Table 3 Time schedule

Activities	Jun. 10				Jul. 10				Aug. 10				Sept. 10			
Preparation of research proposal and desk study				X	X	X										
Field research/Data collection							X	X	X							
Data processing/analysis								X	X	X						
Preparation of concept report									X	X	X		X			
Submission of final report														X		

## CHAPTER FOUR: RESULT

### 4.1 Structure of the milk chain, role of the actors and supporter of the chain.

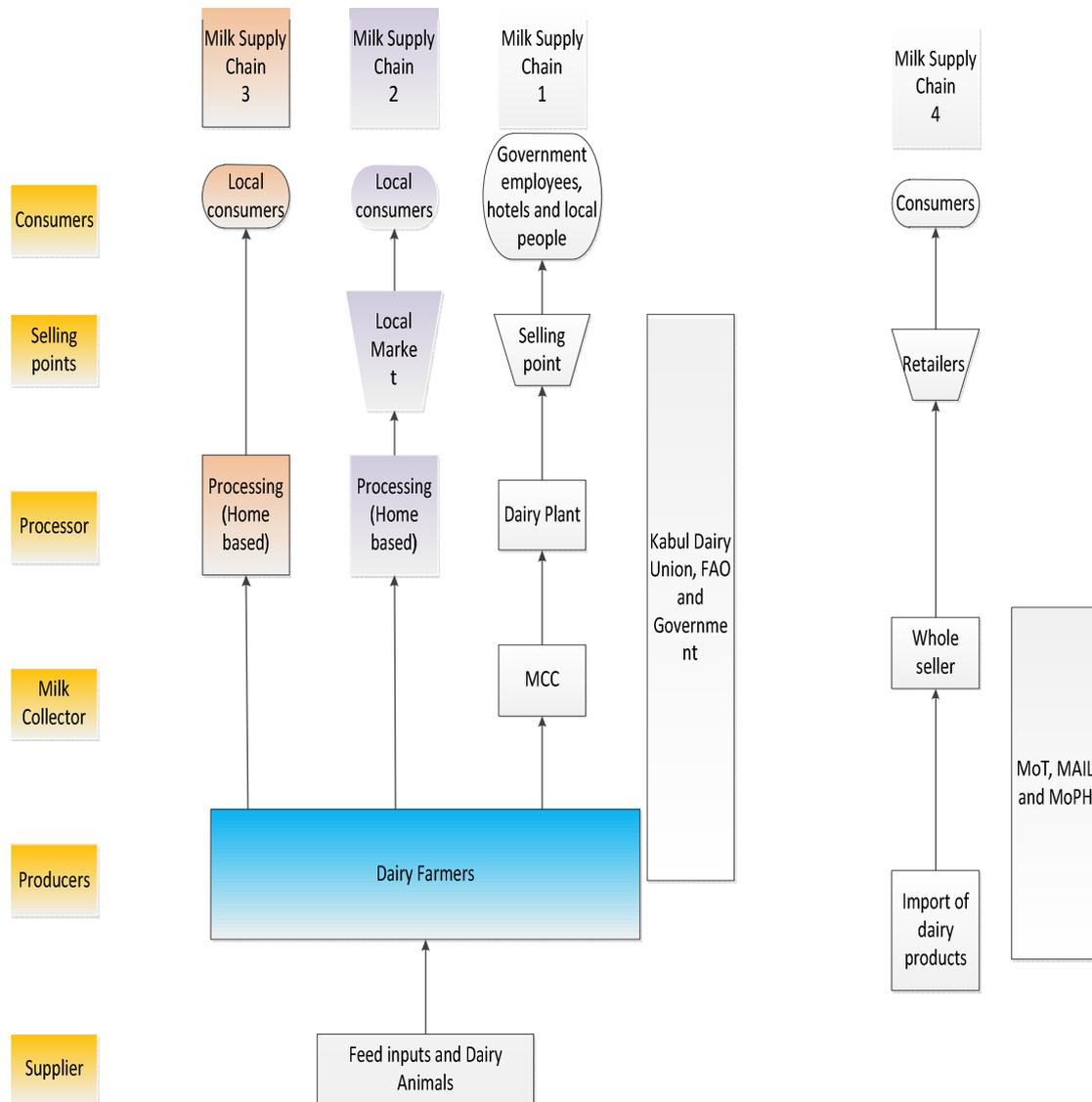


Figure 5 Milk supply Chains and Actors (Muhammad Agha District, Logar province)

There are four different type of milk supply chain as reflected in the figure.

#### **4.1.1 Milk supply chain 1**

- i. Agricultural/veterinary input Suppliers:-These are business people who sell Agricultural and Veterinary inputs like , vaccines, AI, veterinary medicine to farmers for improving their dairy cattle.
- ii. The stakeholders:- are Input suppliers, Producers (dairy cattle farmers), dairy transporter, Milk collector, Processors (farmer and dairy plant), Retailers (local shopkeeper and seller point owner) and Consumers. Kabul Dairy Union, FAO and MAIL are supporter of the chain in Logar (Muhammad Agha district) and Kabul province.
- iii. Producers:- These are small dairy farmer who keep the dairy cow for milk production in Muhammad Agha District, Logar province. They are rearing the dairy cattle in small dairy farm of 1-6 animals on grazing in their own land or purchasing grasses and hay for the feeding of cattle. The dairy farmers sell their milk to MCC located near by their village
- iv. Milk Collector: - Milk collector is collecting milk in MCC from dairy farmer then check the milk for quality and than transport this collected milk to the processing unit in Kabul. Milk collector pay back to farmers and give them feed back about quality and quantity of milk.
- v. Processing:- Milk is processing in Kabul DPU located in Guzargah, Kabul. The Kabul DPU is run by KDU. The milk is inspected in the DPU for fat contents and souring before processing. Different dairy products are produced and packed in the DPU and then sent to retailing/selling points, presidential palace and hotels.
- vi. Retailers:- in Kabul, the retailer sell the dairy products to urban consumers, shopkeeper and government employees.
- vii. Consumers are the last actors in the milk chains. The consumers buy the dairy products from retailers and enjoy in different time of meal.
- viii. FAO, KDU and MAIL are supporting the farmers for feeding, AI, medicines and quality control of milk.

#### **4.1.2 Milk supply chain 2**

This is simple milk supplies chain in which farmers are processing the milk at home after production and produce traditional dairy products like pasteurized milk, yoghurt, butter, whey etc and then sell it to retailers in local market or direct to consumers. The dairy farmers in this chain are also supported by FAO and MAIL for extensions services, AI and veterinary medicines.

#### **4.1.3 Milk supply chain 3**

This is also simple milk supply chain in which farmers are consuming their dairy products after processing at home. This chain is also supported by FAO and MAIL.

#### **4.1.4 Milk supply chain 4**

In this milk chain, the dairy products are imported by traders from neighbor countries and distributed to whole seller in Kabul and provinces and then the whole seller distribute it to local retailers and shopkeepers. The consumers are getting these dairy products at local market from shopkeeper and retailing points. MoT is giving permit to traders for imports of dairy products while MoPH is checking quality but mostly toxicity of the dairy products. MAIL is checking other qualities of the imported dairy products.

## 4.2 Back ground information of the respondents (dairy farmers)

### 4.2.1 Age

The average ages of the farmers are forty one years in Muhammad Agha district.

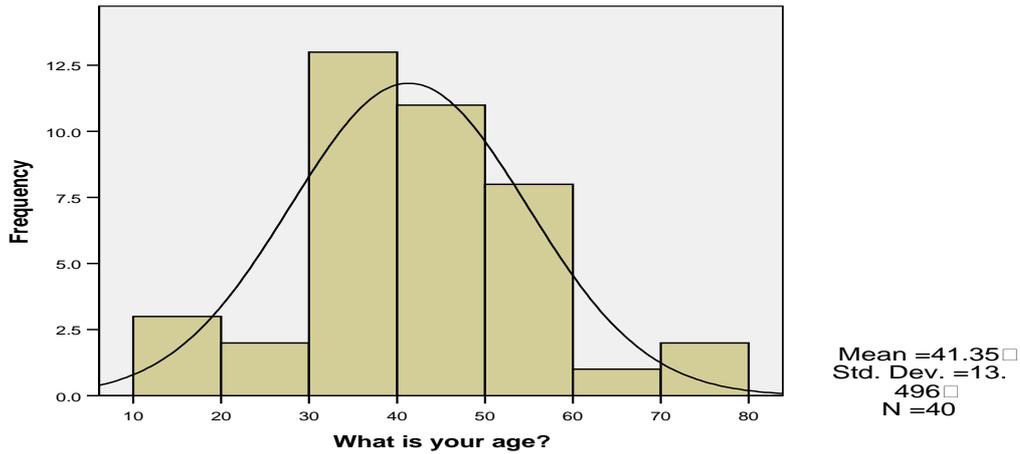


Figure 6 Average age of the farmers.

### 4.2.2 Average number of dairy cattle owned by the farmers.

Mostly the farmers have two dairy cattle in Muhammad Agha district, Logar province.

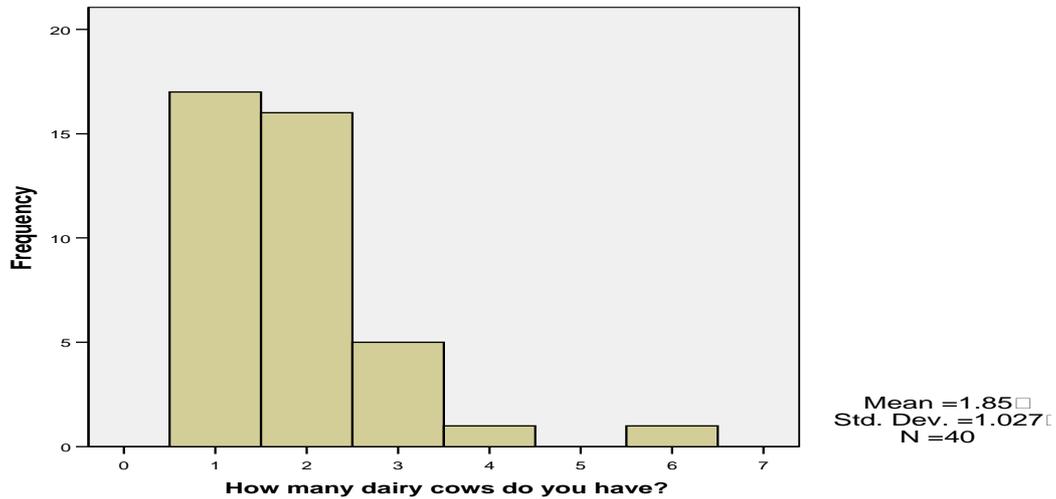


Figure 7 Average number of dairy cattle

### 4.2.3 Education Level of the farmers

The figure 8 shows that fifty five percent of the dairy farmers in Muhammad Agha district never been in school or they are illiterate.

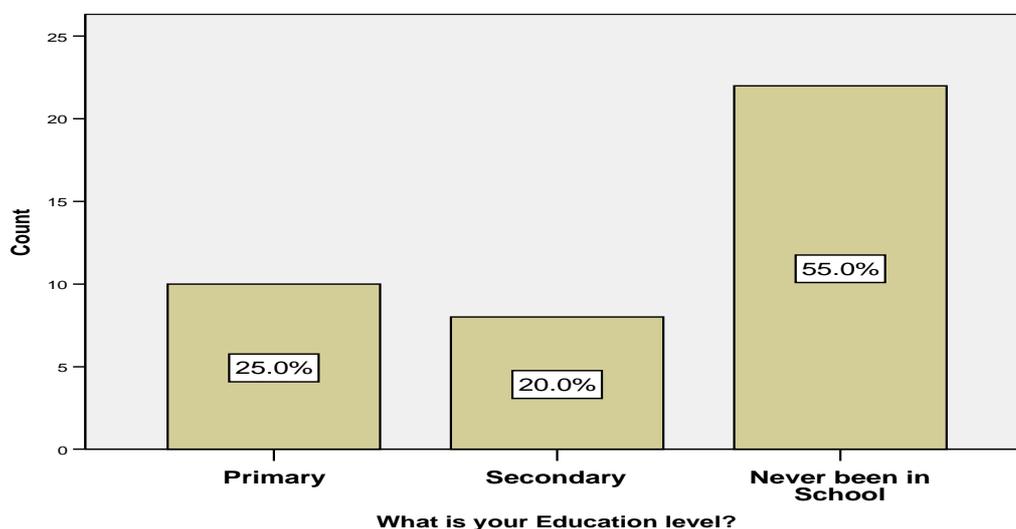


Figure 8 Education level of farmers

The cross tabulation of education level among male and female dairy farmers show that 79 percent of female and 42 percent of male dairy farmers have never attended school or they are illiterate.

Table 4 Education level among male and female dairy farmers

			what is your gender?		Total
			Male	Female	
What is your Education level?	Primary	Count	8	2	10
		Expected Count	6.5	3.5	10.0
	Secondary	Count	7	1	8
		Expected Count	5.2	2.8	8.0
	Never been in School	Count	11 (42%)	11 (78.57%)	22
		Expected Count	14.3	7.7	22.0
Total		Count	26	14	40
		Expected Count	26.0	14.0	40.0

### 4.3 Dairy production system

All the dairy farmers in Muhammad agha district are small dairy farmers and keeping the dairy cattle under family rearing or farming system.

### 4.4 Breed of dairy cattle owned by farmers

The figure 9 and table 5 show that 60% of farmers have local dairy cattle breed while 28% farmers have improved dairy breed.

Table 5 What kind of cattle breed do you have? Among male and female farmers

			What is your gender?		Total
			Male	Female	
What kind of cattle breed do you have?	Local Breed	Count	16 (61.53 %)	8 (57.14 %)	24 (60%)
		Expected Count	15.6	8.4	24.0
	Improved Breed	Count	8	3	11 (27.5 %)
		Expected Count	7.2	3.9	11.0
	Both (Local and Improved breed)	Count	2	3	5
		Expected Count	3.3	1.8	5.0
Total		Count	26	14	40
		Expected Count	26.0	14.0	40.0

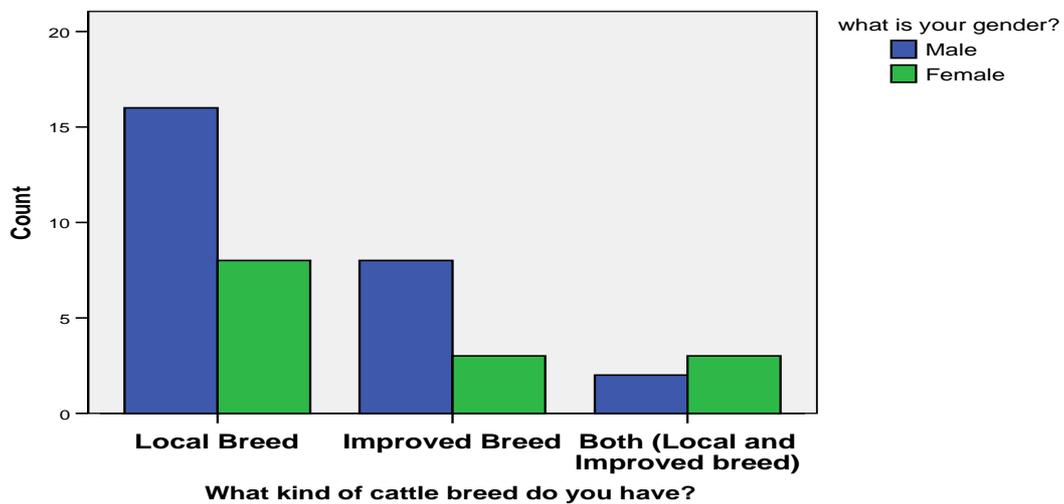


Figure 9 Average number of dairy cattle breed owned by farmers

#### 4.5 Method used for breeding of dairy cattle

The data shows that sixty three percent of dairy farmers are using natural method of breeding for breeding of dairy cattle.

Table 6 Method you use for breeding of dairy cattle

			what is your gender?		Total
			Male	Female	
What kind of method you use for breeding of animal?	Natural	Count	17	8	25 (62.5 %)
		Expected Count	16.3	8.8	25.0
	Artificial	Count	9	3	12 (30%)
		Expected Count	7.8	4.2	12.0
	Both (Natural and Artificial)	Count	0	3	3 (7.5%)
		Expected Count	2.0	1.1	3.0
Total		Count	26	14	40
		Expected Count	26.0	14.0	40.0

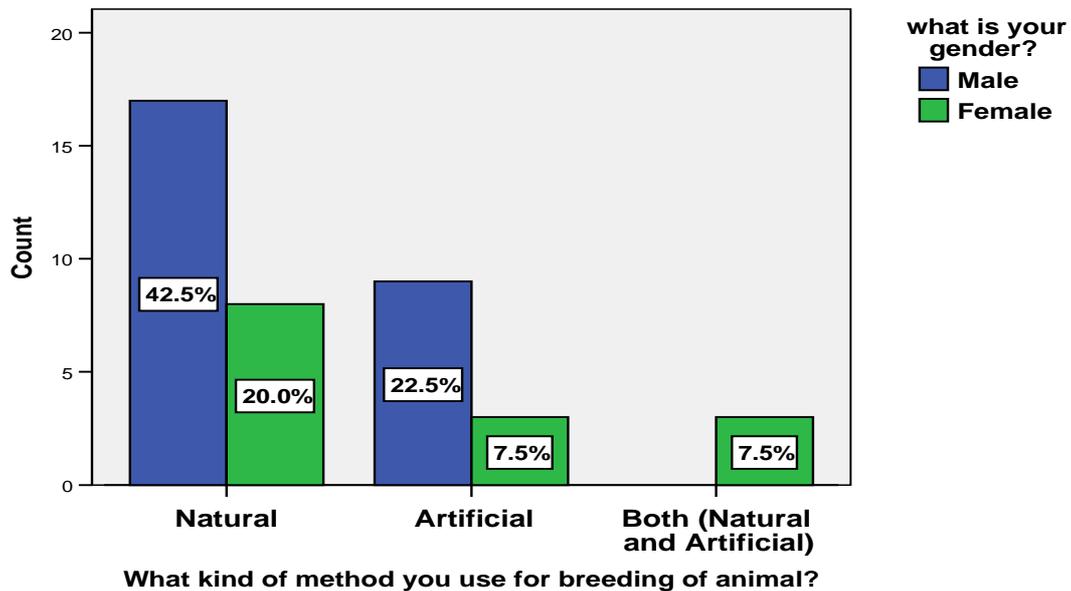


Figure 10 . Method used by farmers for breeding of animals (both in number and percentage)

#### 4.6 Semen availability

More than eighty percent of dairy farmers mentioned that semen is available.



Figure 11 The availability of semen

#### 4.7 Insemination of dairy cattle

Most of the farmers mentioned that insemination is done on time to dairy animals.

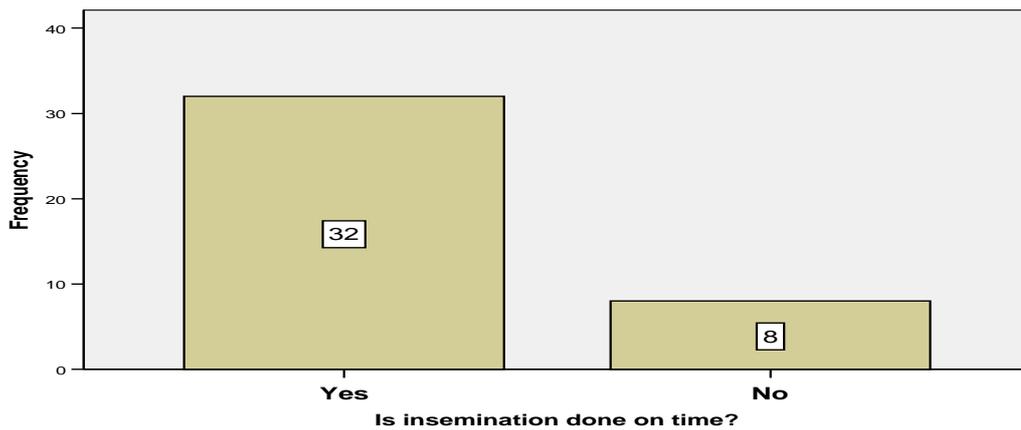


Figure 12 Insemination time

#### 4.8 Veterinary services

The figure 13 shows that seventy eight percent of the dairy farmers have access to veterinary services in Muhammad Agha district.

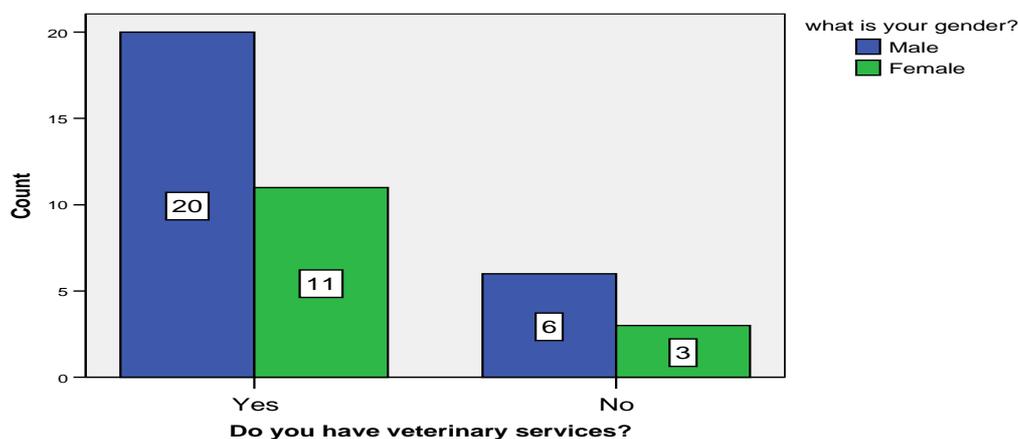


Figure 13 Access to veterinary services

#### 4.9 Common dairy cattle diseases

FMD and some seasonal diseases like fever are common dairy cattle diseases in the area and fifty percent of the respondents mentioned that they have on time treatment for dairy cattle diseases.

Table 7 More common dairy cattle disease

More common dairy cattle disease			
	No. of Respondents	Treatment	No. of Respondent
FMD	16	On time	12
		Some time	1
		Not on time	3
FMD+ Seasonal diseases	12	On time	4
		Some time	6
		Not on time	2
Seasonal diseases	8	On time	2
		Some time	2
		Not on time	4
Reproductive diseases	2	On time	
		Some time	2
		Not on time	
Mastitis /Udder problem	2	On time	1
		Some time	1
		Not on time	

#### 4.10 Veterinary services providers

Table 8 Veterinary services and providers

Veterinary services	Provider	No. of Respondents
Vaccination	KDU	18
	Private	13
Vet. Medicine	KDU	18
	Private	13
Artificial Insemination	KDU	18
	Private	13

#### 4.11 Extension services

In average, sixty five percent farmers mentioned that they do not have any extension services in the area.

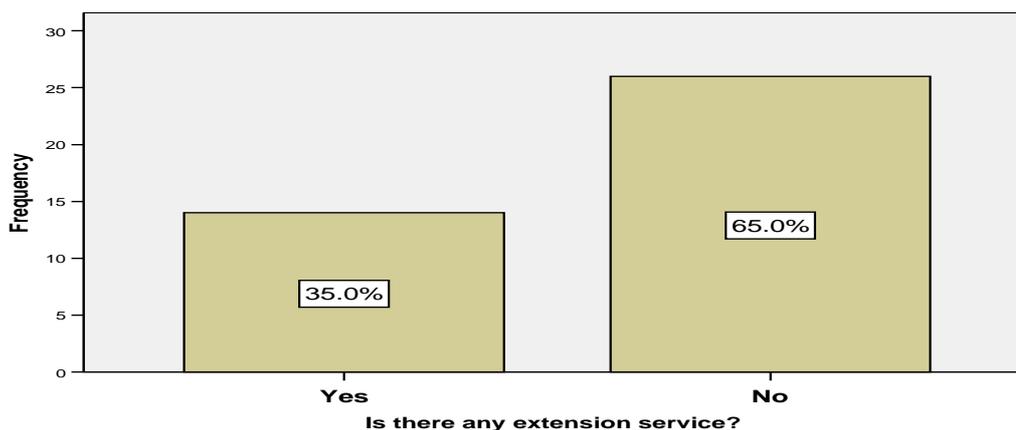


Figure 14 Extension Services

#### 4.12 Type of extension services,

Only fourteen respondents mentioned that we have feeding management and market information provided by KDU.

#### 4.13 Financial support

The entire forty respondents mentioned no financial support like loan, credit and subsidy is provided by any other organization for the dairy farmers in Muhammad Agha district.

#### 4.14 Selling of milk

All the forty respondents mentioned that milk is sold to MCC. Five respondents also mentioned that milk is sold in winter to local market after processing at home.

#### 4.15 Opinion of dairy farmers for selling milk to MCC

All the forty farmers mentioned that we are selling milk to MCC because we have sustainable market and payment is done on time.

#### 4.16 Pricing System in the milk chain

Fifty five percent dairy farmers mentioned that they are satisfied with the price paid by MCC.

Table 9 Farmers satisfied with the pricing system

			what is your gender?		Total
			Male	Female	
Are you satisfied with the pricing system?	Yes	Count	17	5	22 (55%)
		Expected Count	14.3	7.7	22.0
	No	Count	9	9	18
		Expected Count	11.7	6.3	18.0
Total		Count	26	14	40
		Expected Count	26.0	14.0	40.0

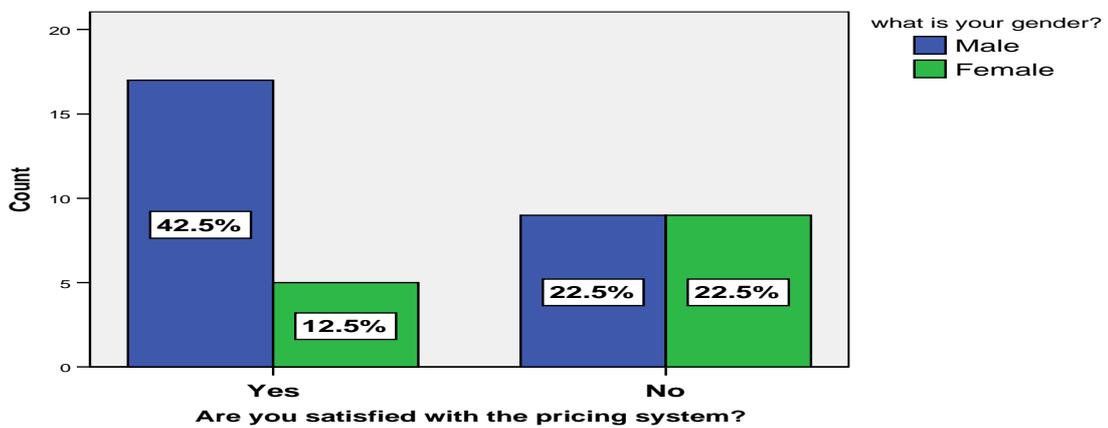


Figure 15 Satisfaction of dairy farmers with the pricing system.

#### 4.17 Land owned by the farmer

In average, the dairy farmer has agriculture land of 2.6 Jirib in Muhammad Agha district.

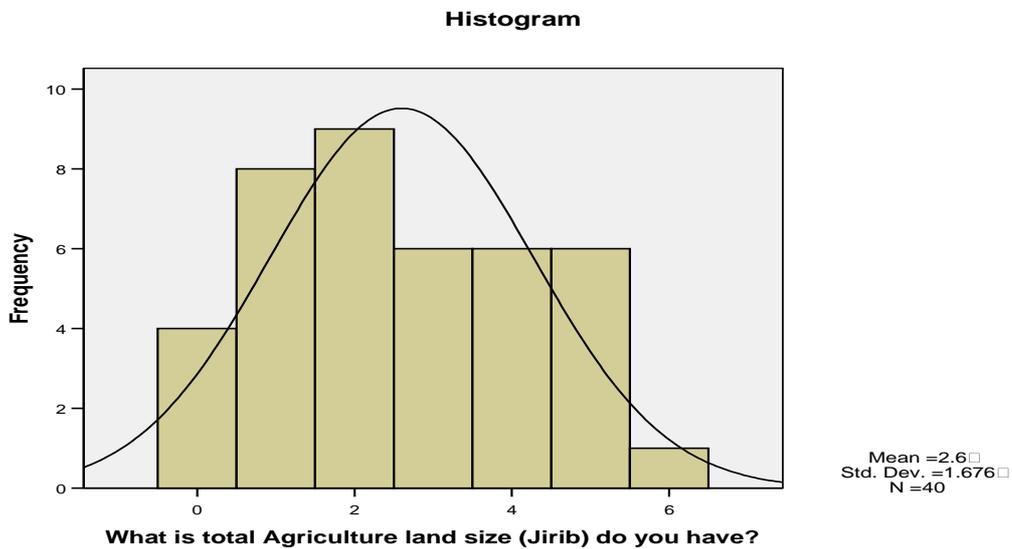


Figure 16 Land owned by the dairy farmers

#### 4.18 Feeding system

Sixty five percent farmers are using both grazing and in house feeding system for feeding of dairy cattle while thirty five percent dairy farmers are giving feed to dairy animal at houses.

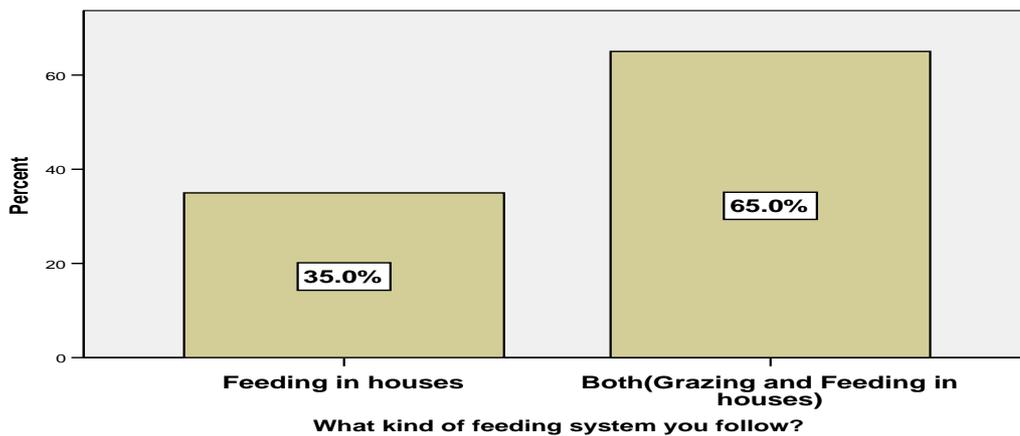


Figure 17 . Feeding system

#### 4.19 Type of feed of feed offer to the animals.

Table 10 Feeding crops and season

Name of crop	Feeding season	No. of respondents
Alfalfa	Spring and Summer	40
Clover	Spring and Summer	40
Hay and straw	Winter	40
Green grass	Spring, Summer and early Winter	35

#### 4.20 Availability of feed

More than half of the farmers have sufficient feed for the dairy animal in all season of the year.

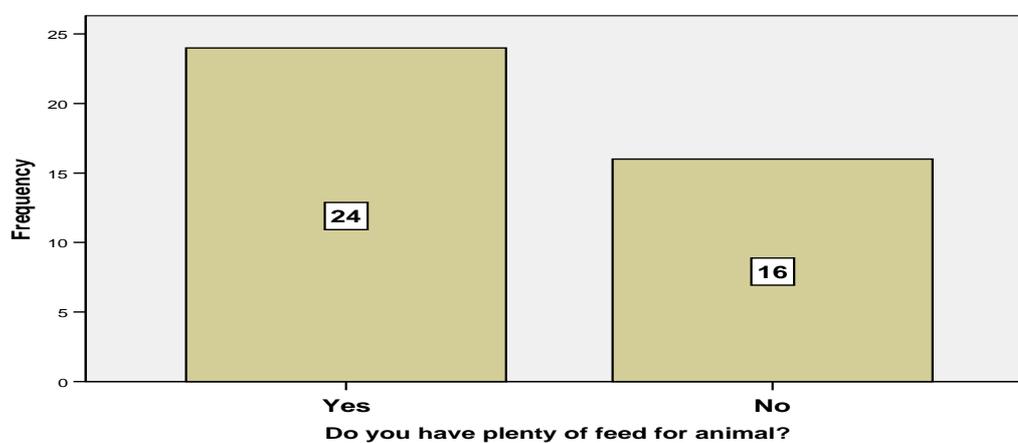


Figure 18 Feed for dairy animal

#### 4.21 Water for dairy cattle

All the farmers mentioned they have plenty of water for their dairy cattle.

#### 4.22 Suggest of farmers to the problem faced by small dairy farmers

Table 11 Farmer's suggestion to the problems

Suggestions by small dairy farmers to overcome the problems in production of milk		No. of respondents (Out of 40 respondents)	Percentage respondents out of total respondents.
1	Financial support to farmers	33	82.5%
2	Extension services and training	28	70.0%
3	Facility for selling of evening milk	25	62.5%
4	Trained veterinary staff	22	55.0%
5	Increase the price of milk	18	45.0%
6	On time treatment to dairy cattle	17	42.5%
7	Breeding facilities	16	40.0%
8	Equipment for milk collection	14	35.0%
9	Repairment of water Irrigation systems	12	30.0%
10	Provide feed on low price	9	22.5%

#### 4.23 Calving and lactation parameters of dairy cattle

Total 40 famers have 70 dairy cattle, among which 41 are local dairy cattle while 29 are improved dairy cattle.

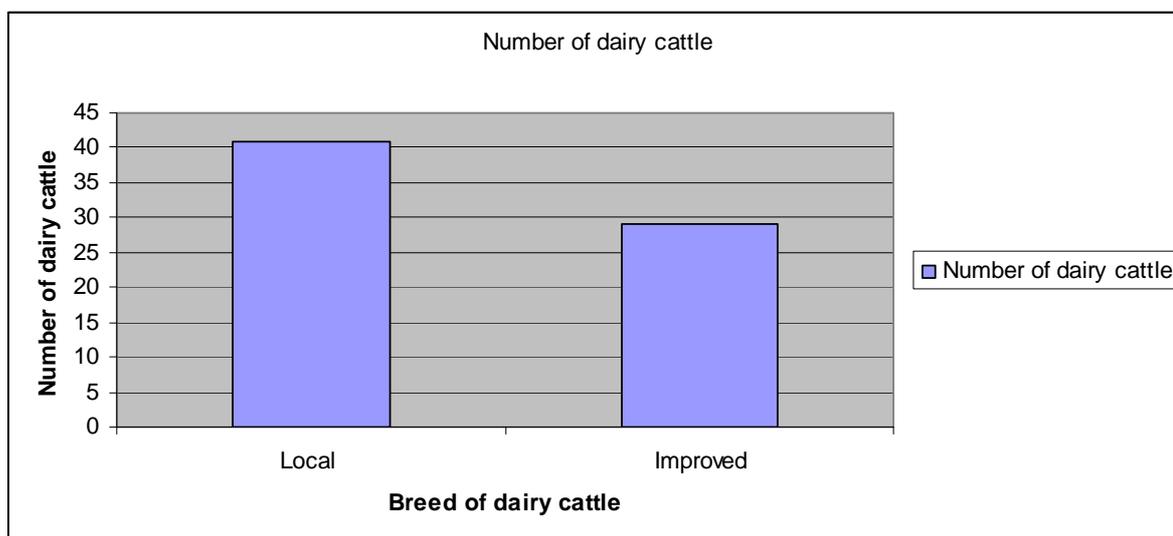


Figure 19 Number of dairy animal (Breed wise)

## Calving and non-calving dairy cattle in 2009

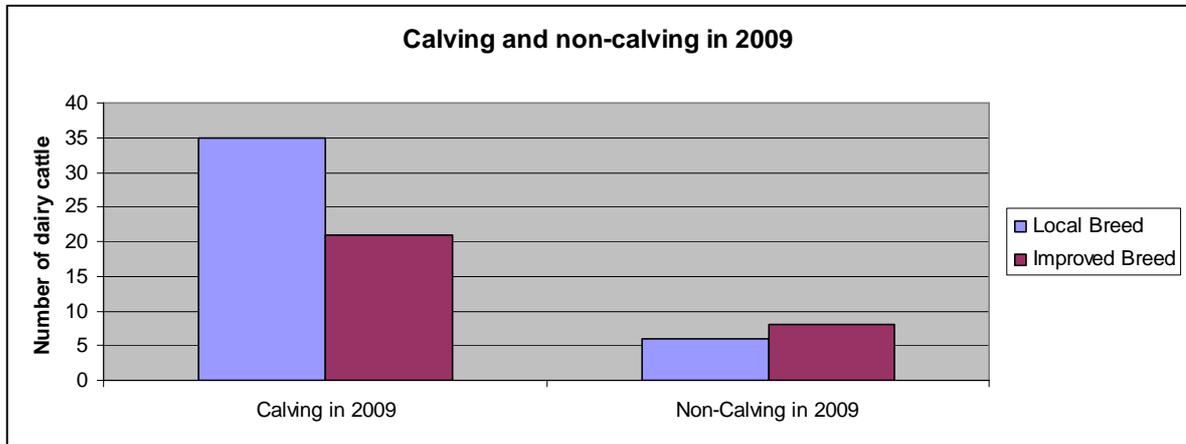


Figure 20 Number of dairy cattle calved and non-calved in 2009

Figure 21 shows that most of the calving occurred in the month of April and May 2009.

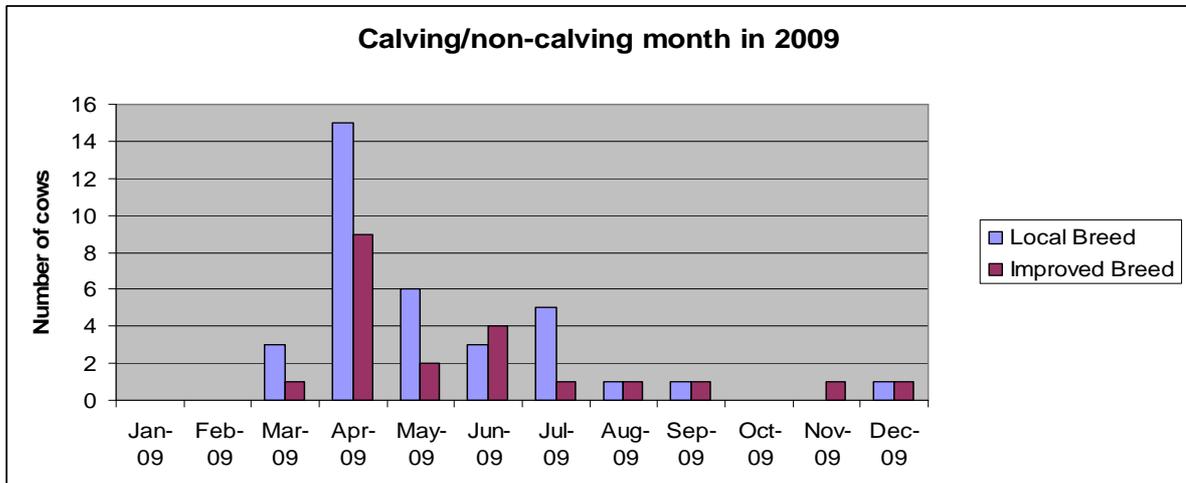


Figure 21 . Number of dairy cattle gave calf in different months of 2009

Figure 22 shows that fifty three dairy cows out of 70 gave calf in 2010.

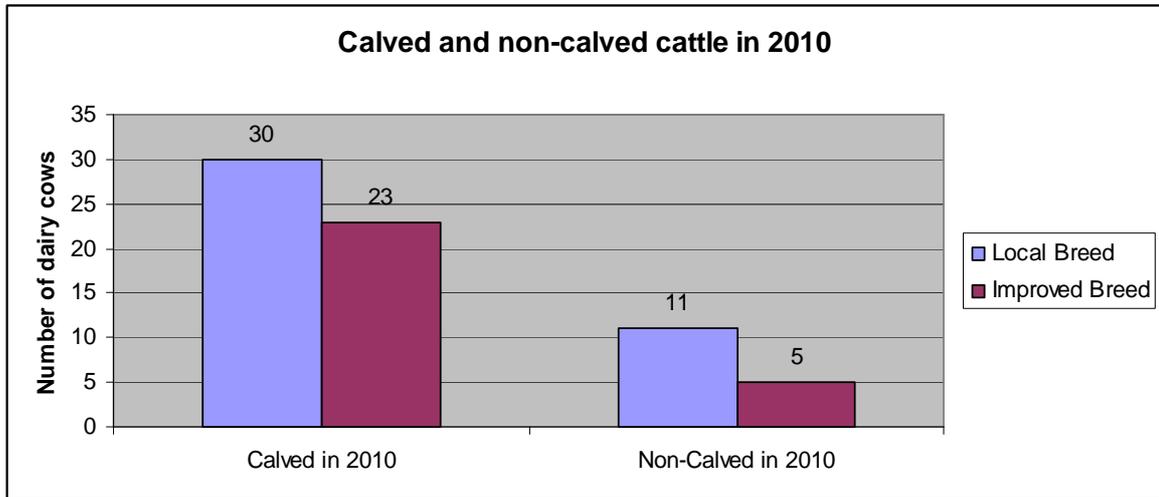


Figure 22 . Number of dairy cattle calved or non-calved in 2010

Figure 23 shows that calving of most dairy cattle occurred in the month of May, June and July 2010.

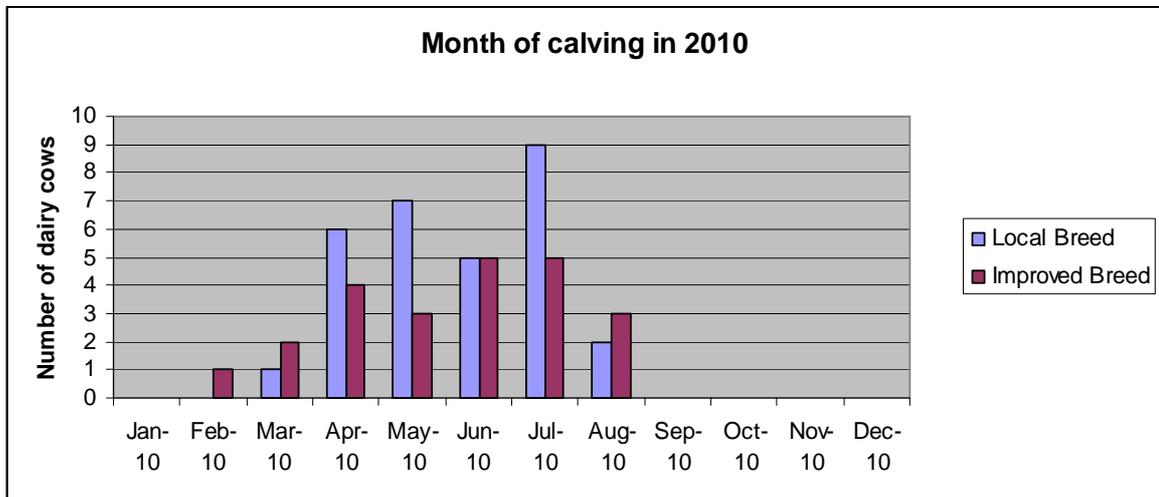


Figure 23 Months and number of calving in 2010

Figure 24 shows that more than fifty percent dairy cattle have nine month lactation period.

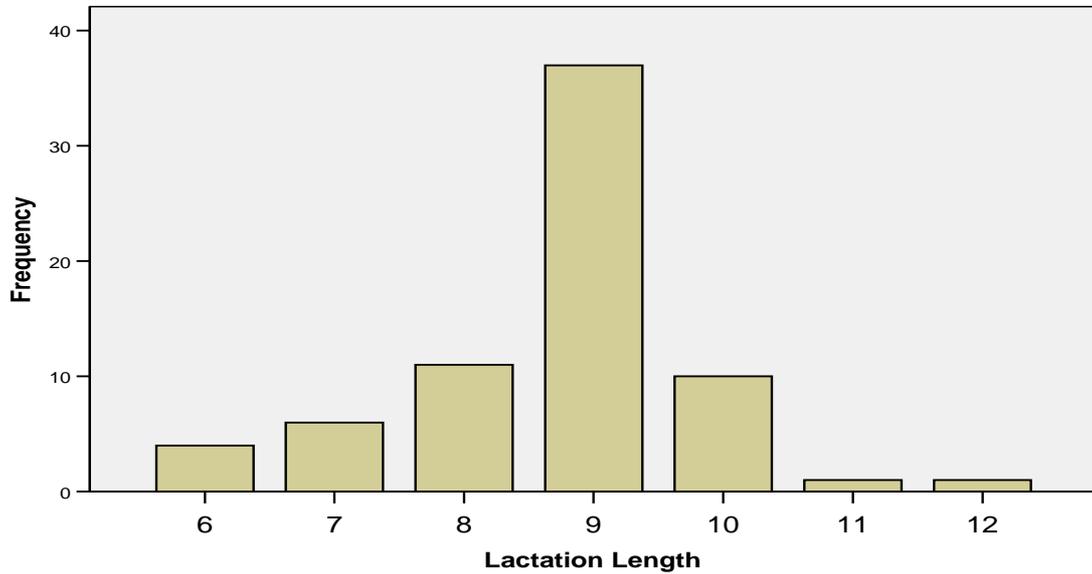


Figure 24 Lactation length in months

The table of cross tabulation shows that among local breed of cattle has forty nine percent dairy cattle has 9-12 liter milk per day production as highest production at early lactation or just after calving while among improve breed, the highest production of forty one percent of cattle is 9-12 liter/day and thirty four percent are producing 13-16 liter milk per day.

Table 12 Table Breed of dairy cows \* Highest Production Liter/day

			Highest Production Liter/day					Total
			1-4	5-8	9-12	13-16	17-20	
Breed of dairy cows	Local	Count	1 (2.43%)	16 (39.02%)	20 (48.78%)	2 (4.88%)	2 (4.88%)	41
		Expected Count	.6	12.3	18.7	7.0	2.3	41.0
	Improved	Count	0	5 (17.24%)	12 (41.38)	10 (34.48%)	2 (6.89%)	29
		Expected Count	.4	8.7	13.3	5.0	1.7	29.0
Total		Count	1	21	32	12	4	70
		Expected Count	1.0	21.0	32.0	12.0	4.0	70.0

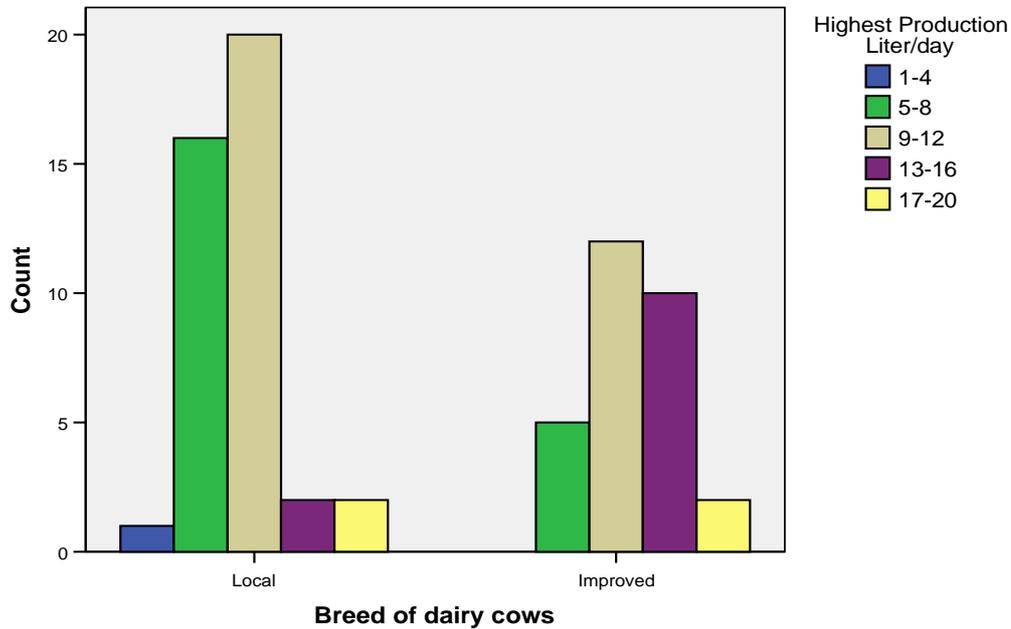


Figure 25 Milk production of dairy cattle per day (Highest level of milk)

Table 14 shows that most of the local dairy breed produces two liters milk per day at the end of the lactation period while improved breed produce five liter milk per day as lowest production rate.

Table 13 Breed of dairy cows \* Lowest Production Liter/day

			Lowest Production Liter/day					Total
			1	2	3	4	5	
Breed of dairy cows	Local	Count	4	24	6	3	4	41
		Expected Count	2.9	16.4	6.4	7.0	8.2	41.0
	Improved	Count	1	4	5	9	10	29
		Expected Count	2.1	11.6	4.6	5.0	5.8	29.0
Total		Count	5	28	11	12	14	70
		Expected Count	5.0	28.0	11.0	12.0	14.0	70.0

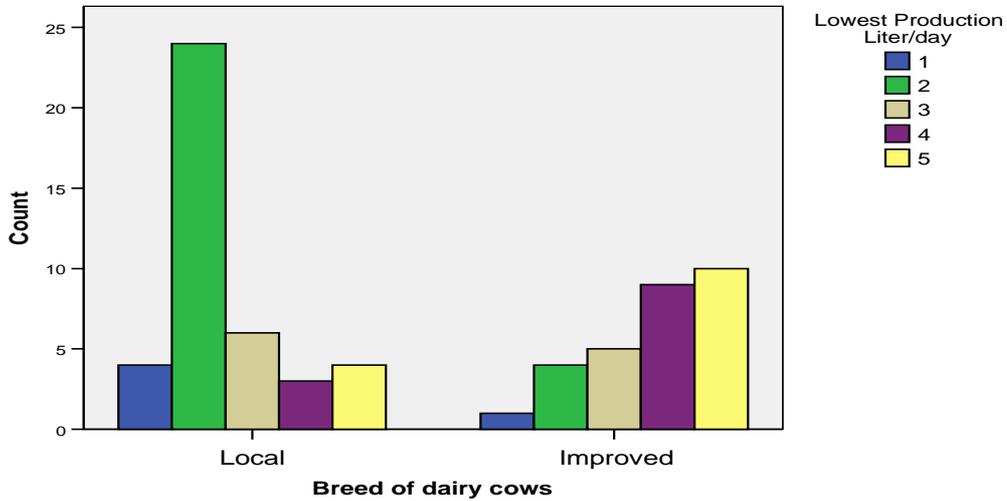


Figure 26 Lowest milk production (liter per day) in dairy cattle

Figure 27 shows that total production of milk (liters per lactation period) of local breed is mostly 1200-1399 liters while among improved breed, it is 1800-1999 liters.

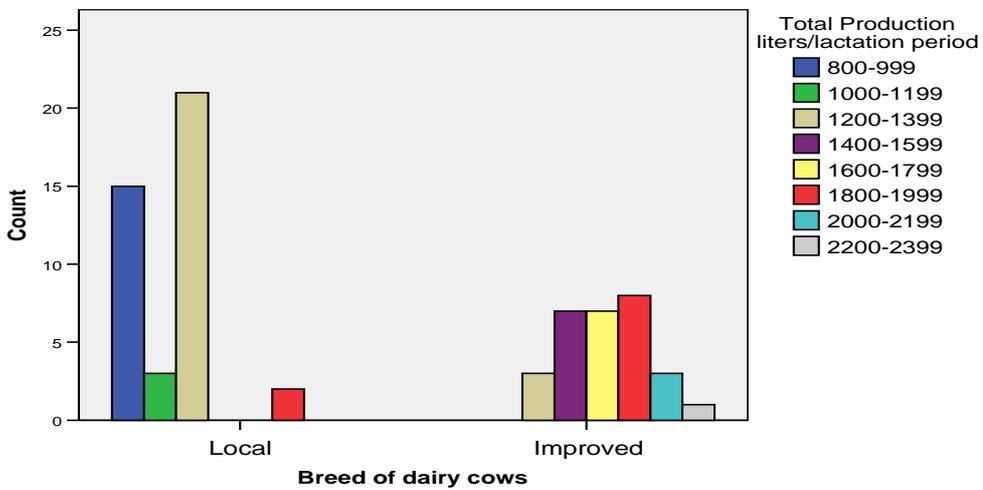


Figure 27 Total milk production per lactation period

### Insemination of dairy cattle in past one year

Totally twenty four dairy cattle out of seventy cows have been inseminated in past one year July-09 to August-10 and sixteen of them were inseminated with semen of local breed (natural service)

Table 14 No. of cattle inseminated with semen of Local or improved breed in 2009 and 2010

Last Insemination month	No. of dairy cattle Inseminated	AI or Natural service/Insemination used (Breed)	
		Number of Dairy cattle	AI or Natural service used (Breed)
Jul-09	1	16	Local
Sep-09	1	8	Improved
Oct-09	2		
Nov 09	3		
Jan-10	2		
Mar-10	3		
Apr-10	4		
May-10	1		
Jun-10	1		
Jul-10	3		
Aug-10	3		

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#### 4.24 Problem faced by small holders in milk production.

Interviews were conducted with two cooperative representative and both of them mentioned that dairy farmers are facing the following problem in milk chain.

- Breeding. Farmers are using natural breeding method with locally available breed and efficiencies of these breed are not proved. AI is available but technician is not full trained to use the AI.
- Vaccination and Vet. Medicine. Vaccines and veterinary medicine are mostly imported from neighboring countries. The quality of these medicines and vaccines are low due to lack of control from the authority. Similarly there is also lack of veterinarian and technician.
- Extension services. Extension services are present but coverage of these services are very confined and at low level.
- Financial service. There is no financial services or support to the farmers
- Management of farm. Farmers are using traditional method of farm management and there is no training facility to the farmers for farm management.
- Selling of milk. Farmers can easily sell their milk in different milk channel.
- Farmers also have problem of space, they do not have sufficient space for dairy cattle

During the interview the cooperative representatives mentioned that these constrained can be overcome by proper and regular extensions service, loan without interest, rising of technical veterinarian.

#### **4.25 Selection of different milk channel by farmers**

During the interview with cooperative representatives, the following milk channels were concluded.

- Most of the farmers sell their milk to MCC
- Some farmers consumed milk by their own.
- Some farmers are used to process milk at homes and then sell into local market but it is mostly occurred in winter season. During winter season people are using dairy products due to lack of vegetables. Other reason for that farmers are selling their milk in local market is that MCC is getting the milk having low fat contents with low prices so that farmers having milk with low fat contents are processing their milk at homes and then sell to local market with high price compare to price offered by MCC.

#### **4.26 Necessary steps for farmers to increase and maintain milk production.**

The interviews with cooperative representative yielded following points

- Farmers should get together and establish association and cooperatives.
- The farmers should raise their voices to legalize these associations and cooperatives.
- The farmers should link the cooperatives and associations with other cooperatives and association present in the locality.
- The farmers should insist the government and other organization to give them loan without interest and credits.
- The farmers should insist the government to increase and expand extension services and farmers training.

#### **4.27 Milk collection center**

The interview was conducted with milk collector in Sheekhak MCC, Logar province. The interview produces the following information.

##### **4.27.1 Problems faced by MCC during milk supply from farmers and then to processing unit**

During the interview with milk collector, it was revealed that MCC has problem of cooling system in supply of milk. The milk is collected only morning time because MCC can not collect milk at evening due to non-availability of cooling system to keep the milk up to next morning which it will be supplied to DPU. The farmers are producing milk two times (morning and evening) but they do not have cooling system or tradition cooling facility to keep the milk up to next morning. Even some time, the morning collected milk become sour before supplying to

MCC. Similarly MCC is supplying milk to dairy processing unit in ordinary vehicle without cooling system which also deteriorates the quality of milk before reaching to processing unit.

#### **4.27.2 Problems in MCC in term of facilities**

The milk collector mentioned that the MCC is well equipped and have all necessary equipments (see Annex 1) but the big problem MCC is facing that we can not run cooling room to keep the milk cool because of no electricity. We have the generator but we can not offer the fuel expenses.

#### **4.27.3 How these problems can be over come or minimized?**

The milk collector revealed that the above problems can be over come with following measurements

- Farmers should be trained to keep the milk cool under traditionally available cooling facility like keeping of milk jar in cool water before supply to MCC.
- Specific type of milk cane should be provided to the farmers
- Use of solar energy equipment for proper running of cooling system in the MCC
- Specific car having cooling system should be used for supply of milk from MCC to DPU

#### **4.28 Status of DPU in Guzargha, Kabul**

During interview with DPU's Manager, the following information was revealed.

##### **4.28.1 Problems faced by DPU in milk supply, technical staff and equipments**

- Security situation
- Cooling system is not available in the field
- Supply of milk from MCCs to processing unit is in ordinary car without cooling system
- Low capacity of processing unit
- Marketing problem due to international competitors.
- No problem in term of technical staff

##### **4.28.2 How these problems can be over come?**

- Provision of cooling facilities at MCC and supply level
- Enlargement of processing capacity in dairy unit.
- Control on import of dairy products from neighbor countries by Ministry of Trade.
- More quality control facilities to the DPU.

#### 4.28.3 Where do you sell your dairy products?

- Presidential palace and government departments
- Public costumers through 25 selling points
- Hotels (3 hotels in Kabul)

#### 4.28.4 Support from any organization

The DPU is run under the establishment of kabul dairy union while other organization are supporting as follow;

- FAO is supporting DPU in term of advisory services, purchasing all equipments and vehicles and other technical assistances.
- Government is providing support for quality control of the dairy products.

#### 4.29 Status of dairy product selling points

The interviews were conducted with three dairy sellers in Kabul which provided the following information.

Table 15 Information about selling points

Questions	Answer	No. of Respondents
Problem in getting milk products from dairy unit	Some time we are receiving dairy products late in the morning	3
Suggestion to overcome this problem	To increase the number of supply car and also two time supply, morning and evening	3
Problems in selling point in term of equipment and facilities	No problem	1
	○ Electricity problem specially in summer ○ Less number of cooling equipments	2
Suggestion to over come problem in selling point	○ To facilitate us with electricity ○ More cooling equipment	2
More and less selling of dairy products	More selling of dairy products in summer and Holy month of Ramdhan  Less selling of dairy products in winter season because of not having dairy products from dairy unit due to low milk production	3
Any support from any organization	All the cooling equipments have been purchased for the selling points by FAO	3

#### **4.30 Support of different organizations with different actors in milk supply chain.**

Interview with 2 stakeholders yielded the following information about problems and support to different actors in the milk supply chain.

##### **4.30.1 Problems in the milk supply chain.**

All the two stakeholders mentioned the following problems.

- Mostly farmers are scattered and not organized
- Feeding is of low quality
- Less veterinary health and AI facilities.
- Low quality veterinary medicine and vaccination
- Old and traditional system of dairy farming
- Use of low quality breed for dairy production
- Less number of veterinary technician
- No proper milk cooling system
- Less number of DPU with low processing capacity
- Market for national dairy products are saturated by international competitor
- Less extension services in the rural areas by the government.
- Low awareness among the farmers about importance of dairy.

##### **4.30.2 Support of government and other organization**

During Interview with FAO representative (Mr. Zafar), the following points were noted about their support in milk supply chain.

- Cooperative formation in different areas
- Help in preparation of strategy for farmers cooperative, associations, dairy union and finally dairy federation formation
- Veterinary medicine and vaccines provisions
- Support in improving of feeding quality
- Training of veterinary technician
- Support in establishment of DPU and purchasing all equipments for DPU
- Marketing for national dairy products

Support of the Directorate of the Cooperative, MAIL

- Organization of farmers in cooperatives
- Giving legitimization to them
- Law and policy establishment for farmers to become in cooperative
- Advertisement for cooperative
- Information to farmers about importance of cooperative
- Linkage among cooperatives
- Regulatory policy for milk supply

#### 4.31 Observations of farms

During the survey, six dairy farms were observed and noted the following information

Table 16 Observation of dairy farms

Criteria	Observation	No.of Farmes
Location	Rural	6
No. of dairy cattle in farm	One dairy cattle	2
	Two dairy cattle	2
	Four dairy cattle	1
	Six dairy cattle	1
Production system	Family rearing	6
Type of breed	Local breed	3
	Improved breed	1
	Local and Improved breed	2
Status of dairy cattle	Fair	2
	Good	4
Feeding stuff	Hay	2
	Hay and green fodders	4
Milking	Hand milking	6
Housing status	Fair	4
	Good	2

Status of dairy cattle was observed good and fair depends on skin type (oily or soft), eyes laceration, activeness, muscular appearance and mastication.

Status of housing was observed good and fair based on good space, good drainage system, shedding, feeding and watering equipments and air ventilation.

#### 4.32 Observation of MCC

The Sheekhak MCC was observed and found the following information

Table 17 Observation of Sheekhak MCC

Location	Rural area
Distance from farmers (farmers surveyed in research)*	30 meter-1000 meter
Milk collection method	Farmers bring milk every morning in different types of cane.
Milk collection equipment	Milk was collected in specific type of cane having 40 liter capacity
Quality control measurement	Tests were being performed for water contents and souring of milk.
Storage and cooling equipments	The MCC has storage and cooling equipment but were un-functional because MCC was not able to offer fuel expenses for generator of electricity
Supply to DPU	After collection of milk in MCC, milk was supplied to DPU in Kabul through ordinary vehicle having no cooling system.

\* The farmers those were living beyond this distance from Sheekhak MCC were bringing their milk to another MCC near to them.

#### 4.33 Observation of DPU

Table 18 Observation of Guzargah DPU

<b>Location</b>	Peri-Urban area
Distance MCCs	40-50 Km
Staff of the unit	Professional staff
Status of the unit	Medium size of DPU Well equipped and have plenty of water Hygienically in good condition
Quality control measurement	Testing for milk souring Testing for fat contents
Storage and cooling equipments	Well equipped and have good storage room (see Annex 2)
Supply to DPU	Supply of dairy product to seller and costumer was done within two hours after processing of dairy products

#### 4.34 Observation of selling point

Three dairy selling points were observed and got following information

Table 19 Observation of retailing/selling points

Criteria	Observations	No. of Retailing/selling points	
Location	Peri-urban	2	
	Urban	1	
Equipments in selling point	Well equipped with refrigerators	3	
Quantity of dairy products	Morning (10 a.m)	Shelves were full	3
	Evening (4 p.m)	Shelves were less than half full	1
		Shelves were empty	1
		Shelves were half full Because due to short distance between selling point and DPU, the seller was getting milk by himself directly from DPU at noon also.	1

## **CHAPTER FIVE      DISCUSSION**

### **5.1      Structure of the milk chain, role of the actors and supporter of the chain**

The actors of milk supply chain in central region (Kabul and Muhammad agha districts) are individual farmers, milk collectors, milk supplier, dairy processors, seller and consumers. The chain is not well organized and there is weak coordination among the actors of the chain especially with farmers. Individual farmers sell their milk to any direction according to their wish and looking to the opportunity of the high income. There is also no sharing of information among the actors about quality and quantity of milk except in milk supply chain first where some information is shared with farmers.

Different amount of milk is produced from dairy farmers in rural areas in Muhammad Agha district. The quantity of milk production is dependent on number of dairy cattle and management practices. Most of the milk is collected by the MCC in Muhammad Agha district while some milk also goes to local market after processing at home. Part of the milk is also consumed by the dairy farmers. Most of the rural farmers are poor so they try to sell more milk to MCC and also to local market for more income. The supply of milk to different channels reflect market portfolio of milk.

There is also import of dairy products from the neighboring countries which is the big competitor and challenge in establishment of national dairy industry. According to CSO-Afghanistan 2009, Afghanistan produced 1.70 million tones total liquid milk during 2008-2009 and the share of cow milk is 1.39 million tones of total national milk production mentioned above while according to estimation of Bonnier 2007, Afghanistan import 50 tones milk powder and up to 18000 tones (18 million liters) of liquid milk per year.

This indicates that national dairy cattle are contributing 80.9 % of total national consumption of fresh milk. This reflects that cow milk is contributing a big share in domestic but this sector needs to be improved to produce more amount of milk with good quality and low cost to compete with competitors.

### **5.2      Back ground information of dairy farmers (Age, Education, Land size and number of dairy cattle)**

The average age of respondents are 41.35 years which indicates that all the family farm are run by the head of the family member while the young member of the family are busy in other non-farm activities because all the rural people have diversified income source and many are involved both on-farm and non-farm activities.

In average 55% dairy farmers are illiterate which indicates that literacy rate of the rural farmers are very low because of certain factors like lack of education facilities due to thirty years conflict in the country.

In average the farmers has 2.5 Jirib agriculture land and similarly every farmer has 1 or 2 dairy cattle so in average dairy farmers have 1.85 dairy cattle for milk production. This study reveals that cattle per Jirib raised by farmers are 1.35.

### **5.3 Dairy production system**

All the dairy farmers have family farm and have one or two dairy cattle because rearing of cattle is an important livelihood activity of the landless people in the rural areas. Rural farmers are keeping small number of dairy cattle to fulfill the daily requirement of family food and also a source of quick income.

### **5.4 Breed of dairy cattle**

24 farmers out of 40 have local breed of cattle while 11 farmers have improved breed. Rural farmers are keeping local breed because these are drought animal and need less care and management. Mostly people in study area are keeping WATANI (local) breed of cattle while among the improved breeds, mostly farmer keep Friesian and Jersey.

Kahi et al 2000b, mentioned that certain studies and experiment shown that introducing Friesian breed improve milk yield in the herd. In their study, crosses with 50% Friesian genes out-performed other crossed from Ayrshire, Brown Swiss, or Sahiwal in lactation milk yield, annual milk yield and lactation length.

### **5.5 Method of breeding of dairy cattle**

Sixty three percent of the farmers mentioned natural breeding method for their animals while eleven percent farmers mentioned AI. In rural areas, natural breeding is the only easily available method of breeding for dairy cattle. It is also a trend among the farmers that one farmer is keeping a sire (bull) since long time and other farmers are bringing their cows for breeding. Dairy farmers are gradually increasing in number to use AI for the breeding of their cattle since last few years but mostly AI is associated with improved breeds. Still dairy farmers in rural areas have concerned about cost and efficiency of the AI.

Primary source for breeding services are AI and improved heifer on public ranches while distribution of breeding services are done through extension services in Ethiopia. The establishments of local facilities for liquid nitrogen and semen sourcing have contributed considerably in the accessibility of farmers to semen and AI during the last five year. The training and deployment of increasing number AI technician have also contributed significantly in availability and use of semen in the area. (Teskaye and Puskur 2007)

### **5.6 Semen availability and insemination time**

Thirty two farmers mentioned that semen is available always and insemination to dairy cattle is done on time. Mostly farmers in rural areas are using natural service method for cattle so sire is always available in the rural area. The farmers mentioned that when the cattle comes in heat so immediately we contact with the farmer having sire for natural service. A number of farmers also call veterinarian for AI when their cattle comes in heat. Some of the farmers acknowledged that semen is not available and also insemination is not done on time because they are living far in the village and do not have easy access for insemination for their cattle and also they have less information about Insemination time of dairy cow.

Hegde 2006, mentioned that for the sustainable livelihood of small farmers, all the semen freezing laboratories should be registered with MoA and the bull which is used for breeding purpose should be certified for pedigree, performance and disease free status. Minimum expected quality of semen freezing should be maintained.

Zewudie 2010 presented that some other factors are also contributing to the performance of AI like insemination of healthy cow, detection of heat on time, timely and effective insemination, normal and energetic sperms cells and cost of semen and services.

### **5.7 Veterinary services and its providers**

Thirty one farmers acknowledged that they have access to veterinary services with less or more difficulty but they have health services for their animals. They mentioned that veterinary services including vaccination, veterinary medicine and AI are provided by KDU and Private veterinary clinics. KDU does not have own veterinary clinics but they provide support to cooperative members farmers through private veterinary clinics in term of low price of veterinary services. Still the farmers have great concern about cost and quality of veterinary services because these are not so effective. The veterinary medicine and equipment are imported to Afghanistan without any quality check inside Afghanistan which leads to import of veterinary medicines with low quality.

Demands for veterinary services by the farmers are not due to subsidy on the service delivery but mostly depends on education and awareness of the farmers and access to output market. The level of demand for veterinary services was comparatively high with respect to the milk price and educational status of the households (Ahuja 2003).

### **5.8 Most common dairy cattle diseases**

Farmers mentioned that FMD is most prevalent disease in the area which cause big loss in production and also cause death of calves. Seasonal diseases like fever, flue, digestive problems and etc are also prevalent in the area which causes loss of production and also farmer can not offer to pay for medicine.

### **5.9 Extension service and its providers**

Almost every farmer said that there is no extension service from any organization except few farmers who told that KDU has provided us training about feed and milk management and also about market information of milk. There are many NGO those are strong in extension services but they can not go to work in rural areas due security constraints.

### **5.10 Financial support**

Farmers mentioned that there is total absence of any kind of financial support to the farmers. There is no organization to provide credit and banking facilities to the farmers. There are some NGO who gives loan on interest bases but farmers are very reluctant to get that loan due to religious control.

Mahmood et al 2009, observed during his study that credit was correlated with the education level and farm size. The farmers those have less education have less trend toward credit demand compared to farmers of higher education. The reason is that educated farmers have familiarity and understanding about the role play by credit in getting modern technology and the role of technology in enhancement of productivity. Generally, it is also concluded that educated farmers have good capacity to use the credit for improvement of the farms and production because they know better about input, technology and output relationships.

### **5.11 Selling of milk**

As all the respondents mentioned that they sell milk to MCC. They mentioned that milk collected at evening is stored and then sell along with milk collected next morning to MCC while the milk collected afternoon is used for home consumption. Five respondents also mentioned that milk is sold in winter to local market after processing at home. The selling of milk to MCC is high in later spring and summer and then decrease gradually in autumn and winter due to low milk production at farm level.

### **5.12 Pricing system and opinion of farmers to sell milk to MCC**

All the farmers were not feeling good with the pricing system paid by MCC but still they were willing to sell their milk to MCC because they have sustainable point/market for selling of their milk.

### **5.13 Feeding system, availability and type of feeds**

As most of the farmers mentioned that they are feeding to animals at homes and also grazing outside the home in the agriculture field. The dairy cows are kept at homes in a confinement area and offered fresh alfalfa and clover during spring and summer seasons. Farmers also let their animal to graze in their own agriculture land during the day in spring and summer seasons. While in winter season, cattle are kept in confinement area at home for the whole days and feed with straw and hay.

Sixteen farmers mentioned that we don't have sufficient amount of feed for animal while twenty four farmers said that we have plenty of feed for their animals during all season. As the farmers have feed but the quality of feed is not standard or not high to full fill the requirement of animal for better milk production.

Land'O lakes 2008 worked in Badakhshan province through LSTP on demonstration a system of feed production and micro feedlots that provided improved quality and more quantity, compared to traditional feeding/grazing methods. As due to several environmental degradation, previously more available pastures in mountains were unable to full fill the requirement of livestock herds at before war levels, so micro-feedlots can be found an important elements of revitalizing Afghanistan's livestock sector.

#### **5.14 Water availability**

All the farmers mentioned that they have plenty of water for animal. They have water resources for watering the animal from wells and canals.

Lactating cow in the tropical region needs more water frequently. When the water is available frequently so dairy cows drink 18% more water and yield more milk than when watered once a day (ARC 1980).

#### **5.15 Suggestion of farmers to over come the problems**

Farmers mentioned series of suggestion to support the dairy sector in the area. Eight two percent of the farmers suggested financial support for them because most of the farmers are poor and they can not offer proper feed, medication and vaccination and AI on time to their animal. In second priority, farmer mentioned extension services and training which is also very important to make all the farmers familiar about farming and its management. In third priority farmers acknowledged that they need facility to sell evening milk because the MCC does not collect milk from the farmers at evening so the farmers are facing problem to keep this milk up to morning and sell with morning milk together. Other suggestions are on time treatment, trained veterinary staff, increase milk price and etc.

Iqbal 1994, mentioned that improvement of livestock productivity has been rendered by three main hindrances and these can be categorized as insufficient support services, nutritional constraints and market and policy constraints.

#### **5.16 Calving and lactations parameters of dairy cattle**

The calving and lactation parameters of 70 cows were collected from the farmers. Out of which 41 are local breed while 29 are improved breed. This ratio reflects that most of the farmers have local breed because it is easy in rearing and feeding.

##### **Calving and non-calving in 2009**

In total, fifty six gave calf while the remaining fourteen did not calve in 2009. Among the calving cattle, thirty five are local breed cows while twenty one improved breed cows.

Among fifty six calving cows, sixty three percent cattle calved in the months of April to July 2009 which reflects more milk production is in spring and summer season while in the month of January to March and then from October to December 2009, there are no or very less number of cattle calved which indicates less milk production in the winter season.

##### **Calving and non-calving cattle in 2010**

Up to August 2010, totally fifty three cows have given calf while seventeen cows still not. More than half calving occur in April-July. There is no calving in January and only one cow calved in February 2010. Therefore, more milk production is in spring and summer season. So less number of cows calved in winter, therefore ultimately low milk production.

**Lactation parameter (highest and lowest production liter/day and also total production in one lactation period)**

The farmers mentioned that most of the dairy cattle of local breed produce in average 9-12 liter milk per day at early time of lactation while 1-2 liters milk per day late in lactation. While the improved breed produce 13-16 Kg per day at early lactation while 5 liters per day at late lactation time. Total lactation time among all type of cattle breed is 8-9 months in average. The total production per lactation is 1200-1400 liters among local breed while 1800-2000 liters of improved breeds. These all parameters are directly related to farm management practices, extension and veterinary services which are very deficient in the area.

Hussain et al 2010, studied factors effecting milk production in buffalo and revealed that relatively more influential factor in the production of milk were green fodder, lactation number and labour hours. However, he mentioned that other factors like dry fodder and concentrate had no effect on milk production. He mentioned that increase in milk production is directly related with increase in green fodders and labour hour in the farm while milk production is indirectly related to number of lactation period.

The calving is possible to spread through out the year to maintain the milk production in all seasons of the years equally. But the main factors in the area for not spreading the calving time through all seasons of the years are availability of feed, environment stress, nutritional and farm management. For example, if the cow calved in the winter season when the environment temperature is below -10 °C so the cow will face scarcity of feed and also environmental stress which will affect both productive and reproductive ability of the cow. The farmers also mentioned that they will loss the new calf in the month of severe winter season.

**5.17 Problem faced by small dairy farmers and suggestion**

Due to three decades war in the country, all the infrastructures have been seriously devastated and dairy farming is not remained out this war's adverse effect. All the veterinary services and dairy industry were seriously affected. Therefore, all the farmers are facing a lot of problems even they do not have basic facilities for their family rearing farming. Since last few years, there are some activities started by different NGOs in the field of dairy sectors but these are still not sufficient and all the farmers do not have access to these activities in rural areas. So the suggestion was given by the cooperative representatives that farmers should come together and join the cooperative and make the cooperative certified from the government so in this way, they will be able to attract the services provided by certain NGOs.

Farmers are supplying milk in different channel base on market opportunity and more income for them but still most part of the milk goes to MCC because it is sustainable market place for the farmers.

Smallholder dairy cooperative production system is more advanced and grown-up than smallholder system. This system is formed from bringing together small dairy units. The cooperatives are made either with support of government or private sector or both, varies from country to country. In India, cooperatives are established with the support of both private sector while in some other countries, cooperatives are made with direct support of government. Cooperatives provide holistic support and services to associated farmers as well as promoting organized collection, handling and sale of milk to consumers. Cooperatives

support the small holders to improve their competitive frame in open-market economies. Good examples are found in Thailand, Philippines, Vietnam and China. In Philippines, for example, specific government support included promotion of dairy cooperatives for groups of farmers producing milk from swamp x Murrah cross-bred and also from Holstein-Friesian cattle crossbreds (Devendra 2001)

#### **5.18 Problem faced by MCC**

The main problem that MCC is facing now a day is not having functional cooling system. The MCC has the cooling tanks and other equipment provided Czech government but MCC can not run it due to lack of electricity in the rural area. MCC has the generator to produce the electricity but they can not pay for fuel of the generator. Similarly milk supply to DPU was also facing problem of not having cooling system in the vehicle. So as milk collector suggested that to solve the problem of the electricity in MCC, we need solar base electricity which is a successful experience in the area so that we will be able to run the cooling equipments and will be able to collect the evening milk from the farmers to store it up to next morning before supplying to DPU.

Solar energy is most common and important source of renewable energy in Afghanistan. Solar energy plays an important rule in the enhancement of life quality of rural low-income community that does not have access to grid electricity. Solar energy is used for many daily life activities like cooking, heating, and lighting in remote villages and also solar energy has contribution in development of community in term of education, health, agriculture, and rural industry and other income generation activities (MoWP 2007).

#### **5.19 Problem faced by DPU and suggestion for solution**

Guzargah DPU is a medium size processing unit run under the umbrella of KDU which collects milk only at morning time it can not collect milk at evening from farmers through MCC because DPU does not have cold chain so there will be great loss of quality if they will collect milk at evening and keep it overnight. The milk collection is more in spring and summer season as shown in figure 29. Some testing is conducted in DPU like fat contents and milk quality test. At the moment, Guzargah DPU is supported mainly by FAO from technical, financial and equipment points of view. The main costumers of the dairy products are local people and government departments such like presidential palace. In first priority to overcome the problem in DPU, it needs cold chain facility to collect the evening milk and keep it overnight.

#### **5.20 Problems of selling points**

As mentioned by the seller, the main problem is electricity and delay supply of dairy products. Electricity supply is big problem even in the capital due to destruction of thirty years war in the country but still some people are using generator for electricity production. While delay products supply is related to DPU because it does not have sufficient supply car to supply on time and also processing activities is done only at morning and products prepared at ten o'clock morning while the retailing points also have more costumers at breakfast at early morning.

## 5.21 SWOT analysis

A brief analysis of the dairy sector is as following,

Table 20 SWOT analysis of dairy sector

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>➤ Farmers are very interested in dairy.</li> <li>➤ Milk is daily product for the market.</li> <li>➤ Milk is the agriculture product that is produced and sold on daily bases.</li> <li>➤ Milk is a source of income for the farmers.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Farmers are scatter in rural areas.</li> <li>➤ Less land available.</li> <li>➤ Low yield of milk due improper feeding.</li> <li>➤ Poor animal husbandry practices.</li> <li>➤ Insufficient/lack of veterinary and extension services.</li> <li>➤ Poor policy or government support.</li> <li>➤ Lack of equipment and technical staff.</li> <li>➤ Lack of cold chain for MCC and DPU.</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>➤ Government gives priority to dairy sector development through MAIL five years strategy.</li> <li>➤ Demand for dairy products is high.</li> <li>➤ Most of the rural people are rearing dairy animals.</li> <li>➤ Developed MCC to give more value to local products.</li> <li>➤ Electricity for the cooling system in MCC and DPU can be produced through solar system.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Security situation.</li> <li>➤ Climatic condition.</li> <li>➤ Import of dairy products from neighboring countries.</li> <li>➤ Low quality milk.</li> <li>➤ Prevalence of viral diseases which cause decrease in production.</li> <li>➤ Lack of electricity.</li> </ul>

## **CHAPTER SIX CONCLUSION and RECOMMENDATIONS**

### **6.1 Conclusion**

It is concluded that there are three milk supply chains from the farmers to rural and urban consumers while one other dairy product supply chain which is import of the dairy products from neighboring countries.

The rural farmers are mostly poor and uneducated having land of 2.6 Jirib in average and rearing 1-2 cows' cattle at home. The farmers are mostly keeping locally originated cattle breeds while some farmers have improved cattle breeds like Jersey and Friesian. Farmers are using natural service/insemination method for breeding of their cattle. Medicine, vaccines and AI are available to some extent but farmers have big concern about cost and quality of veterinary services. Veterinary services are provided mostly by private/public veterinary clinics which is costly and not efficient due to lack of technical staff and low quality of medicines. Extension services are almost unavailable in the area. There is no financial support from any organization to the farmers.

Previous study in Afghanistan shows that introduction of improved breed bull is the cheap way for improvement in productivity of local cows. Similarly the study shows that locally provided liquid nitrogen and semen sourcing along with trained technician is important for improvement of dairy production.

It is observed from the previous literature that trends of farmers for veterinary services and financial support depend on level of education of farmers. So for the awareness of farmers, education and short term extension services or national wise campaign about dairy farming is necessary.

Farmers are feeding their animal at home or through grazing in their own agriculture land. But grazing is mostly in summer and spring season while feeding at home is mostly done in winter season. Feed is available but of low quality.

It can be concluded that most of the cows calve in spring and summer season so milk production is more in summer. The milk production decreases in winter mostly due to low production and lack of sufficient and efficient feed.

It was observed that farmers are selling morning milk to MCC and they satisfied with the price paid by MCC. But farmers are facing cold chain problem to keep the evening collected milk overnight and sell to MCC tomorrow.

The lactation periods of cattle is 8-9 months and have 1200-1399 liters production per lactation period by local period while improved breed has 1800-1999 liters milk per lactation in average.

Farmers were expecting supports like financial support, extension services, and veterinary services on time and with low cost, breeding facilities, milk collection equipments for improvement and constant milk production.

MCC is facing problem of electricity to keep milk under proper cooling temperature. According to literature review, solar energy is cheap and easy solution for electricity supply in rural areas of Afghanistan.

MCC and DPU have mainly problem of cold chain which is big hindrance in the collection and processing of milk while DPU has problem of good marketing strategy for selling of dairy products to compete with international competitors. The dairy selling points are receiving dairy products not on time.

Only one organization is working for the support of milk production and processing in the area.

## **6.2 Recommendations**

The following recommendations are given here for constant milk supply.

- The farmers are suggested to get together in cooperative, cooperatives into Union and further in association to develop the milk supply chain through organized relationships among stakeholders of the chain and to access financial, veterinary and extension services.
- Well managed and organized veterinary services including establishment of mobile or permanent veterinary units (with low cost veterinary technology), veterinary training and extension services are recommended for the dairy rural farmers especially in housing, feeding, watering and milking management for the improvement of cattle health, production and reproduction.
- More veterinary technical staff are suggested to raise.
- For the control of the diseases, a general campaign could be arranged for all farmers and also farmers could be made familiar with certain common diseases.
- Provision of artificial insemination facilities but further study is required to find out the current effectiveness of the AI.
- The government and other livestock supported agencies are advised to work for the improvement of genetic potential of the local cows through establishment of breeding farms.
- It is strongly recommended here to introduce new and improved varieties of fodder crop and its utilization to remove the scarcity of feed.
- The imported veterinary medicines and AI need strong quality control measurements through establishment of veterinary laboratories
- Dairy industry needs financial support to be provided as micro-credit, loan and subsidy under a specific strategy.

- MCC should be facilitated with electricity generated with solar source for running of cold chain.
- DPU should be provided proper cold chain.
- The processing capacity of the DPU should be increased.
- DPU is required to establish good marketing strategy and better selling system.
- For competition with international dairy supplier, DPU should improve its processing, packing and branding.

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## Annex 1. Status of Sheekhak MCC

- The MCC has been established with support of Czech PRT.
- The MCC is well equipped.
- The MCC is collecting milk from 178 farmers. 118 farmers are cooperative member while 60 are non-cooperative members
- Daily (morning time) 750 Liters milk is collected.
- More milk is collected during spring and summer season (April-September) as shown in figure 28

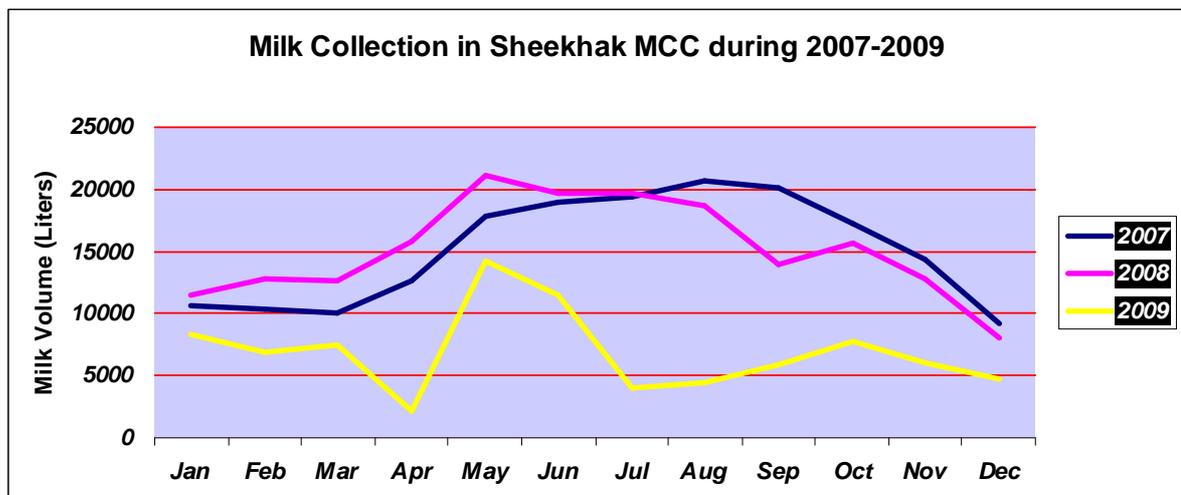


Figure 28 Volume of Milk Collection per month during 2007-2009  
(Source: Daily Milk Record Register of Sheekhak MCC)

The MCC has the following room

- Milk collection room
- Milk storage room
- Cold room
- Warm room
- Administration compartment

The MCC has the following equipments

- Milk cooling tank (1000 liter capacity)
- Milk cream separator (165 Liter per hour capacity)
- Butter churn (50 liter capacity)
- Solar refrigerator.

## Annex 2. Status of Guzargah DPU

- The capacity of the DPU is 5000 liter/day
- Produce different dairy products like pasteurized milk, yoghurt, cream, butter, cheese and chaka.
- More milk is collected during spring and summer season (April-September) as shown in figure 29

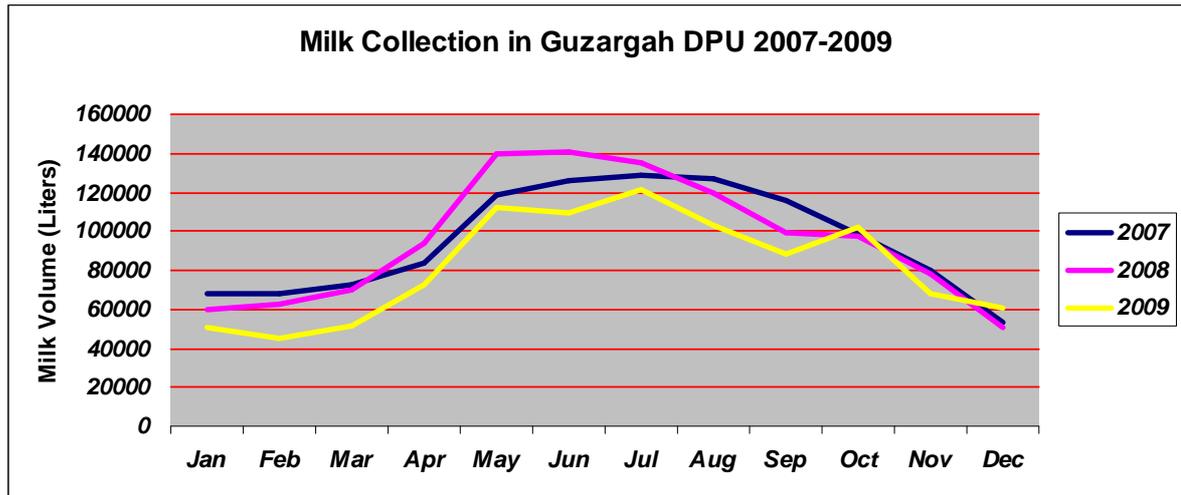


Figure 29 Total milk collected in Guzargah DPU during 2007-2009  
(Source. Daily Milk Record Register in Guzargah DPU)

## Processing and equipment in Guzargah DPU

- Supply of milk from milk collection centers
- Weighting of milk
- Testing of milk for souring
- Testing of milk for fat
- Pouring into filter cane for processing
- Chilling at 4 °C in chilling equipment with 2000 liter per hour capacity
- Pasteurization at 82.6 °C in an equipment with 1200 liter per hour capacity
- Storage tank for 48 hours with capacity of 5000 liters
- Packing and labeling
- Incubation room
- Cold room 0 °C for two hours
- Retailing

**Annex 3 Questionnaires for survey and checklists for interview and observation**

**Questionnaire for small dairy holders.**

Name of the farmer..... Age ..... Sex.....  
 Location: Village..... District.....  
 Contact # .....

Number of cows .....

1. Education level
  - a. Primary.....
  - b. Secondary.....
  - c. High school/University.....
  - d. Never been in School.....
  
2. What is the total agriculture land size do you have?  
 Number of Jiribs.....
  
3. What is the dairy production system?
  - a. Extensive.....
  - b. Intensive.....
  - c. Family rearing.....
  
4. What kind of cattle breed do you have?
  - a. Local.....
  - b. Improved.....
  - c. Both (Local and Improved breed).....
  
5. What kind of method you use for breeding of animal?
  - a. Natural .....
  - b. Artificial.....
  
6. Is semen available? Yes..... No.....
  
7. Is insemination done on time? Yes.....No.....
  
8. Do you have Veterinary services? Yes..... NO.....

If yes, which kind of veterinary services are there and who provides this?

<b>Veterinary services</b>	<b>Y/N</b>	<b>Name of organization</b>
Vaccination program		
Artificial Insemination		

Vet. Medicine		
Veterinary training		

9. Which kinds of animal disease are more common?

10. Do you have treatment on time for the disease mentioned in question 10?

11. Is there any extension service? Yes..... No.....

If yes, what kind of extension services is there?

Extension services	Y/N	Name of organization
Feeding		
Market information		
Volume quality		
Information about new techniques		

12. a) Do you have any financial support (loan/credit/subsidy) from Government or any organization? Yes..... No.....

b) If yes, which organization is providing financial supports?

c) How the organization is providing the support.

13. If the cattle give milk, where do you sell the milk?

- a. Local consumer around
- b. Local market
- c. To processing unit/milk collector
- d. Any other
- e. Not selling (home consumption)

14. Give the reason for above question.....

15. If you are selling your milk to more than one direction mentioned in Q.14 so in which direction, selling is more and in which season of the year.

Season of the year	Direction of Selling of milk	Amount of milk (High, medium and low)	Why
Spring			
Summer			
Autumn			
Winter			

16. In which season you have more milk?

- a. Spring.....
- b. Summer.....
- c. Autumn.....
- d. Winter.....

(1- High, 2-Medium, 3-Low, 4-Very low)

17. Are you satisfied with the pricing system? Yes..... No..... if No so how it can be improved.

18. What kind of feeding system you follow?

- a. Grazing.....
- b. Feeding in house.....

19. What kind of feed you offer to the animal in which season?

Name of crop	season
Fresh Alfa Alfa	
Clover	
Hay	
Straw	
Corn stalk	
Any other	

20. Do you have plenty of feed for animal? Yes..... No.....

If yes, which crop/feed do you have plenty and in which season?

If No, what is the reason behind?

21. Do you have plenty of water for animal? Yes..... No.....

22. What are your suggestions to solve these problems and maintain the production of milk constant?

**Some parameters about lactating cows.**

Cow no	Cow breed(improved or Local)	Calving month Last year	Calving month This year	Date last insemin/service	Lact length in month	Highest Prod l/day	Lowest prod l/day	Total prod L/ lact period	AI Semen used Breed (Local or Improved)
1									
2									
3									
4									
5									
6									
7									

**Checklist for interview of cooperative representative.**

Name of the cooperative.....  
Location.....  
Contact number .....  
Date:.....

1. What are the main constrains that farmers face during production and supply of milk?
  - a. Breeding:
  - b. Feeding:
  - c. Vaccination:
  - d. Vet. Medicine.
  - e. Extension services:
  - f. Management of farm:
  - g. Any financial services (subsidy or credit or loan program)
  - h. Selling of milk
  - i. Any other
2. How these constrained can be overcome by helping the farmers?
3. Where mostly milk goes after production and in which direction and why farmers select this direction of milk?
4. What the farmers should do to get the support of the organization to increase and maintain their milk production?

**Checklist for interview of the milk collectors**

Name.....  
Location.....  
Contact number.....

1. How many litters of milk are you collecting per day?
2. How many times are you collecting milk per day?
3. How many farmers do you have for milk supply?

4. In which season of the year you are collecting more milk? The decrease of milk supply to you is only due to milk production or there is also some problem in milk collection to collect the milk in that season?
5. Do you have any support from any kind organization? Yes .....No.....  
If yes which kind of support and who is providing the support?
6. What are the problems you faced in milk supply (collection from farmers and supply to processing unit)?
7. How these problems can be overcome or minimized?
8. What problem do you have in milk collection center in term of facilities and equipments?
9. What you suggest to overcome the problem in your milk collection center?

#### **Checklist for interview of processing unit staff**

Name of the dairy unit.....  
 Year of establishment.....  
 Location.....  
 Contact number.....

1. What is the milk processing unit capacity per day?
2. What are the milk products and quantity per day?
3. What are milk processing quantities per month during the last three years? (data)
4. What are the main problems you face during collection of milk from producers?
5. What you suggest to overcome or minimize these problems?
6. What are the problems you face in the processing unit in term of technical staff and equipments?
7. What you suggest to overcome these problems in the processing unit?
8. Where you supply your products?
9. What kind of market segments do you have? Name and which one is big segment?
10. How the processing can be helped to improve its processing unit capacity? By supporters and influencers?
11. Do you have any kind of support from any organization? Yes..... No.....

- If yes, which kind of support and from whom do you get?
12. What is the role of government in your dairy processing unity?
  13. What the government and other organization can help you to increase and maintain the processing capacity?

### **Checklist for interview of the retailing point**

Name .....

Address.....

Contact number.....

1. What are the main problems you face in getting milk products?
2. What you suggest to overcome these problems?
3. What problems do you have in retailing point in term of equipments (cooling)?
4. What you suggest to over come these problems?
5. When (season) you have more sell of dairy products?
6. When you have less sell of dairy products? And what is the reason behind less sell of the dairy products?
7. Are you getting any kind of support from any organization? Yes..... No.....  
If yes, which kind of support do you get and from whom?

### **Observation of the farm**

Following points will be observed in the farm

1. Location of the farm
  - a. Urban
  - b. Peri-urban
  - c. Rural
2. Production system
  - a. Extensive
  - b. Intensive
  - c. Family rearing
3. Number of animals

4. Type of animals (breed).
  - a. Local
  - b. Improved

5. Status of the animal
  - a. Good
  - b. Fair

(Good and fair depends on skin type (oily or soft), eyes laceration, activeness, muscular appearance and mastication)

6. Feeding management (feeding stuff)

7. Method of milking

8. Housing status.
  - a. Good
  - b. Fair

(Good and fair depends on good space, good drainage system, shedding, feeding and watering equipments and air ventilation)

#### **Observation of milk collection centre**

1. Location of milk collector center
2. Distance from farmers
3. Milk collection method.
4. Milk collection equipments
5. Quality control measurements
6. Storage and Cooling equipments
7. Supply to processing unit

#### **Observation of milk processing unit**

1. Location of milk processing unit
2. Staff of the unit
3. Status of the processing unit
4. Equipments and storage systems
5. Supply of the products to the retailing/consumers

### **Observation of retailing/selling point**

1. Location of the selling point
2. Equipment of the retailing point
3. Quantity of dairy product in the selling point
  - a. Morning
  - b. Afternoon

### **Checklist for interview of the supporters' organization**

**Name of the Organization**.....

**Location**.....

**Contact Number**.....

1. What are main areas (actor) of your support in milk supply chain?
2. What kind of support do you provide to the actors?
3. What are the main problems do you think, present in the milk supply chain?
4. How these problems can be overcome?
5. What will be your role in minimizing of this problem?

### **Interview checklist with Influencer**

Name.....

Department.....

Contact number.....

1. Is there any policy for milk supply chain?
2. What kind of support do you provide to different actors in the milk supply chain?