

MASTER'S THESIS

“Opportunities and Needs for Warana union to expand milk procurement chain in dry land area of Satara district in Maharashtra state (India)”

In partial fulfillment of the Requirements for the degree of
“Master In Agricultural Production Chain Management”
Specialization Livestock Chain Management



Submitted by
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Research project Submitted to,
Vanhall Larenstein University of Applied Sciences
Wageningen, The Netherlands

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September 2011
Wageningen
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Dedication

It is dedicated to those Milk Producers, who work for whole day-night and deprive themselves of milk for sake of earning some money, but are compelled by the system to sell their milk at a cost lowers than bottled mineral water.

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Abbreviations

AI	: Artificial Insemination
DLASD	: Dry land area of Satara District (two sub districts Man and Khatav – Research area)
MoA	: Ministry of Agriculture
MSCMMF	: Maharashtra State Cooperative Milk Marketing Federation
NDDB	: National Dairy Development Board, India
Vets	: Veterinary
VMCC	: Village Milk Collection Center

Definitions of Concepts

Bhaskar : Chilling Center name in the dry land area of Satara district

Chilling Center: Bulk Milk cooling Unit (capacity greater than 20000 liters/day)

Gokul : Competitor milk union in Kolhapur district

Harnai : Chilling Center name in the dry land area of Satara district

Khillar : Local Cow Breed

Murrha/Meshana: Buffalo high milk Yielding breed

Procurement chain: Section of milk value chain from Input supply to processing

Procurement : Milk collection from village milk collection Center

Rajarambapu : Competitor milk union in Sangli district

Rupees (Rs.) : Currency of India, 1 Euro= 65Rs. (2- 9-.2011)

Warana union: Cooperative milk union in Kolhapur and Sangli districts
(Research problem area)

Warana Union area: Warana union milk procurement area from Kolhapur and Sangli districts
(Comparison area)

Abstract

The demand for milk and milk products of Warana milk union is high against own total milk procurement. There is a positive response in milk procurement from dry land area of Sangli district. Hence, the union is looking opportunities to enhance milk procurement by expanding milk procurement chain in dry land area of Satara district; however the union has inadequate knowledge about this area. The aim of this research is to identify the opportunities and needs for expansion of Warana milk procurement chain in dry land area of Satara district.

Research is based on desk study and field study. Desk study was done on major three levels of milk procurement chain namely production, procurement and milk chilling Center. For field study, surveys are conducted at producers and VMCC level, while interviews are conducted at milk chilling Center's level.

A comparative study between field research, literature review and Warana union procurement area research shows several positive and negative aspects related to expansion of Warana union milk procurement chain in dry land area of Satara district (DLASD).

The positive aspects for Warana union at producer's level found that the producers have more land than Warana area, fodder quality is better, performance of cross breed cows are better and 62% producers are willing to join Warana union. The negative aspects for Warana union at producer's level found that in DLASD buffalo milk production is low, in summer 75% producers have the shortage of roughage and producers are requesting for cheap concentrate, veterinary services and, finance support.

The positive aspects for Warana union at milk procurement level found that, 36 % VMCC are willing to join Warana union; the competitors have weak strategy than Warana union. The negative aspects for Warana union found that 46% VMCC are not interested to join Warana union, 9% VMCC are doing adulteration in the milk and 85% VMCC are not providing the records and fair prices to producers.

The positive aspects for Warana at chilling Center level found that two chilling Centers are ready for partnership, third-party services and external environment are satisfactory. The negative aspects are that several milk chilling Centers are functioning in DLASD, resulting in to low milk procurement quantity and high cost.

Research concludes that Warana milk union has more favorable environment at milk production and milk chilling Center level, while at milk procurement level there are certain challenges. Additionally, the expansion of Warana union procurement chain in DLASD will be socially, technically and economically viable. Warana union should take immediate steps for further expansion of milk procurement chain in dry land area of Satara district.

Chapter 1: Introduction

1.1 Introduction

India has been the largest milk producing and animal population country in the world (Hemme et al., 2003). About fifty percent buffaloes and twenty percent cattle of the world are found in India. Total milk production of country was 104.8 million tons in 2007-2008. The landholding size of 58% rural producers are lower than two hectares, while 32% are landless, however they provide almost 75% country livestock sources (Hemme et al.,2003). Livestock sector plays an important role of income and employment in rural areas.

Maharashtra state is the sixth largest milk producing state in India (MoA, 2010). Mumbai is capital city with population more than one million which provides big market for milk and milk products. Maharashtra state has 35 districts with different geographical and climate variation. This state has both cooperative and private milk organization; however dairy sector development in some districts are very good and while in some districts are not so developed. The dairy sector has the three level structure, as village milk collection Center which collects milk from producers and this collected milk is procured by milk union and processed to convert standard milk and milk products, these products are sold to different cities through wholesalers and retailers, those cooperative organizations could not sell their milk in market, they can supply milk to state cooperative milk federation known as Mahananda, every cooperative milk union has the minimum quota for milk supply to this state federation.

Satara, Sangli and Kolhapur are three major districts in southern Maharashtra. In western part of those districts rainfall is around 1900 mm while eastern part has around 500 mm known as drought prone area. More than 90 % of cultivable land in Kolhapur district is under irrigation due to flow of five main rivers flowing across the district, while drought areas of Sangli and Satara districts have no such irrigation facility.

Satara district is at northern site of Sangli district, this district has 11 sub districts, out of which two sub districts Man and Khatav comes under drought prone area known as dry land area of Satara district (**Research area**).

Due to cooperative movement, dairy sector is well developed in Sangli and Kolhapur districts. Warana, Gokul, Rajarambapu are three major cooperative milk unions in these districts. In addition to those Milk Unions, several small private milk unions are also operating in this area.

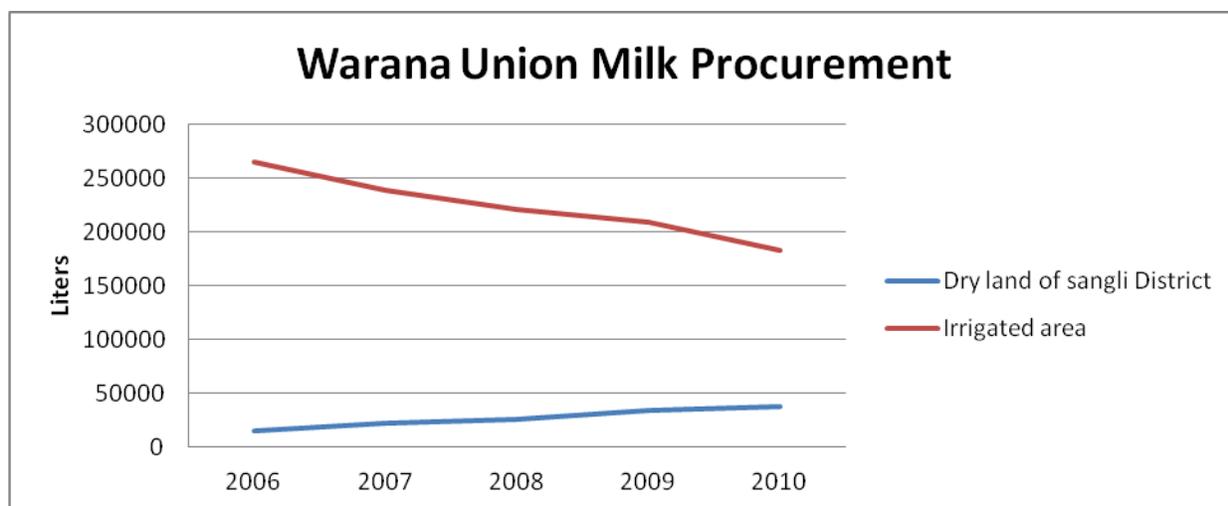
The dairy sub sector in Satara district is still under developmental stage. Though geographical situation in Sangli and Satara district is similar, the dairy development in Satara district is far behind than Sangli. There is only one small cooperative and several small scale private dairy processors operating in Satara district.

Warana union (**Research problem owner**) is procuring 221,000 liters milk daily from 460 villages of Kolhapur and Sangli districts; this union has the good name in cooperative sector. Warana union is providing inputs and support services to milk supplier for competitive dairy business. Gokul and Rajarambapu unions are two major competitors in Kolhapur and Sangli districts.

1.2 Background information

The Warana cooperative milk union is established in 1967, with objective to improve the socioeconomic condition of producers from Kolhapur and Sangli districts. Warana union has the good brand name in market due to standard quality milk and milk products. The market demand for Warana union milk and milk products is high against its own milk procurement, initially Warana union tried to fulfill this increased demand by providing various inputs and supports to milk producers and village milk collection Centers. There was progressive growth in milk procurement till year 2005; later on milk procurement graph is declining due to two main reasons viz. Entry of new competitors in the area and low production per animal. Warana union cooperative milk union has also expanded its procurement area in two dry land sub-districts of Sangli. The milk procurement from this dry land area is showing steady positive growth. For enhancement of milk procurement, Warana union has the two options either to enhance milk procurement in own area or to expand milk procurement chain in nearby area of Satara district. Research on first option is already done by Lembhe (2010), student of Van Hall Larenstein. He also suggested need of further research on expansion of procurement area in nearby Satara district.

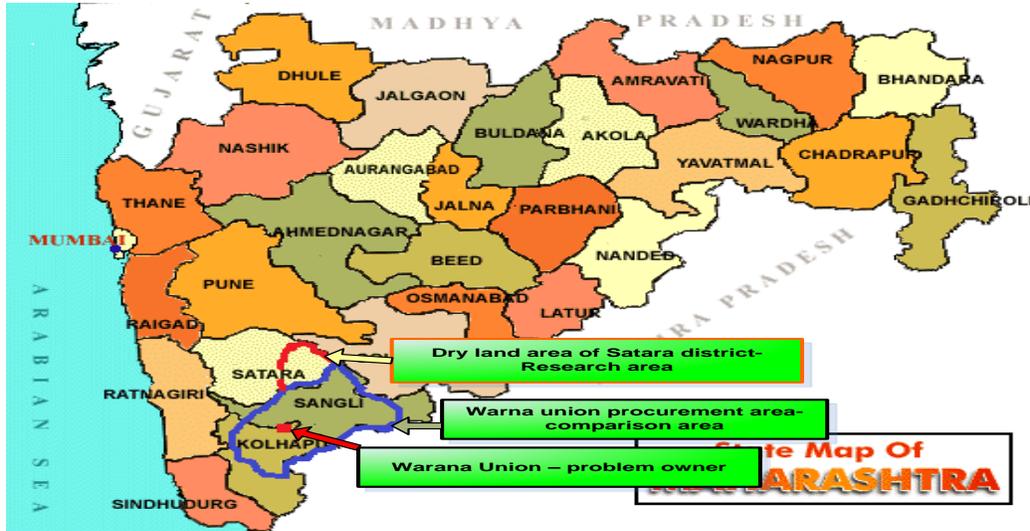
Figure 1: Warana union Milk Procurement trends



Source: Annual Reports of Warana milk Union (year 2005 -2010)

Looking at last five years performance of total milk procurement of Warana union shows that the milk procurement from newly established procurement chain in dry land area of Sangli district has more positive response than Warana union valley, so Warana union is looking opportunities to expand its procurement area in dry land area of Satara district, But Warana union has inadequate information about the dairy sub-sector of dry land area of Satara district, and union is enthusiastic to see the opportunities and needs for expanding milk procurement chain in that area. Thus research is designed to identify opportunities and needs for expansion of Warana union Procurement chain in dry land area of Satara district.

Figure 2: Research and Warana Union procurement area



1.3 Research problem

Market demand for milk and milk products of Warana union is high against its own total milk procurement, There is positive response for milk procurement in newly expanded milk procurement area in dry land area of Sangli district, so union is looking possibilities, to enhance milk procurement by expanding Milk procurement chain in dry land area of Satara district but Warana union has inadequate knowledge of opportunities and needs for expansion of milk procurement chain in dry land area of Satara district.

1.4 Research objective

- To identify opportunities and needs for expansion of Warana union milk procurement chain in dry land area of Satara district by studying dairy sub-sector of dry land area of Satara district.

1.5. Research questions

1. What is status of dairy sub-sector in dry land area of Satara district?

Sub questions-

- What are milk chains in dry land area of Satara district?
- What is status of milk procurement chain in dry land area of Satara district?
- What is the role of external environment in dairy sub-sector of dry land area of Satara district?

2. What will be opportunities for expansion of Warana union milk procurement chain in dry land area of Satara district?

Sub questions:

- What are positive aspects for Warana union at production, procurement and milk chilling Center levels?
- What are strong points of Warana union in milk procurement chain?
- What are supports from stakeholder involved in milk procurement chain?

3. What will be the necessities for expansion of Warana union milk procurement chain in dry land area of Satara district?

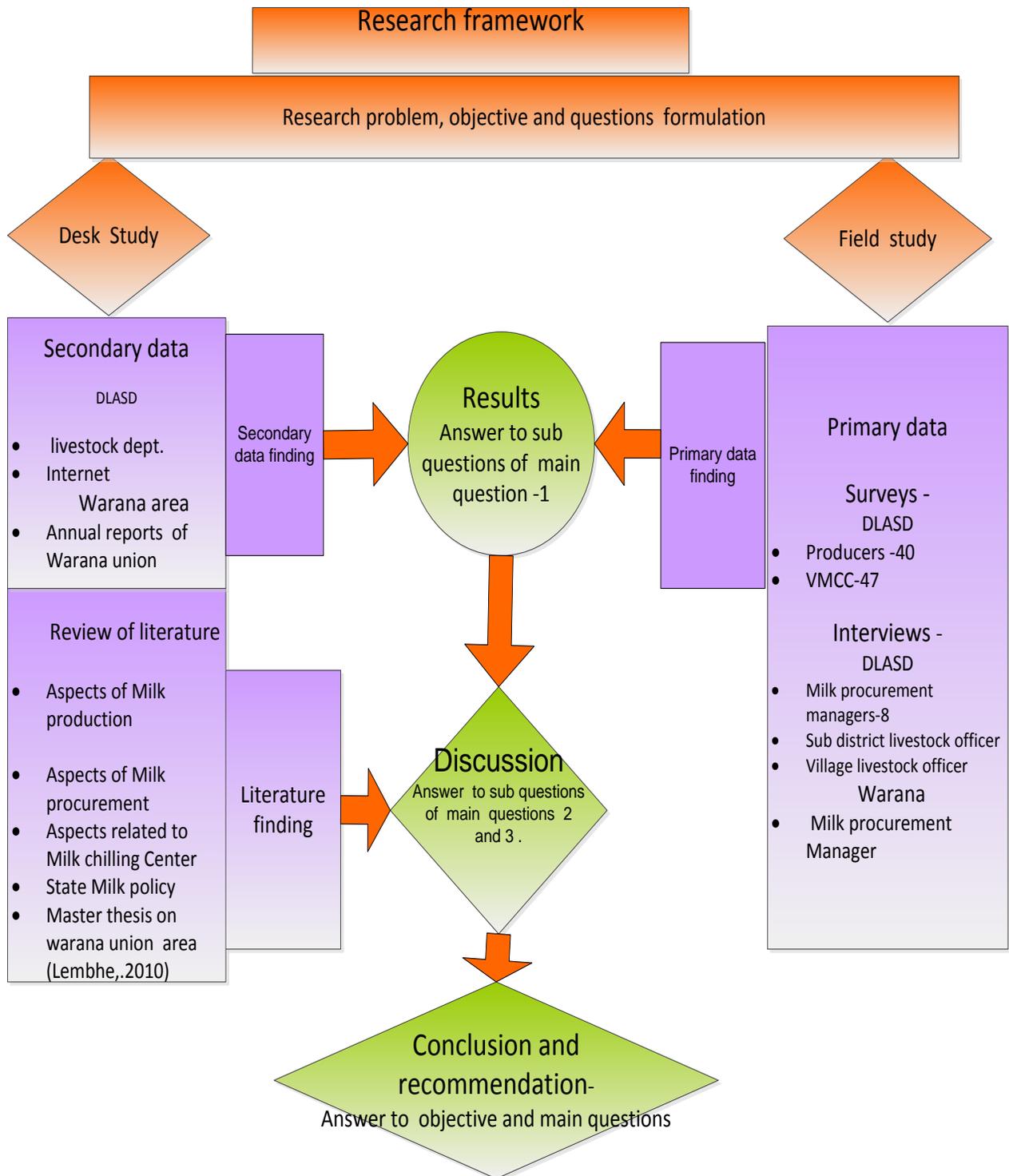
Sub questions:

- What are negative aspects for Warana union at production, procurement and milk chilling Centre levels?
- What are Strong points of competitors in milk procurement chain?
- What are threats in milk procurement chain?
- What are demand/requirements from stakeholders involved in milk procurement chain?

1.6 Research Methodology

This research work followed both qualitative and quantitative approach based on field and desk study. The field study is based on primary data collection from the dry land area of Satara district and Warana union procurement area. The desk study is based on secondary data and literature review. The field study was done at three levels viz. Producer, village collection center and milk union/chilling center. The desk study was conducted on three major levels of milk procurement chain viz. Production, procurement and chilling centers. All the important aspects of these three levels were taken in to consideration during desk study (See Fig.3).

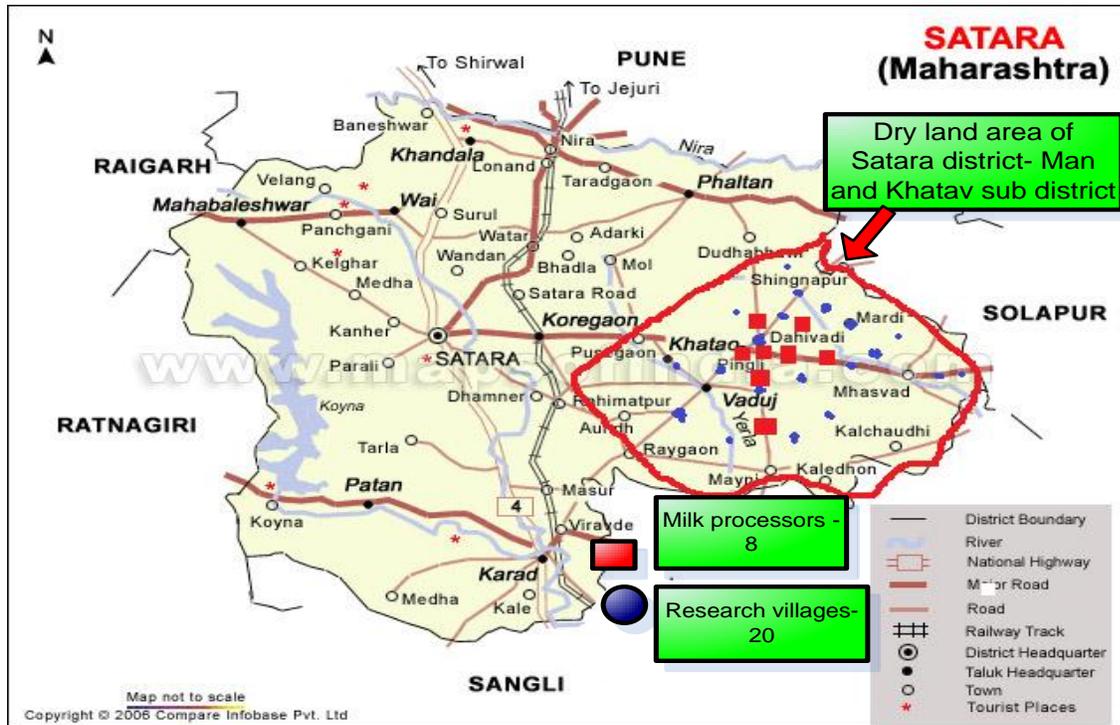
Figure 3: Research Framework



1.6.1 Study Area

Research area is Man and Khatav sub-districts of Satara district known as dry land area of Satara district. There are 161 villages in this area, out of these, 20 villages were selected for this research, from these selected villages all VMCC(47) and 40 milk producers were select for survey, while for interviews all milk Chilling Center managers(8) were select from DLASD. For government policy information one extension officer was selected from this area. For expertise opinions Warana union milk procurement Manager was selected for interview.

Figure 4: Data Collection Area



1.6.2 Data collection

Primary quantitative and Qualitative data was collected by conducting surveys and interviews. Predesigned questionnaires were used for survey data collection at producers and VMCC level. Semi structure questionnaires were used for interviewing milk chilling Center Managers in DLASD and Warana milk procurement manager

Secondary data was collected from annuals report of milk unions, sub district record of Maharashtra Government animal husbandry department and through internet resources.

The following table shows that overview of primary data collection

Table 1: Data collection overview

Place of information	Number	Resource person	Source
Producers	40	Producers	Survey with predesigned questionnaire
Village milk collection Centers	47	Secretaries	Survey with predesigned questionnaire
Milk chilling Centers DLASD	8	Managers	Interviews with Semi structure questionnaire
Warana milk union	1	Manager	Interviews with Semi structure questionnaire
Livestock sub district Dept.	1	Extension officer	Interview with Semi structure questionnaire

1.6.3 Data analysis

The quantitative data was processed by using excel program and outcome was analyzed by comparing with Warana union milk procurement area (Source: Master thesis, Lembhe, 2010) and desk research finding.

Qualitative data was processed by using different tools viz. Chain map, PESTEC, porter five and SWOT. Outcome of all processed data was analyzed by comparing with Warana union milk procurement area (Source: Master thesis, Lembhe, 2010) and desk research finding.

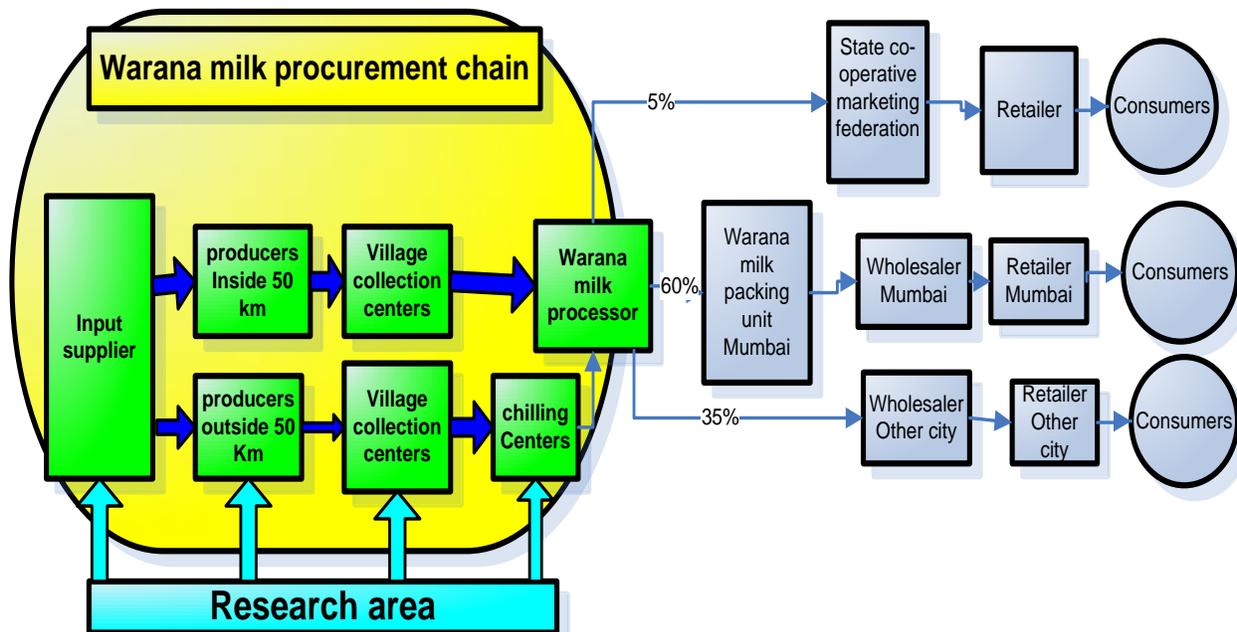
Chapter 2: Review of Literature

2.1 Concept of Warana union Milk procurement chain

Warana union procures milk from producers mainly in two ways. Within 50 km radius distance, milk is collected at village level, then it is transported by union vehicle to the main processing unit. Outside 50 km radius distance, union either establishes its own chilling Center or rents chilling Center in that area, in this area milk is collected at VMCC level after that it is transported to the chilling Center and subsequently to main processing unit. For effective and efficient milk procurement, Warana union provides inputs, supports services at milk supplier levels namely Producers and VMCC level.

At Warana main processing unit, only 40% milk is pasteurized for conversion into standard milk products, while remaining 60% milk undergoes only chilling procedure. Subsequent pasteurization process is conducted at another Warana union sub-unit which located at Mumbai. Milk products from this unit are sold only in Mumbai market, while Milk products from main processing unit are sold in different cities other than Mumbai.

Figure 5: Warana Union Milk Procurement Chain Concept



This research is designed, to identify opportunities and needs for expansion of Warana milk procurement chain in dry land area of Satara district, which is 100 km away from union. In orderly, this research is focusing at four important actors of milk procurement chain viz. Input suppliers, milk producers, village collection Centers and milk chilling Centers (Figure-5).

2.2 Aspects of Milk production

Ramkarishnappa and Jagannatha (2006), stated that dairy business is playing vital role in generating additional income and employment in rural part of India. Their study in Karnataka state has shown that the micro finance is very much needed to promote dairy business in low income level communities and it can help to promote dairy business as a major economic source for producers.

Kit and IIRR (2006), described case study of Thika district in Kenya, they mentioned that after collapsing of coffee sector, the producer's economic condition became worse. When National Agricultural and livestock extension programme (NALEP) conducted survey to identify problems and potential opportunities in Thika district, in this survey many producers showed their interest in dairy farming, however in problem analysis NALEP found that traders/middlemen were doing only function of transporting but they were getting more than 50% of the profit. The producers get hardly any profit, here producer also realized that they have enough Manpower, so they can earn more profit if they solve problem of transport. They formed producer's organization for arranging transport and later on they got success in those activities.

Rajendran (2009), studied dairy business in drought prone kolar district of Karnataka state, in this study he found that though Kolar district was economically backward due to drought but it produces 20 % of total state milk production. The main reasons for dairy business development was strong co-operative activity and producers were getting good support and services from co-operative union and state government, it included financial supports, cheap concentrate and veterinary services.

Misra et al.,(2007), conducted case study on dry land villages in Mahabubnagar and Anantpur district of Andhra Pradesh and Tumkur district from Karnataka state. They found that average rainfall in those areas was 520 mm and major crops in these areas were maize and sorghum. Animals were provided green and dry fodder from these two crops. They found that causes of low production in these areas were scarcity of feed and fodder resources, non-availability of inputs, services in time and inconvenient access to market. This study suggests that all these dry land areas have the potential to improve milk production by improving feed and fodder resources.

Kar et al., (2009), stated that the urea molasses block play important role in improving nutrition of animals especially when there is enough dry roughage availability. This is cheap source for improvement of milk production. He suggested that for high milk yielding animals, additional concentrate feeding is also essential.

Behera et al.,(2005), did case study on sugarcane top use in animal diet and his research conclude that when sugarcane top with dry fodder had given with 100, 200 and 300 gm. concentrate for per kilogram dry matter diet, it can produce milk 5.1, 6.7and 9 kg/day respectively.

Munshi and Parikh (1994), developed milk supply model to identify sources of growth in milk production, India. This model analyzed that recent growth of milk production in India is due to technological progress and they stated that expansion of crossbreed cattle can increase future milk production in India.

Saxena (2000), conducted study on comparative cost analysis of different milk yielding animals in India, He found that Haryana state Murrha buffalo has more profitability than crossbred cow and other state local breed buffalo. He also found that the profitability in crossbred cow is more than local indigenous cow.

Berg (1990), stated that cross breeding, management, animal health, nutrition extension, AI service and credit services to producers are the key issues to improve milk production.

Berg (1990), stated before introducing new species or breed of milking animal, the benefit and disadvantage of local breed should be taken into consideration. Feeding, management and climatic condition can also affect overall performance of animals. He suggests that cross breeding program is best policy for improvement of milk production with better disease resistance.

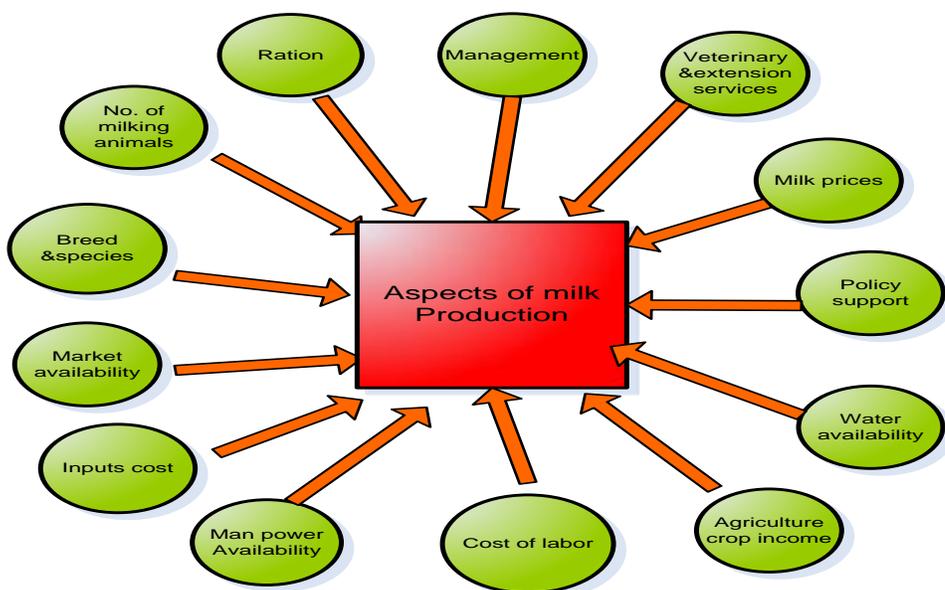
Berg (1990), stated that in tropical country good quality fodder can produce 2500-3000 liters of milk without any feeding of concentrate, but in shortage of this fodder the producers should feed appropriate quantity of concentrate, for this extension and training activities are essential to get awareness among producers about importance of balance nutrition in milk production.

Singh (2008), stated that there is serious shortage of roughage in arid and semi-arid part of India. To overcome this roughage shortage problem, he suggests different possibilities, as given below,

- To harvest maximum quantity of roughage in rainy season and apply different preservation methods like hay, silage making and use this roughage in Scarcity season.
- Use locally available crops residue and agro-industrial by-products and apply different nutrients enrichment procedures like urea treatment and urea molasses block use.

Above literature study indicates important aspects of milk production, as given in following figure.

Figure 6: Aspects of Milk Production



2.3 Aspects of Milk procurement

Vijaylakshmi and Sitarmaswamy (1995), studied the different milk procurement channels in drought prone kolar district of Karnataka state, they analyzed that the milk procurement transport cost of formal milk channel was higher than informal channel, because informal channel only procure milk from rural areas which were nearer to market. The formal milk procurement chain collects milk from entire areas including hilly and remote. For reducing transport cost and improving milk quality, he recommended milk unions to establish bulk cooler at low milk quantity supply villages and in hilly area.

KIT and IIRR (2010), described case study of dairy sub sector in Kenya, they concluded that due to poor management and political interference co-operative dairy sector collapsed and it cause worst condition in keiyo district of kenaya. There was mistrust relationship among actors in milk chain, but when Elreco development organization mobilizes the producers to build co-operative society for dairy business, the result of this action was very positive on dairy sub sector development in chepokorio. Every actors start to get benefit from this co-operative development, various opportunities opened for dairy producers, processor and trader, the relation among these actors developed very well.

Kit and IIRR (2010), described case study of Mahabubnagar, one of the poorest district of Andhra Pradesh in India. They have mentioned that dairy business was important economic source for poor producers of Mahabunagar district. Producers had 2-3 buffaloes and the yield was only 2-2.5.liters/day and dairy chain was not well developed. Producers were paid only once in a month, price offered to producer was too low and there was inadequate control on adulteration at producer level and village milk collection level. When Reliance fresh industry entered in this area for dairy business, company realized that milk procurement section is important part for dairy business, so company focused on this section of milk chain. They started from production, gave financial support for purchase of high yield animals, for purchasing of animals company made agreement among producers, village milk collection Centers and banks. The Company assured the banks for loan repayment from producers, while producers made agreement to deliver their milk to Reliance Company, this Reliance strategy help to get benefit to every stakeholder involved in finance support activities.

Chandra and Jain (2007), studied India's most successful Amul co-operative milk union logistics system. They stated that Amul is unique example of logistics system for milk procurement from small holder producers, in which small holders deliver their milk at village milk collection Center, then it is transferred to either chilling Center or directly processing unit. In this case, the logistics information is provided through personal contact, internet or telephone, this system helps milk union to collect high quality milk efficiently.

Naik and Abraham (2009), conducted case study on cost benefit and milk quality analysis for bulk milk cooler and non-bulk cooler milk procurement methods. In this case study they found that the transport cost for bulk cooler method was Rs.0.20/lit. While non-bulk cooler method transport cost was Rs.o.32/lit. While in milk quality there was big difference in bacterial count, the average bacterial count in bulk milk cooler was 1-2 lakh while in non BMC method Bacterial count was 1-2 million.

Kalra and Singh (1998),studied different routes of milk transportation in Haryana state of India, when he use the geographical map of that milk procurement area and did trial and error accordingly to milk quantity and distance, it resulted in 6% saving in transport cost.

Thirunavukarasu and Sudeepkumar (2005), studied different market options for dairy producers in Tamilnadu state, They explained different criteria for shifting from one channel to other channel, they found that one of main cause of shifting from vendor to another channel was irregularity in payment and stoppage of procurement in flush period. While poor performance of co-operative resulted in shift of producers to private contractor. Later some producers again shift to vendors because of long distance of milk collection Center, they also found that regular, prompt and better payment was major attraction for shifting of producers from one channel to other.

Chakravarty (2000), stated that in Gujarat state the continuous successful growth in milk production is due to two main aspects, one is fair share to producers and other is efficient milk collection, and both of these aspects are influenced by technology. He stated that initially there was Gerber machine for fat testing but it has the limitation of time and human error often results in false reading. This machine was replaced by automatic fat tester which indicates fat percentage within very short time and this reading is automatically recorded in computer. This technology helped to co-operative to bring transparency in milk procurement chain and build relationship. The system also helped to minimize problem of side selling of milk and corruption

Berg (1990), stated that milk should be transported in bulk instead of small amount because the temperature of small amount milk grows faster than large quantity of milk and bacterial growth is faster if temperature of milk increases.

Berg (1990), stated that there are different methods of milk transporting, it can be transported by supplier themselves or can be picked by dairy plant, but it is always advisable to organize milk collection by dairy plant itself, it has the advantages of having full control of running the collection according to causal and the plant can collect milk as early as possible and it will help to maintain keeping quality. The transportation cost for milk collection can be reduced by applying effective milk collection method.

Bhandopadhyay (1996), studied on performance of two different co-operative milk unions in India namely Amul and Himul, he found that the Amul co-operative milk procurement growth is much more positive than Himul milk union. Major difference between in those two unions was price given by Amul was better than Himul union and in addition of this Amul union was also focusing other activities like extension services, input supply and cheap veterinary services.

Berg (1990), stated that for acceptability of milk hygienic quality can only be assured after long lasting laboratory tests are performed. It is not possible to do all tests at milk collection Center but at least four test namely Acidity, smell, abnormalities and density test are conducted at collection Center. He also stated that it is highly recommended to give extra rewards for good quality milk, so that supplier will pay much more attentions to supply high hygienic quality milk.

Berg (1990), stated that milk prices to supplier depend upon the selling milk prices, break even prices and production cost of milk, for calculation of cost production he suggests three system. In the first system, number of farm data is used for making average standard figure of cost of milk production. In second system, he suggests theoretical calculation based upon knowledge of farming system and in third system he makes suggestion on cost price analysis of large number of farm.

Berg (1990), stated that there are many reasons, why producers are unable to sell their milk directly to consumer, .such as –

- Small quantity of milk
- Market /consumer is far away
- Non co-operative activity and inadequate knowledge

In this case many times middlemen collect from producer and prices given to producers depend on the competition among the middlemen, if the middlemen have monopoly or are very few in number the milk prices given to producers are not favorable.

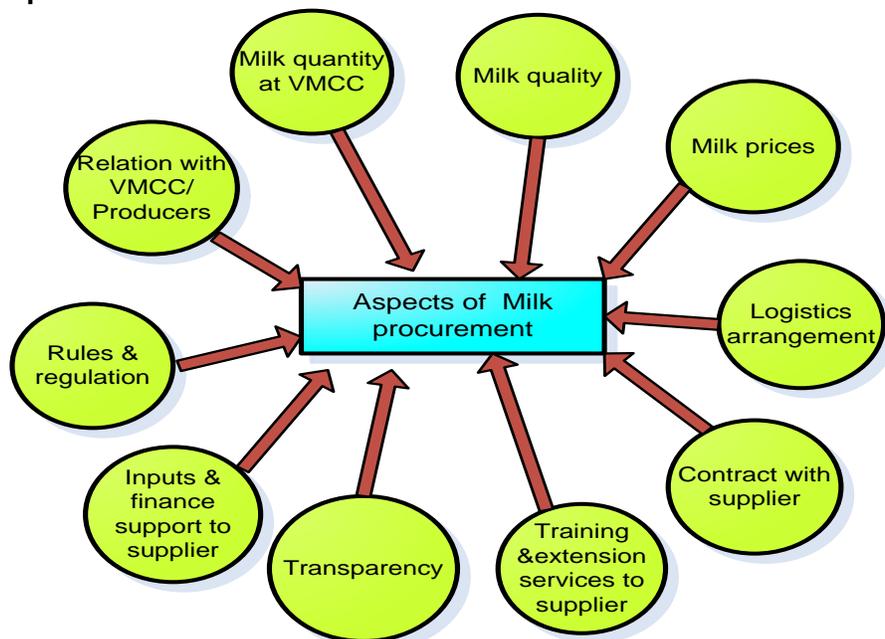
Sirohi et al., (2009), studied different factors affecting low performance of dairy plant in Assam. They found that the main cause of low performance was low milk procurement and the causes of low milk procurement were as given below.

- Producers had different informal milk selling channel
- Low milk prices
- lack of effective networking with Village milk collection Center
- Absence of non-price incentives e.g., inputs. Veterinary services, extension etc.
- Administrative constraints
- Shortcoming planning and coordination
- Inadequate milk procurement strategy
- Improper human resource management
- Political interference

For further development of this processing plant, they recommended that government should withdraw its involvement in dairy activities and public private partnership should come forward. They also suggested that milk procurement strategy should be more rewarding, so milk price for producers is satisfactory and increase the milk procurement quantity.

After review of above all literature, it can be concluded that the following are important aspects in milk procurement

Figure 7: Aspects of Milk Procurement



2.4 Important aspects related of Dairy unit /chilling Center

Berg (1990), stated that small scale chilling Center has the great importance in milk chain to maintain milk quality, there are many purposes of establishing dairy Center as given below –

- To supply high quality milk
- Create market for milk
- Support to rural producers.
- Create employment for rural people and industrial development in rural area.

During implementation of dairy unit, analyses of following points are very essential for future dairy unit continuity.

The amount of milk produced –for this animal population from animal husbandry will helpful but it is always make difficult to rely on this figure because the some animal might be miss from this counting, for this he suggested that the survey at producer level will helpful for actual milk production.

The amount of milk available for sale -it is important to know how much milk is produced in certain area and more important to know the production potential (I e. the amount of milk that can be produced).it is often mistaken that milk available at producers level, it will sell to dairy Center, so this might be serious mistake, for this different aspects should be taken in to consideration like competition at supplier level, informal marketing channel, religious and political issues.

Third party services (electricity and water)- 24 hrs water and electricity availability is very essential for maintain milk quality, in rural areas of tropical country, this might become serious problem for the chilling Center

Infrastructure –The bad quality infrastructure can delay the transportation of milk, and it usually hampers milk quality.

Berg (1990), recommended that raw milk always should be collect from rural area those far from city because the milk producer living near urban areas have different marketing options and they can sell their milk on better price what dairy Center offer for them.

Berg (1990), recommended that the Dairy unit should have over capacity than actual milk procurement, but while unit implementation, it should be always take to consideration that planning capacity too high means high fixed cost, while planning capacity too low means that processing facilities need to be extended in future.

Turhan et al., (2007), stated that there are different aspects influencing on location of Center, out of these infrastructure is very important category, which includes following important aspects

- Availability of good quality water
- Availability and cost of electricity
- Waste disposal facility and cost

- Cost of fuel
- Road facilities
- Truck availability for transport

Sharma (2010), stated that for successful dairy business, location of milk dairy unit is very important, the location of unit should be consider logistics cost, employment and third party services availability.

After studying above all literature it is concluded, that followings are important positive aspects for expansion of Warana union milk procurement chain in dry land area of Satara districts.

Figure 8: Positive Aspects for Expansion of Warana milk procurement chain



3. Results

3.1 Secondary Data finding

3.1.1 Cultivable land and Number of villages

There are 161 villages in these two sub-districts, total cultivable and non-cultivable land in Man and Khatav sub districts are having first and second rank in Satara district, while average cultivable area in each village is 5242 and 3056 acres respectively.

Table 2: Cultivable and non-cultivable land in Satara district (Acre)

Sub district Name	Villages No.	Cultivable land	Non cultivable Land	Total geographical area	Average Per village cultivable land
Man(DLASD)	71	258944	113252	372196	5242
Khatav (DLASD)	90	275116	46083	337199	3056
Jaoli	196	140130	74829	214959	714
Karad	115	191387	46913	254300	1664
Khandala	46	86188	43573	129761	1873
Koregaon	76	175634	100000	275634	2310
Mahabaleshwar	56	10419	45726	56145	186
Patan	203	241407	105240	346647	1189
Phaltan	80	238165	52832	290997	2977
Satara	153	179134	45511	224645	1170
Wai	91	75218	77260	152478	826

Source: The Gazetteers Department Satara, 2007

3.1.2 Average rainfall and crops

There are three major seasons in dry land area of Satara district namely summer, rainy and winter. The average rainfall in this area is 515 mm and the major crops of three seasons are as following.

Table 3: Average rainfall and crops

	Summer (March- May)	Rainy (June- October)	Winter (Nov.-March)
Crops	Maize ,Onion Groundnut	Bajara, Sorghum Maize, Onion	Sorghum, Maize, onion,
Rainfall(mm)	5	415	95

Source: The Gazetteers Department Satara, 2007 and www.agri.mah.nic.in

3.1.3 Water availability

The ground water level in Man sub-district is at safe level where as in Khatav sub district it is at semi-critical level. There are seven small size ponds which are supplying water to agriculture land of 23 villages (Annex: 4).

Table 4: Water availability

	Net ground water availability (Ham/yr.)	Net ground water availability in future (Ham/yr.)	Category
Man	19897.87	8238.20	Safe
Khatav	16524.79	3829.79	Semi critical

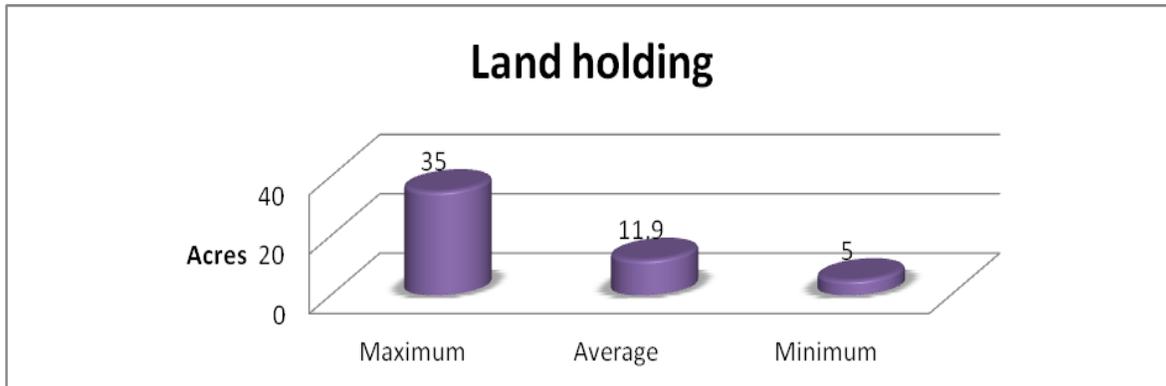
Source: Ground water information Satara district, Government of India, Ministry of water resource, central ground water Board 2004

3.2 Field research finding at milk producer level

3.2.1 Land holding

The maximum land holding of producer is 35 acres, while minimum land holding of producer is 5 acres and the average land holding per producer is 11.9 acres

Figure 9: Land holding per producer



Source: Field survey 2011

3.2.2 Animals Population

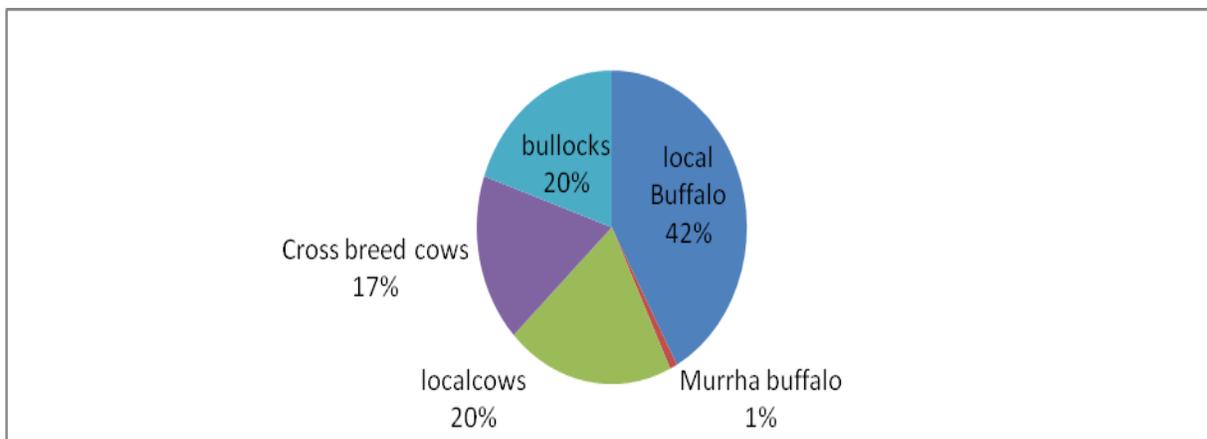
There are 2 to 12 animals per household, which include local buffaloes, Murrha buffaloes, crossbred cows, local cows and local bulls. The average number and percentage of all animals are as following.

Table 5: Average Number of animals per house hold

Local Buffalo	Murrha Buffalo	Cross breed cow	Local cow	Bull	Total
2.125	0.05	0.913	1.02	1	5.07

Source: Survey 2011

Figure 10: Animals Population

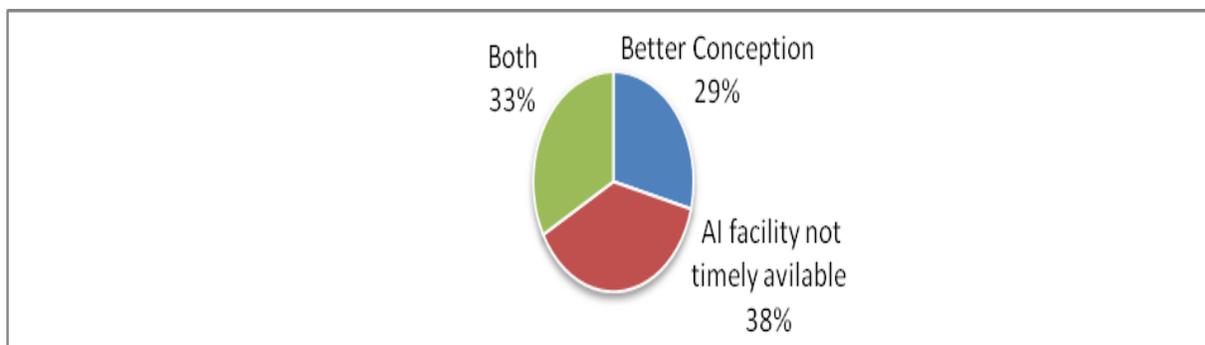


Source: Survey 2011

3.2.2.1 Reasons for high Number of local buffalo

The local buffaloes population in this area is 42 %, it is mainly because the purchasing of high yield Murrha buffaloes are almost negligible and only 15 % producers are following AI breeding method. The reasons given by producers for use of natural service breeding method is as following.

Figure 11: Reasons for Natural Service Breeding Method use



3.2.2.2 Reasons for local cow and bullock Rearing

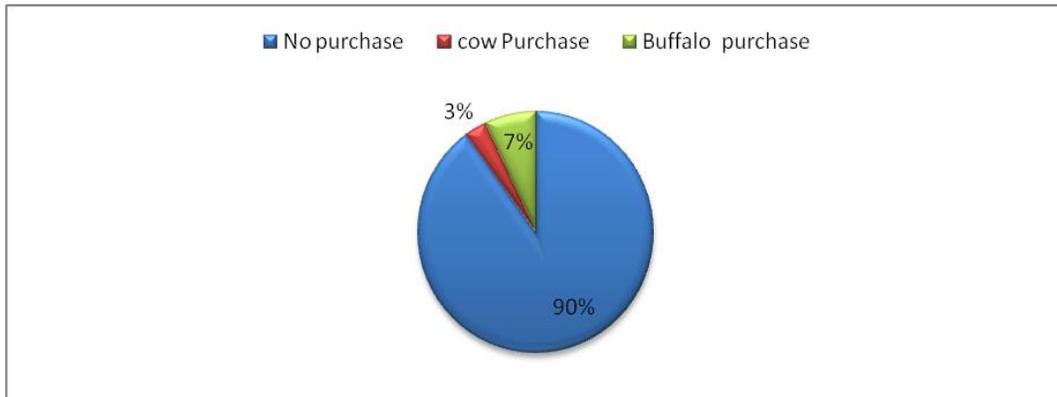
Local khillar breed cow is not used for milk production but it is kept due to various reasons as given below.

- This cow has the high immunity against diseases.
- Fertility status of this cow is better than cross breed cow and buffalo.
- Bullock of this breed is used for agriculture work purpose and this bullock has better market price than cross breed cow and buffalo.
- People in this area worship local cow as God, so they are not selling or slaughtering it. They give cow to other producers for rearing without any cost and prefer to take care of cow until natural death.

3.2.2.3 Reasons for Low Number of cross breed cows

Cross breed cows' population in DLASD is only 17%, the main reasons for its low population is that the producers are not interested in cross breeding program with local cow due to above mentioned reasons. Another reason is that purchasing of this cow from outside area is very less in percentage. Figure-12 represents the percentage of purchased animals by the producers in the year 2010.

Figure 12: Percentage of producers purchased animals in year 2010

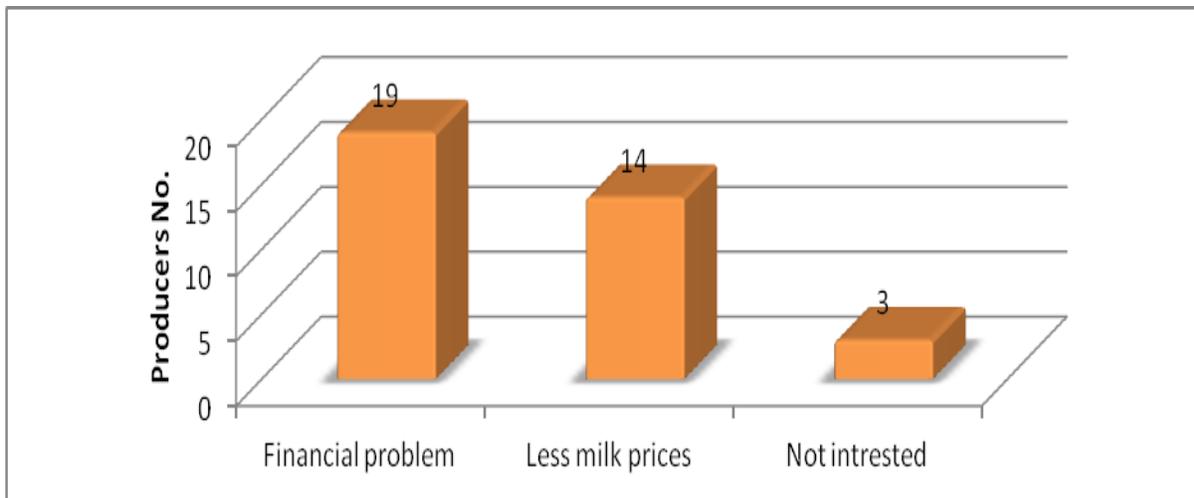


Source: Field Survey 2011

3.2.2.4 Reasons for non purchasing of animals

Financial problem and uncompetitive milk prices were major causes of non purchasing of animals.

Figure 13: Reasons for Non purchasing animals



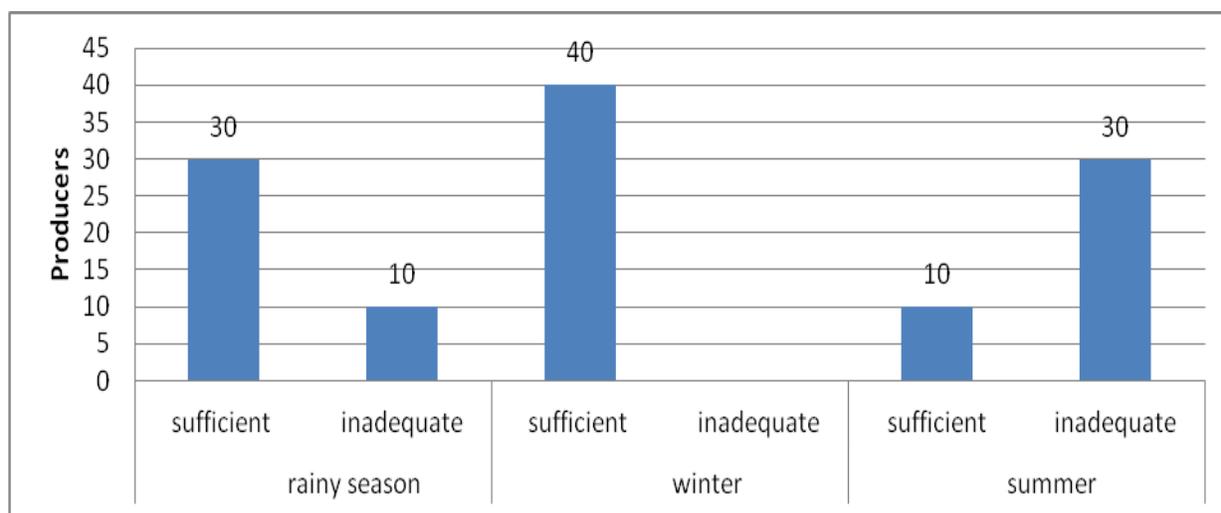
Source: Field Survey 2011

3.2.3. Animal nutrition

3.2.3.1 Roughage availability

In summer 75 % producers and in rainy season 25 % producers have the shortage of roughage, while in winter season all producers have enough or more than enough roughage.

Figure 14: Roughage Availability: Producers opinions



Source: Field Survey

3.2.3.2 Feeding trend

Roughage feeding

In summer season 80 % producers are feeding only dry roughage, while in winter 100 % producers are able to feed green as well as dry roughage.

Table 6: Feeding trends

Season	Green and dry roughage feeding		Only dry roughage feeding	
	Number	Percentage	Number	Percentage
Rainy	34	85 %	6	15%
Winter	40	100 %	0	0%
Summer	8	20%	32	80%

Source: Survey 2011

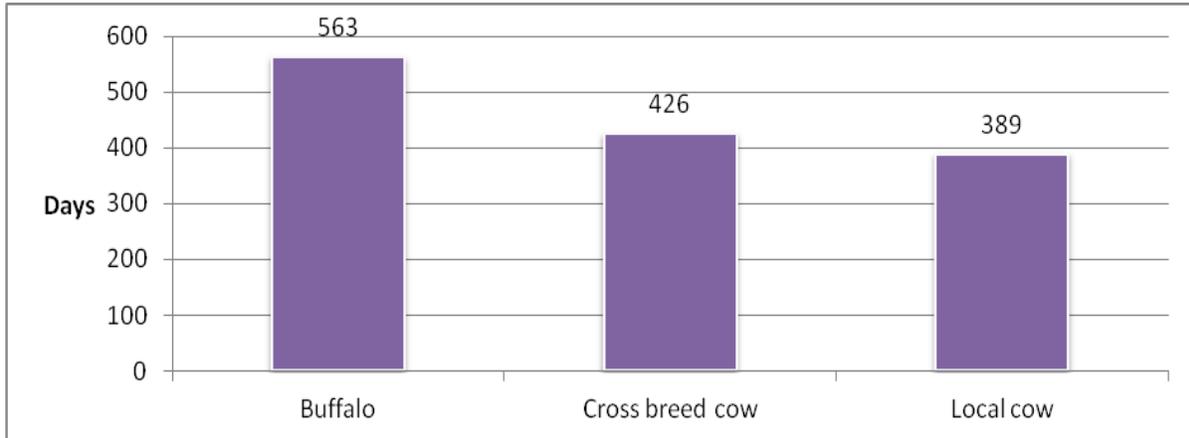
Concentrate feeding

Domestically produced agricultural grains and concentrate from market are two main types of concentrate used for feeding animals. This concentrates are bought through private shops or village milk collection Center. The average per kg prices of concentrate is Rs 13.68, while average per kg price of grains is Rs.12. All 40 producers responded that the price of concentrate is very high and it needs to be low than Rs10. The average concentrate feeding per animal is 1 kg for milking buffalo and 2 kg for milking cow.

3.2.4 Fertility status

There are big variations in inter calving periods of different animal breed, the maximum inter calving period is in local buffalo followed by cross breed cow and local cow.

Figure 15: Inter calving periods

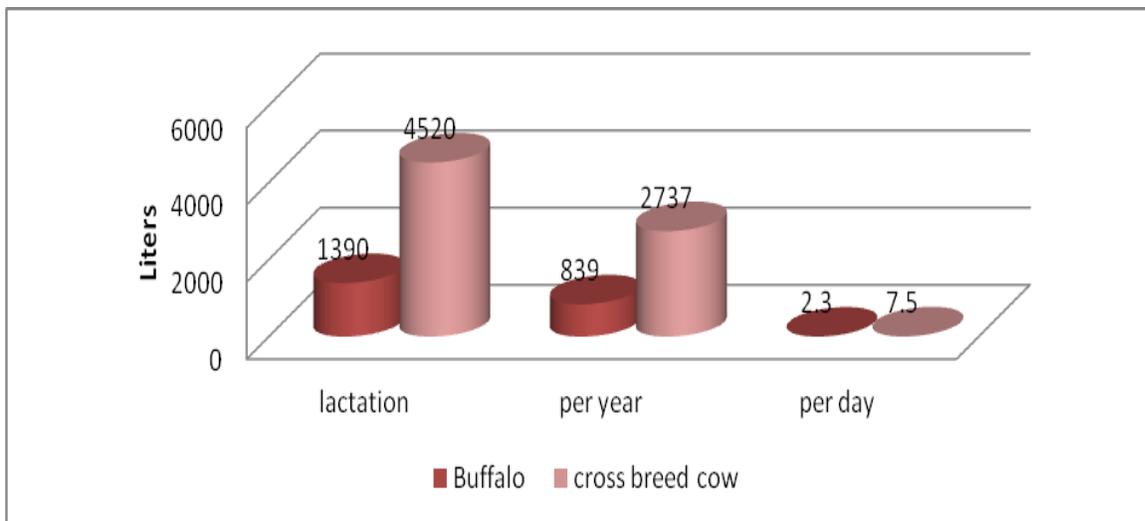


Source: Field Survey 2011

3.2.5 Milk production per animal.

Crossbreed cow and local buffaloes are two animals used for milk production, while local cows are not used for milk production. The average milk production of local buffalo is 2.3 liters/day while average milk production of cross breed cow is 7.5 liters/day

Figure 16: Milk production per Animal



Source:Field Survey 2011

3.2.6 Milk production per household

The maximum quantity of milk production per household is 20 liters/day while minimum milk production quantity is 1.5 liters/day. There are significant variations from household to household in production and it mainly depends on number of cross breed cow available in household. Average number of milking animals per household is 3 while average milk production per household is 11.45 liters/day.

Table 7: Daily Milk production per household

	Maximum	Minimum	Average
Daily Milk production per household in liters	20	1.5	11.45

Source: Field Survey 2011

3.2.7 Dry period of animals

There is big difference in dry period of different animal's type, Average dry period of cross breed cow is 98 days and local buffalo is 168 days.

3.2.8 Milk distribution channel -

The average milk consumption per household is 1.8 liters /day and 95% producers are giving preferences to buffalo milk consumption. Producers are selling their milk to neighbor producers on credits basis or to local village consumer. The normal distribution of produced milk is given as follow.

Table 8 : Milk distribution channels

	Home consumption	Dairy	Local sell	Total
Quantity (liters/day)	1.8	8.294	1.36	11.45
Percentage	16%	72%	11%	100%

Source: Field survey 2011

3.2.9 Milk prices

The 95% producers are getting milk prices on the species basis (cow and buffalo), the average per liter milk price offered to producers for buffalo milk is Rs. 21 and for cow milk is Rs.14.60. No bonus money is offered during Diwali festival.

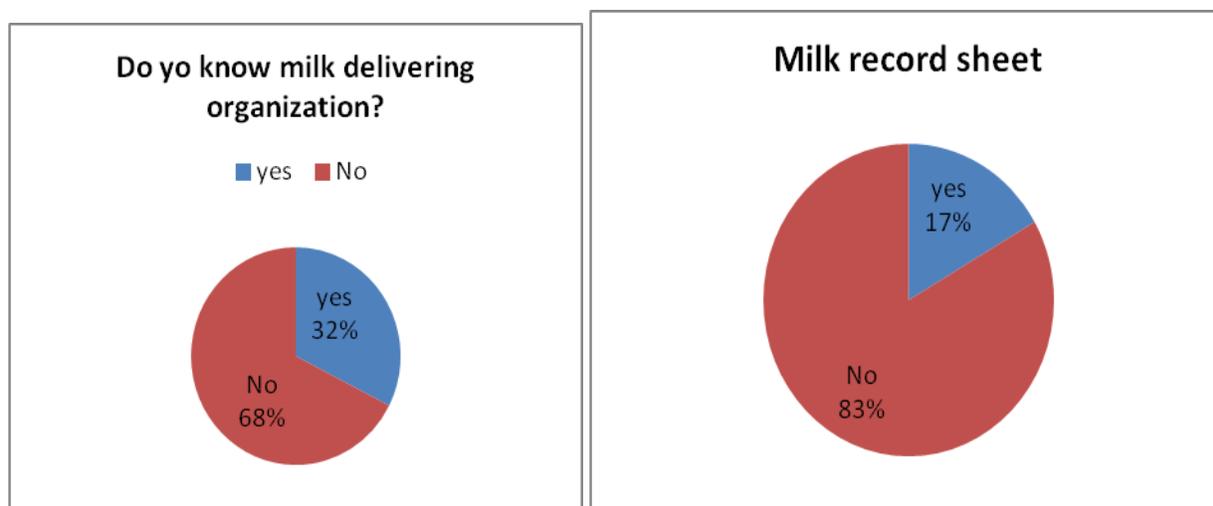
3.2.10 Milk quality at producer level

All producers are washing udder before milking, while teat dipping practice is not common. 27% producers responded that there was mastitis problem in this year. 85% producers are milking the animals both time, but are obliged to deliver only once in morning. Other 15% producers are able to deliver the milk both times.

3.2.11 Information Flow

68% producers does not know the name of their milk delivering processors/chilling Center, while 83% producers does not have any milk delivering record sheet, milk record is kept only at VMCC level and according to this record, milk payment is offered to producers in every 15 days.

Figure 17: Information flow at producer's level



Source: Field Survey 2011

3.2.12 Inputs Supply to producers

Concentrate and minerals are provided by private company, all VMCC are supplying these concentrate on commission basis to producers. Milk chilling centers are not providing any other inputs like fodder seeds and chaff cutters to the producers.

3.2.13 Finance support to producers

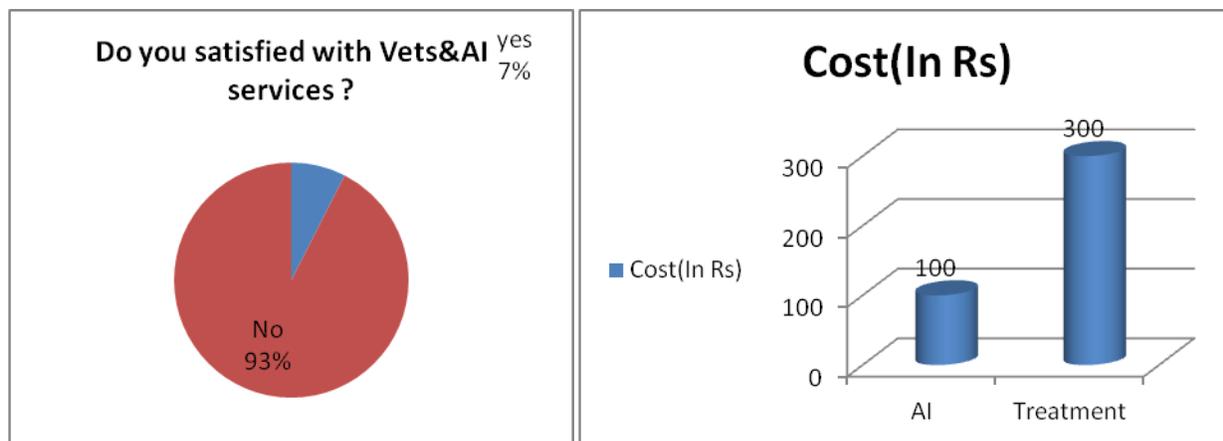
District and state banks are financial supporters for the producers, however out of 40 surveyed producers, only two producers were able to access loan from bank at 12% interest rate.

3.2.14 Animal Health and AI services

Livestock department of state government is providing Animal health and AI services. Every 3-4 villages has the one livestock officer. The department is situated at about 1 km to 15 km from the producer's home. The average farm gate AI and treatment cost is 100 and 300 Rupees

respectively, surveyed 90 % producers were not satisfied with this services mainly due to high cost and timely non-availability of livestock officers .

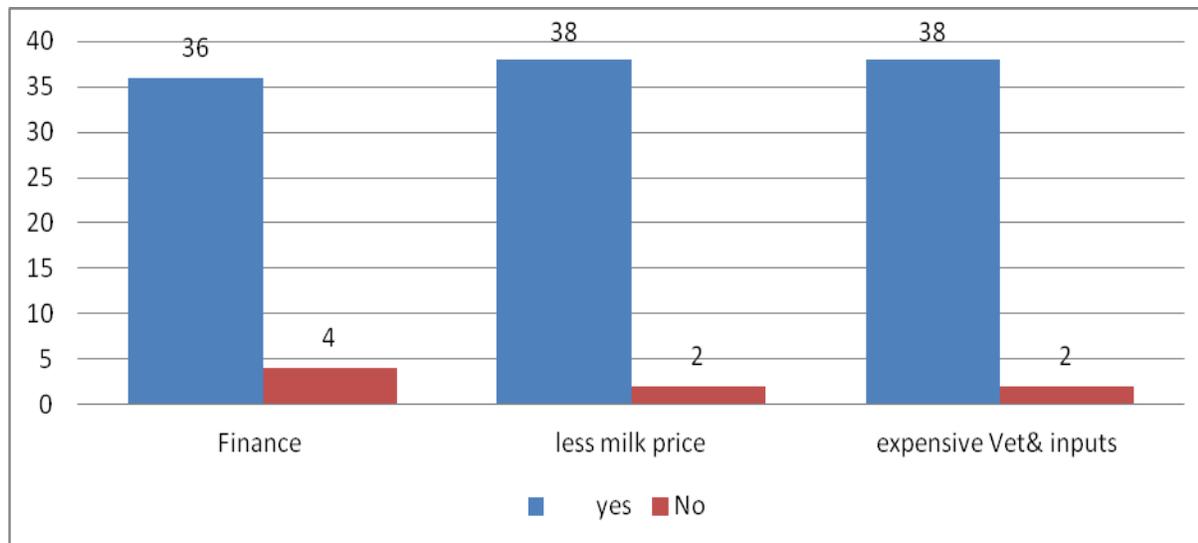
Figure 18: Veterinary service quality and per visit cost



3.2.15 Problems expressed by producers

Finance for animal purchase, low milk prices, expensive veterinary and inputs services are three major constraints expressed by producers.

Figure 19: Constraints expressed by producers

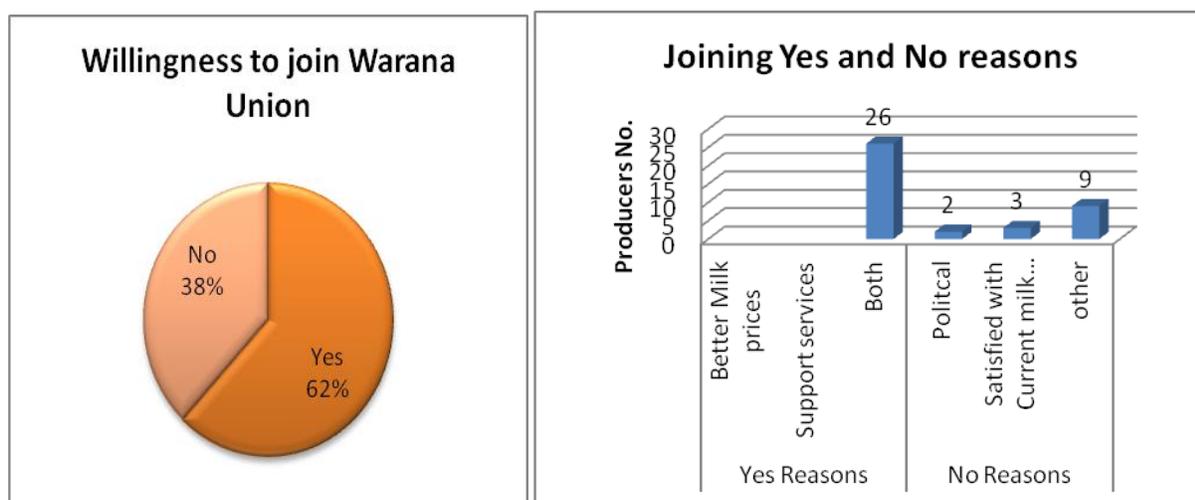


Source: Field Survey 2011

3.2.16 Willingness to join Warana union: producers opinions

In dry land area of Satara district 83% producers know Warana union and 62% producers are interested to join Warana union while 38% producers are not interested to join. The major reasons for joining and not joining are given below.

Figure 20: Warana Union joining producers' opinions



Source: Field survey 2011

3.2.17 Requirements of milk producers

Financial support for animal purchase, cheap veterinary service and better milk prices are major requests of producers in DLASD. The following table showing overview of all the requirements

Table 9: Overview of producer's requirements

Requirements	Max.	Min.	Ave.
Finance support (Rs.)	50000	20000	28125
Interest rate	10%	2%	3.5%
Veterinary services per visit cost (Rs.)	100	50	78
Buffalo milk per liter price(Rs.)	30	25	26.71
Cow Milk per liter price (Rs.)	20	18	19

Source: Field Survey 2011

Opinion 1: Milk producers 1 – we are giving 40-50 liters water and 30-40 kg roughage to animals and supplying produced milk to dairy, but it is very unfortunate for us that price of 1 liter bottled water is more than price of 1 liter milk. We urgently need better milk prices otherwise survival of dairy business in future will be almost impossible.

Opinion 2: Milk producer - We need cheap veterinary services because one time veterinary cost is almost equals to 15 days milk sell payment.

3.3 Field research finding at Village milk collection Center level

3.3.1 Villages milk collection Centers per village and procurement quantity

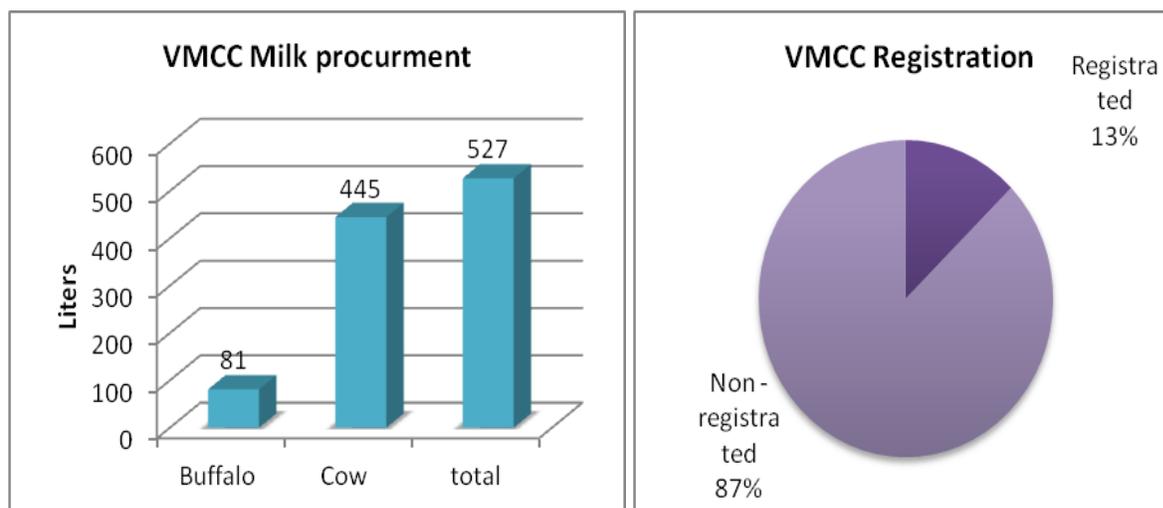
In DLASD generally each village has 2-3 VMCC, out of these 87%VMCC are not registered and operated privately. Biggest VMCC has 2150 liters milk per day while smallest VMCC has 135 liters/day, the average Milk procurement quantity of VMCC is 527 liters/day. The average quantity of buffalo milk is 82 liters/day while cow milk is 445 liters /day

Table 10: Milk procurement at VMCC level

	Maximum	Minimum	Average
No. of VMCC per village	3	2	2.3
Milk procurement at VMCC level/day	2150 liters	135 liters	527 liters

Source: Field Survey 2011

Figure 21: VMCC daily Milk procurement and registration percentage



Source: Field survey 2011

Opinion 3: VMCC representative - Registration of VMCC means creation of problem to our self, because if VMCC registers then lot of inquiries will be done by the Government auditor. They are looking unnecessarily into very small things and try to earn money through this business, if you do not give money to them then court matter will come behind you, so it is better to live as free birds and you can do anything what you want.

3.3.2 Methods of milk collection

83% of VMCC are conducting milk collection at their main collection places while 17 % of VMCC are conducting milk collection from different places scattered all around. The average milk procurement quantity of First category of VMCC is 414 liters/day, while for second category VMCC milk procurement is 1874 liters/day.

3.3.3 VMCC Milk Buying and selling prices

Out of surveyed 47 VMCC, only 7 VMCC are giving milk prices on fat basis whiles other 40 VMCC are giving milk prices on species basis. Average buying and selling prices of raw milk is as following.

Table 11: Milk buying and selling prices of VMCC

	Cow milk	Buffalo milk
Milk buying rate (Rs./liter)	14.60	21
Milk selling rate (Rs./liter)	16.90	25.90
Added value (Rs./liter)	2.30	4.90

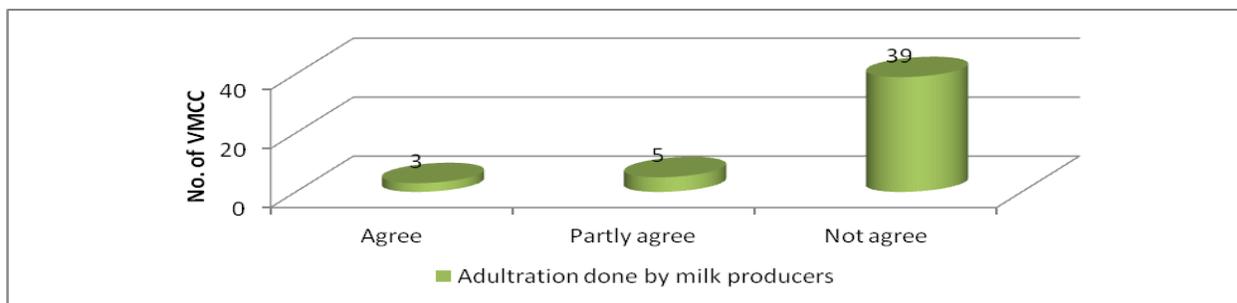
Source: survey 2011.

3.3.4 Milk quality at VMCC level

Only 14 % VMCC are conducting fat, lactometer reading and organoleptic test while remaining 86% VMCC are conducting only lactometer and organoleptic test. The main reason behind this situation is that they are not giving payment according to fat percentage but they are checking water and other adulteration by Lactometer and organoleptic test.

The average adulteration rate is 1.7 % which is done by producers.

Figure 22: Adulteration done by producers: VMCC representatives Opinions



Opinion4: One VMCC representative responded that I was delivering adulterated milk 1700 liters/day to chilling Center, in which I was adding almost 5 cans of water (250 liters) in milk, I manage milk sample taking person in milk chilling unit, I was giving more money than his employee, this malpractice give me lot of money and I have built nice bungalow but now I am feeling guilty and could not sleep well in night.

3.3.5 Inputs and finance Supports to VMCC

Milk chilling Centers are providing all required Inputs to VMCC on no-profit no-loss basis. It includes milk testing instruments and chemicals.

All VMCC are demanding financial support from milk Chilling Center to deliver their milk and this amount depends upon the quantity of VMCC supplied milk.

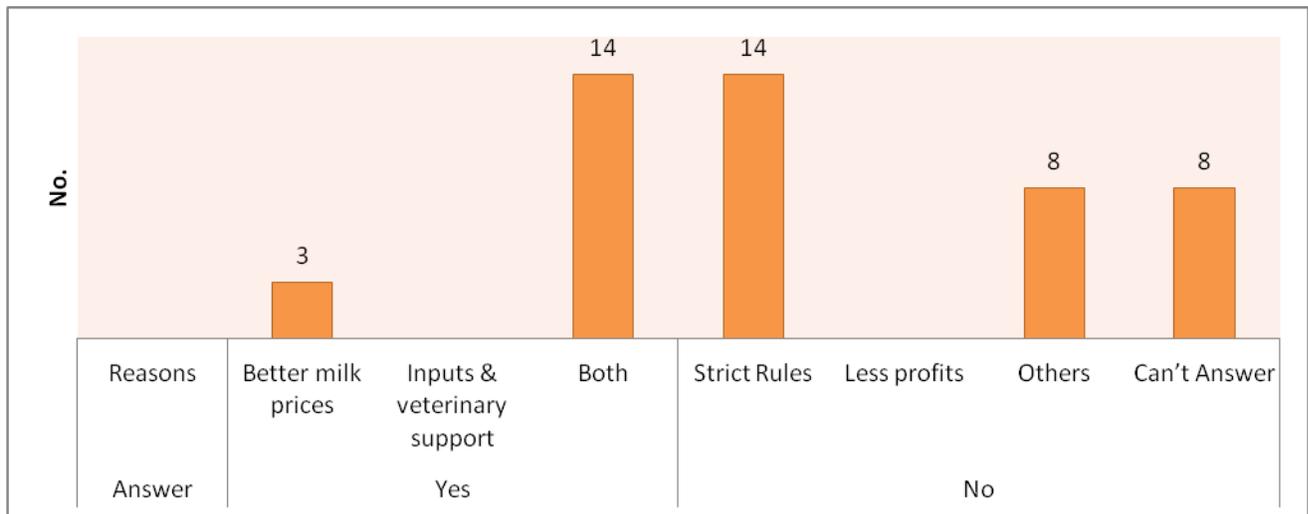
3.3.6 Constraints of VMCC

The main constraints of all VMCC expressed by secretaries is about high investment to run VMCC. The single reason for the same is related to milk transportation as cost of vehicle is too expensive for them.

3.3.7 Willingness to Join Warana union: VMCC representatives opinions

All 100% Surveyed VMCC representative knows Warana union, Out of these 36% VMCC are interested to join Warana union while 46% VMCC are not interested to join Warana union and remaining 18% VMCC did not responded clearly. The reasons for joining and not joining expressed by VMCC representatives are given in following figure.

Figure 23: Willingness to join Warana Union: VMCC representatives Opinions



Source: Survey 2011

Opinion 5: VMCC representative -we are looking for benefit of milk producers as well as ourselves but we have some limitation, for us it is difficult to give support services to producers like veterinary services, finances for purchase of animals. I am sure if Warana union apply their dairy pattern in this region, then Warana union will get at least 60 % milk within one year.

Opinion 6: VMCC representative - If Warana union enters in this area, it will be a problem for us, because Warana union will try to give maximum price to producers, while they will give commission to us according to their rule and this commission is low for us. Now we are making our own system here and we would not like to be governed by somebody.

3.3.8 Demand of VMCC

Financial support, transport facilities, Input services and better milk prices are three major demand of VMCC, 65% VMCC will use finance support for private use while 35 % VMCC will use finance support to purchase animals for milk producers, 100 % VMCC demanded inputs support on subsidy basis. The following table shows the summary of above all demand.

Table 12: Overview of VMCC demand

Demand	Maximum	Minimum	Average figures
Finance support Rs./100 liters	100000	25000	580000
Buffalo milk price Rs./liter	32	28	29.37
Cow milk price Rs. /liter	18	22	19.37

Source: Survey 2011

3.4 Field research finding at milk Chilling Centers level

3.4.1 Number of Chilling Centers and milk procurement quantity

There are total nine Chilling Centers in dry land area of Satara district. Currently Eight private milk Chilling Centers are functioning and one co-operative milk union was closed in year 2005. Among those Maximum capacity of chilling Center is 50000 liters/day, while minimum capacity of Chilling Center is 20000 liters/day. Total milk procurement of all Chilling Center is 94000 liters/day. All these units are only engaged in milk chilling activity although they also have the facility for pasteurization and packaging. Following table shows milk procurement status of all Chilling Centers.

Table 13: Milk procurement status of milk Chilling Centers

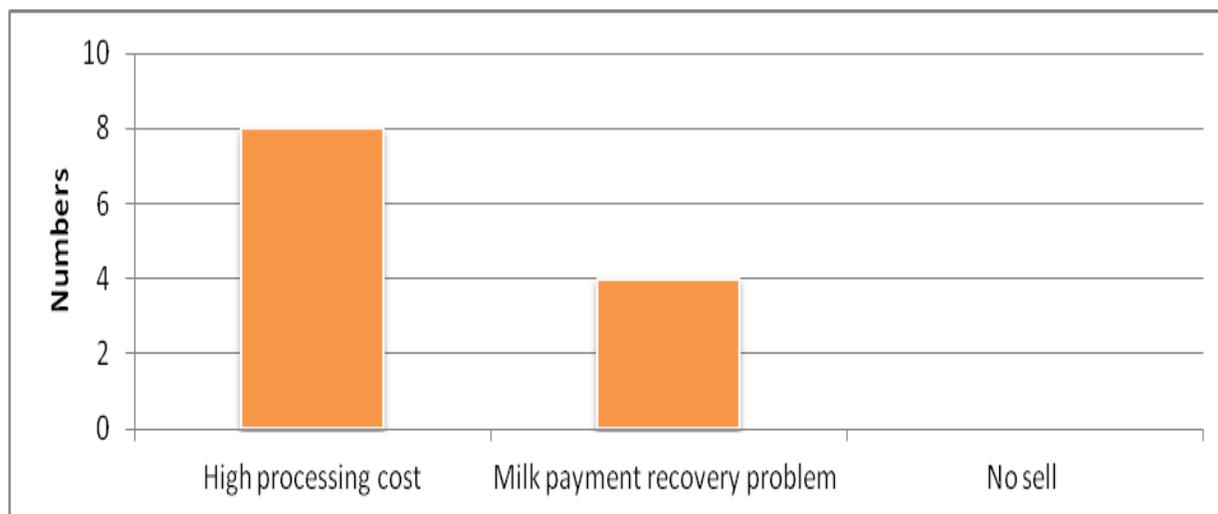
Name	Capacity in liters /day	Milk procurement in liters/ day	Type of organization
Bramachaityna	40000	15000	Private
Priyadrshani	30000	12000	Private
Bhashkar	50000	7000	Private
Shiram	20000	10000	Private
vijayraj	30000	17000	Private
prithviraj	50000	20000	Private
Harnai	25000	3000	Private
Chaityna	50000	10000	Private
		94000	

Source :Interview and chilling Center records 2011

3.4.2 Milk products selling channel

All milk chilling Centers are selling chilled milk on commission basis to other big milk processors. Average per liter commission for cow milk is Rs.3 while for buffalo milk it is Rs 4. Reasons for chilled milk selling to big processors are given follows.

Figure 24: Reasons for chilled milk selling to other processors



Source: Field Interviews 2011

3.4.3 Chilling Centers variable costs

Out of eight Chilling Centers, only three Chilling Centers have given the variable costs of chilling Centers, which are given as follows.

Table 14: Chilling Centers variable cost

Name of chilling Center	Transport cost(Rs/lit)	Labor cost(Rs/lit)	Chilling cost (Rs/lit)	Total(Rs/lit)
Bramachaityna	1.5	0.3	0.3	2.1
Priyadrshani	1.5	0.4	0.35	2.25
Bhashkar	1.5	0.35	0.4	2.25
Average	1.5	0.35	0.35	2.2

Source: Interviews and chilling Centers records 2011

3.4.4 Milk buying rate at milk Chilling Center level

Milk payment is offered to VMCC according to the fat percentage. The average fat percentage of cow and buffalo milk is 4% and 7% respectively. The following table shows buying rate of cow and buffalo milk.

Table 15: chilling Centers milk buying rate

Cow milk		Buffalo Milk	
Fat percentage	Milk rate in Rs /liter	Fat percentage	Milk rate in Rs/liter
3.5	15.9	6.5	24.4
4	16.9	7	25.9
4.5	17.9	7.5	27.4

Source: Interviews and milk payment records of milk Chilling Centers 2011.

3.4.5 Logistics arrangement

Milk transport to chilling Center is done by VMCC owned vehicle and its transport cost is paid by Chilling Centers. The average offered transport cost to VMCC is Rs 1.50 /liter, for saving fuel cost and earning more money, 90% VMCC are delivering their milk in morning only.

Information flow goes through direct contact of VMCC persons or through telephone. No single milk Chilling Center is sending their employees to contact VMCC and producers.

3.4.6 Milk quality at Chilling Center level

Milk quality decision is made on the Fat%, water % and adulteration free milk, currently no single Chilling Center has any quality certification, 37% milk Chilling Centers agree that there is partially adulteration problem from VMCC, while 63% milk Chilling Centers agree that there is adulteration problem. According to Chilling Centers representative opinions, on an average 9 % percentage of VMCC are adulterating the milk.

3.4.7 Third party services

Seven milk chilling centers have sufficient quantity of water availability, while one Chilling Center has the shortage of water, the main sources for water is from government facility and own well.

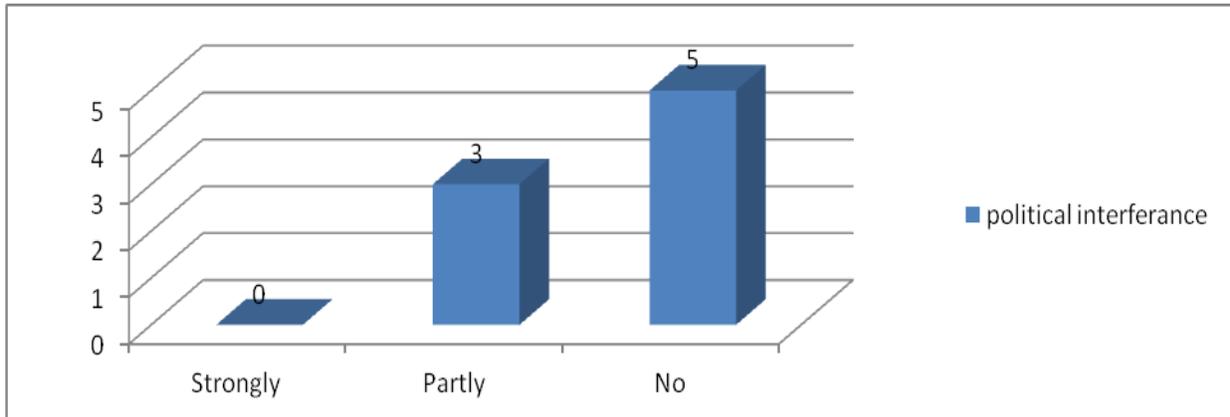
Before year 2009, electricity supply shortage was serious problem for operating Chilling Center, however from year 2010; three Chilling Centers are satisfied with electricity supply, while 4 milk Chilling Centers are still not satisfied about this service.

63% milk Chilling Centers are satisfied with roads condition, while 37% Chilling Centers responded that there is still a need for the improvement in road condition.

3.4.8 Political interference

All chilling Centers are owned by private business firms and out of all eight milk Chilling Center five mentioned that there is no political interference in dairy business. Other three mentioned a small political interference.

Figure 25: Political Interference- Chilling Centers representative's opinions



Source: Field Interviews 2011

3.4.9 Labors availability

In this area industries are not well developed, the economy of this area depends on jobs in big city or on agriculture/dairy mix farming. According to representatives of Chilling Centers, availability of non-skilled labors is in excess, while skill-full labors availability is not sufficient. Main reasons are the low salary for skill-full labor and low interest to work in undeveloped area.

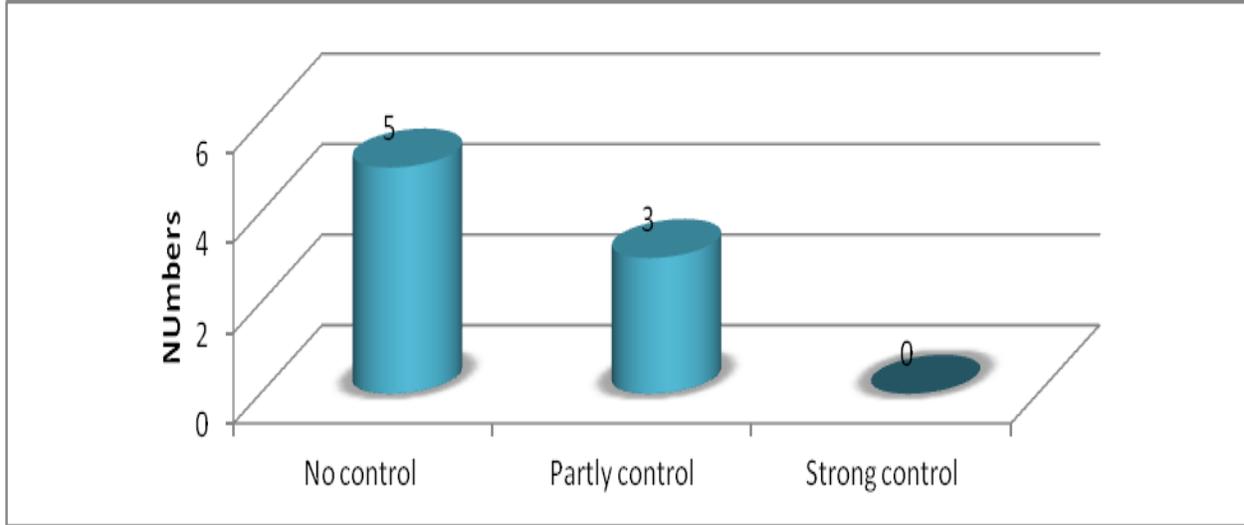
Figure26: Staff Salaries per month



3.4.10 Relation with supplier

There is no strong contract among VMCC and organizations, VMCC can stop delivers milk at any time and divert to other organization, and all organizations agree that they do not have strong control on VMCC and influence on milk prices offered to milk producers.

Figure 27: Control on VMCC- Chilling Center's representative's opinions



Source: Field Interviews 2011

Opinion 7: Chilling Center Manager- VMCC plays highly manipulative role in milk chain and often can divert the milk supply to their own advantage. In this case we are helpless in creating a better condition

3.4.11 Warana union partnership opinions

Out of eight milk chilling centers, Bhaskar and Harnai milk chilling centers strongly agree for partnership, while three organizations strongly disagree for partnership and remaining three did not give any clear cut answer

3.4.12 Demand for partnership

Two milk Chilling Centers are ready for partnership, they responded that we strongly need support from big organization, because our financial situation is not good and partnership with Warana union can help us to survive in dairy business. Both of these organizations are ready to give Chilling Center on rent or commission basis, with following expectation.

Table 16: Demand for partnership

Name of milk Chilling Centers	Daily Capacity in liters	Daily Milk procurement in liters	Rent in Rs./month	Commission in Rs./liter
Bhashkar	50000	7000	70000	1
Harnai	25000	3000	50000	1

Source: Interviews with milk Chilling Centers managers 2011.

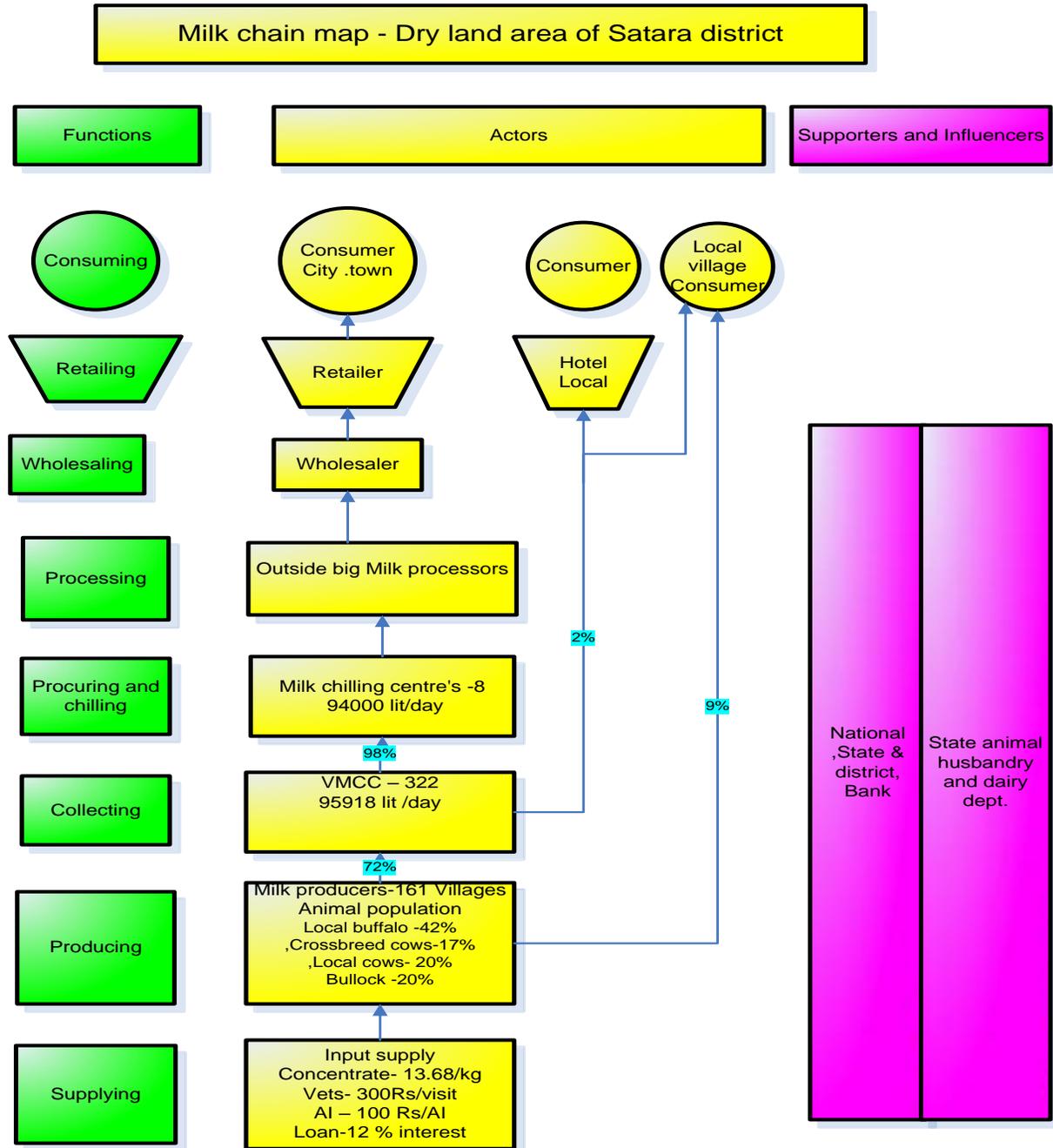
3.5. Interview finding at sub district livestock department

Currently in dry land area of Satara district there are 36 livestock departments at village level. Generally each livestock department is connected with 3-6 villages, state government is giving AI services facilities on cost Rs.11/AI at veterinary dispensary places, some basic medicine supply by state government, but maximum medicine has to be purchased by producers. Currently there is a policy announced by the state Government, the objective of this policy to enhance state milk production and fulfill increasing consumer demand. The policy detail is given in Annex-4.

3.6 Milk chains in dry land area of Satara district

Two milk chains are functioning in DLASD, one is formal and other is informal, surprisingly no single co-operative milk union is functioning in this area. All milk chilling Centers are privately owned.

Figure 28: Chain Map- DLASD



3.6.1 Input suppliers

Input supplies like concentrate and minerals for milk producers are provided by private companies and no subsidy on input supply are given to producers.

3.6.2 Milk producers

The producers from 161 villages are supplying their milk to chilling centers, they are doing mix farming business with average 5 animals and 11.9 acres land per house hold.

3.6.3 Village milk collection Centers

There are about 322 VMCC supplying an average milk of 527 liters/day to milk chilling Center and more than 87% VMCC are privately owned.

3.6.4 Milk chilling Centers

There are eight milk chilling centers in DLASD, procuring milk 940000 liters/day. These chilling centers are supplying their milk to big processor for further milk processing procedure.

3.6.5 Big Milk processors

These are all big processors located outside DLASD. They are converting milk in to standard products.

3.6.6 Wholesalers, retailers, consumers

They are living in different cities. Wholesalers buy milk products from processors and sell to consumers through retailers

3.6.7 Supporters and influencers

Animal husbandry department of state is main supporter and influencer functioning in dry land area of Satara district. The local and state banks are financial supporter to actors involved in chain.

3.7 Value share in milk chain

Value share analysis shows that the maximum value share is taken by milk producers then followed by milk processors, milk chilling Centers, VMCC, wholesalers and retailers

Table 17: Value Share (per liter milk)

Actors Name	Cow Milk				Buffalo Milk			
	Buying price	Selling price	Added value	Value share %	Buying price	Selling price	Added value	Value share %
Producer		14.6	14.6	49		21	21	52
VMCC	14.6	16.9	2.3	8	21	25.9	4.9	12
Milk chilling Center	16.9	19.9	3	10	25.9	29.9	4	10
Milk processor	19.9	28	8.1	27	29.9	38	8.1	20
wholesaler	28	29	1	3	38	39	1	3
Retailer	29	30	1	3	38	39	1	3
consumer	30				39			

Source: Survey, Interviews 2011

3.8 Research finding at Warana union

3.8.1 Milk procurement quantity of chilling Centers

At present Warana union is operating two chilling Centers, one is in dry land area of Sangli district, while another is in well irrigated area of Kolhapur district and the average per day milk procurement of these respective chilling Centers is 38000 liters and 15000 liters.

3.8.2 Milk chilling Center cost

Warana union has rented one chilling unit on price Rs 90,000/month, while other chilling unit is bought from private processor on price Rs 7,000,000. Both chilling Centers have the capacity of 50000 liters/day. The fixed costs and Variable costs of both chilling units are as following.

Table 18: Fixed cost of Warana union chilling Centers

No	Fixed cost	Irrigated land chilling Center(Rs.)	Dry land chilling Center (Rs.)
1	Depreciation cost./month	20833	90000(Rent)
2	Calculated cost of interest (10%) /month	58333	
3	Maintains cost ./month	11666	11666
	Total cost /month	90833	101666

Source: Interviews at Warana union

Table 19: Variable costs of Warana Union chilling Centers

No.	variable	Irrigated land chilling Center (Rs.)	Dry land chilling Center(Rs.)
1	Transport local /liter	1.70	1.60
2	Transport to main processing unit/liter	0.40	0.30
3	Labor cost /liter	0.80	0.70
4	Chilling cost /liter	0.20	0.20
5	veterinary and inputs /liter	0.15	0.15
	Total cost /liter	3.25	2.95

Source: Warana Union annual report 2010

3.8.3 Warana union Milk rate

Warana union is giving per liter fix commission to VMCC, the average commission for cow and buffalo milk is Rs 0.90 per liter, while for producers milk rate is offered on fat percentage and in addition to this Warana union is also offering certain bonus money to VMCC and producers in Dipwali festival. The Milk rate offered to VMCC and producers are as following.

Table 20: Warana union milk rate

Buffalo milk rate in Rs./ liter			Cow milk rate in Rs./liter		
Fat%	producers	VMCC	Fat%	producers	
6.5	24.50	25.40	3.5	16	16.90
7	26	26.90	4	17	17.90
7.5	27.5	28.40	4.5	18	18.90

Source: Warana union milk payment record, August 2011

3.8.4 Warana union Commission for small scale chilling Center

Warana union is also accepting chilled milk from other milk processors/chilling Centers on commission rate 5 Rs/liter for cow milk and 6 Rs /liter for buffalo milk, this milk is only accepted When it meets Warana union quality standards.

3.9 Cost benefit analysis

3.9.1 Cost benefit analysis of Competitors milk chilling Center

Warana union competitors in DLASD are selling milk on commission rate 3.50 Rs/liter (Average 3&4). The average milk procurement of all Chilling Centers is 11750 liters/day, if we assume the fixed cost of competitors chilling Centers by taking consideration of fixed cost of Warana union chilling Center, then cost benefit analysis of the Competitors chilling Center will be as follow

Table 21: Cost benefit analysis of competitors milk chilling centers

	Description	Rupees
1.	Fixed cost per month (Based on Warana union chilling Center)	90,833
2.	Variable cost per month = 352,500 liters *2.20Rs <ul style="list-style-type: none">• 2.20Rs/lit (Average figure)• Average milk procurement 11750 lit /day	775,500
	Total cost per month	866,333
1	Revenue per month=352500 liters*3.50 Rs <ul style="list-style-type: none">• Milk sell = 11750 Liters/day• Commission =3.50 Rs/Liter	1,233,750
	Net profit per month	367,417 Rs. =5652 Euro

3.9.2 Cost benefit analysis for Warana union chilling Center

If we consider the fixed cost and variable cost of current functioning Warana union chilling Center as a standard, while predicted milk procurement of Warana union will be 26000 liters /day and this predicted milk quantity will reduce buying quantity of milk from other chilling unit on commission rate 5.50 Rs/liter, then cost benefit analysis for Warana union chilling Center in dry land of Satara district will be as following.

Table 22: Cost benefit analysis for own established chilling Center in DLASD

	Description	Rupees
	Cost	
1	Fixed cost per month(Based on Warana union chilling Center)	90,883
2	Variable cost for month =780,000 liters *3 Rs <ul style="list-style-type: none"> • Variable cost =3 Rs/liter (Based on Ave. Figure of Warana union chilling Center) • Milk procurement=26000 liters/day (assumption) 	2,340,000
	Total cost per month	2,430,883
	Revenue per month	
1	Milk Buying quantity save from other chilling Center = 780,000 liters/month <ul style="list-style-type: none"> • Average buying rate = 5.50 Rs /liter 	4,290,000
	Net profit per month	1,859,117 =28600 Euro

Table 23: Cost benefit analysis for Rented chilling Center from partner

	Description	Rupees
	cost	
1	Fixed cost(Rent)	70,000
2	Maintains cost (Based on Warana chilling Center)	11,666
3	Variable cost =780,000*3 <ul style="list-style-type: none"> • 3 Rs/lit (Based on Average figure Warana union chilling Center) 	2,340,000
	Total cost per month	2,421,666
1	Revenue per month	
	Milk buying save from other chilling Center =780,000 liters/month <ul style="list-style-type: none"> • Average buying rate = 5.50 Rs /liter 	4,290,000
	Net profit per month	1,868,334 =28743 Euro

Chapter 4: Discussion

4.1 Milk chains in dry land area of Satara district

There are two types' milk chains in dry land area of Satara district, one is formal and another is informal chain. Informal chain is very short while formal chain is longer. At producer level 9% milk is sold informally while at VMCC level only 2% milk Sold informally. This informal milk sale is at local village level not in city. The quantity of informal milk sale is low mainly due to non-availability of nearby urban market, similar observation stated by Bhora et al.,(2003), that formal milk chain become stronger when there is no market available at near milk production, same argument is also given by Berg (2010) that location of dairy plant should be far from city so that producer will not deliver their milk in city but it will come to dairy plant, looking at this scenario in DLASD, this will be positive factor for Warana union that formal chain in this area is stronger than informal chain, because Sirohi et al. (2009) also observed that one of main reason of milk procurement failure for Assam dairy was that producer had several informal options to sell their milk.

4.2 Opportunities for Warana union at milk production level

4.2.1 Positive aspects for Warana milk union at production level

4.2.1.1 Land holding Size

Land holding capacity of milk producer in DLASD is 11.9 Acres which is better, compare to other sub-districts of Satara and Warana's milk procurement area (3.6 acre). Sufficient land availability means more opportunity to grow fodder crops and increase milk production. Lembhe (2010), also stated that in Warana area, the low land holding capacity of farmers made them unable to grow special fodder for animals and this is limiting factors to increase number of animals and milk production in Warana area.

4.2.1.2 Good quality fodder

In DLASD the main roughage has given to animals are sorghum, maize and Bajara while in Warana area the main source of fodder is sugar cane top, sugarcane leaves, paddy and wheat straw. The nutritive value of maize and sorghum fodder is better than Sugar cane top (Chamberlain,1996). Lembhe (2010) also observed reason of low milk production in Warana area was feeding only sugarcane top and straws to animals. Misra et al., (2007), conducted case study on dry land villages from Mahabubnagar and Anantpur district of Andhra Pradesh and Tumkur district from Karnataka state. He found that average rainfall in these areas was 520 mm and major crops in these areas were maize and sorghum which is main fodder in this area. He stated that these dry land areas have the potential to improve milk production and livestock development is possible by improving feed and fodder resources and providing proper input support and services to milk producers.

The all above facts show that there are opportunities to improve milk production in dry land area of Satara district by improving animal nutrition.

4.2.1.3 Agriculture crops and dairy business

In Warana area the main crop is sugar cane whiles in DLASD the major crops are maize and sorghum. The average annual income from sugar cane (Rs 100000/acre) is five times more than annual income from sorghum and maize (Rs 20000/ Acre), due to this reason farmers in Warana area are biased more to agriculture than dairy business. Same observation noted by Lembhe (2010) that in Warana area number of animals is decreasing due to more income from agriculture than dairy business. This is a positive factor for milk production enhancement in DLASD, as income from agriculture is low, so farmers in this area can divert towards dairy business.

4.2.1.4 Farmers willingness to join Warana union

In DLASD 83 % milk producers know Warana union and 62 % are interested to join Warana, on the contrary only 32% farmers know the name of their milk delivering organization. The 62%farmers also realizing that current services and prices given to them are not satisfactory and looking opportunities to deliver their milk to such processor who can give better milk prices and services This 62% producer's response to join Warana is showing that the environment for Warana union is highly favorable at producer (supplier) level.

4.2.1.5 Better milk production of cross breed cow

In dry land area of Satara district average milk production of cross breed cow is 7.5 liters/day while in Warana area milk production of cross breed cow is 3.84 liters/day(Lembhe,2010), this shows the performance of cross breed cow in DLASD is far better than cross breed cow in Warana area, The main reason behind it is better quality of fodder in DLASD than Warana area, this will very positive factor for boosting milk production in this area by purchasing of cross breed animals and by extensive operating cross breeding program. Berg (1990), also stated that the cross breed animal is showing better performance in tropical country, so cross breeding program is best policy to improve milk production in tropical country.

4.2.2 Strong points of Warana union at milk production level

4.2.2.1 Better milk prices to producers

In dry land area of Satara district milk prices given on species basis as cow and buffalo milk and paid on every 15 days. The average milk price per liter of milk for cow and buffalo milk is Rs 14.60 and Rs 21 respectively. The milk prices by Warana Union are given on fat percentage and paid on every 10 days. The average prices per liter of cow and buffalo milk is Rs 17 and Rs 26 respectively, in additional to this Warana union is also giving bonus price of Rs 0.25 to Rs 1 per liter during Diwali festival. This means milk producers in Satara district are getting Rs 2.65 for cow and Rs 6 for buffalo milk less than Warana area. Looking at this two fact difference, this will be positive aspect for Warana union that farmers will divert their milk delivering channel towards union, similar argument is also given by Thirunavukarasu and Sudeepkumar (2005), they studied different market option for dairy farmers in Tamilnadu state, they concluded that regular prompt better payment was major attraction for shifting from one channel to other channel.

4.2.2.2 Better Inputs and support services to producers

In dry land area of Satara district, 68 % farmers do not know name of milk Chilling Center to whom they deliver their milk. There is no any direct contact between Chilling Center and milk producer and no support services are given to milk producers while in Warana area veterinary and extension services are very prompt and easily available to the farmers doorstep and there is regular interaction between Chilling Center, VMCC and milk producer. Similar argument stated by Bhandopadhyay (1996), he observed performance of two different milk union namely Amul and Himul, he found that Amul milk union performance was better than Himul dairy, the main reason was that Amul was giving better milk prices, in additional also provides inputs and extension services to milk producers.

4.2.3 Policy support

Maharashtra state government has recently declared milk production enhancement policy under which around 60-70 milk producers will get 50% subsidy for purchase of 6 dairy animals either cattle or buffalo.

4.3 Needs for Warana union at milk production level

4.3.1 Negative aspects for Warana union at milk production level

4.3.1.1 Low milk production of buffalo

The 42 % population of dairy animal is of buffalo in dry land area of Satara districts but the milk procurement at VMCC Level is only 15%, the main reason behind it is of low production per animal and 95 % producers like to keep buffalo milk for home consumption. The buffalo milk production in DLASD area is 2.1 liters/day. The main causes for low milk production are as follow.

Breed type

In DLASD there are almost 99 % buffaloes are of local ND buffalo. The production level of this type of animal is very low as compare to Murrha and Mehsana type of buffalo (Saxena, 2000). In Warana area purchasing of Murrha and mehsana buffalo from other state is going on since last 16 years and effective cross breeding programme is also conducted with the help of strong A I technician network since more than last 20 years while cross breeding is not effectively done in DLASD due to lack of effective A I network, high cost of available A I service, unavailability of timely A I. However in Warana area number of Murrha buffalo is declining due to infertility problem (Lembhe 2010), so in DLASD breed up gradation of local ND buffalo through use of local pure breed pandharpuri or Murrha semen and effective implementation of cross breeding program in cattle can help to increase milk production as Berg (1990), stated that cross breeding is best policy for the improvement of milk production in local situation.

Inadequate nutrition – There is sufficient amount of green and dry roughage available in winter and dry season but in summer season 75 % animals are facing problem of shortage of roughage and high cost the concentrate leading to poor or inadequate nutrition which ultimately leads to low milk production.

Field research finding shows that the average land holding capacity for producers in DLASD area is 11.9 Acres and in rainy season there is sufficient water for growing fodder crops like sorghum and maize, so farmers can grow these crops in more quantity in rainy and winter season and good quality hay can be prepared, stored and used in summer season (Singh, 2009). The digestion can be improved by feeding UMB (Urea Molasses Block) which has better results in dry land area. Those UMB can be produced at low cost as molasses from Warana Sugar factory can be available at least cost because Warana Sugar factory being a part of Warana Cooperative complex can provides molasses at cheaper rate for this project. This UMB can be made available to milk producers on no profit no loss basis. The feeding of UMB with dry roughage will improve the dry matter intake and nutrition of animals(Kar et al. 2009), however for high yield animals UMB with dry roughage is not sufficient diet, they also need to feed appropriate amount of concentrate (Kar et al.,2009), so making concentrate available at reasonable cost is also important. There is also need to fallow training and extension activity extensively, so these farmers can learn different fodder preservation methods, crop residue utilization methods and importance of animal nutrition (Singh, 2008)

High inter calving and dry period

Inter calving period of local buffalo is 562 days and dry period is 168 days which automatically led to per day low milk production and high milk unproductive periods. This high inter calving period is mainly due to inadequate nutrition and unawareness of producers in heat detection and fertility status management, so for this Warana union is needed to arrange fertility improvement program, so that farmer will gets awareness about nutrition and fertility management practices.

4.3.1.2 Number of non milking animals available

Khillar breed cows and bulls are competing with milking animals in dry land area of Satara districts. It seems that producers in this area are in favor of keeping khillar type of animals mainly due to spiritual and economic issue. The economic value of khillar bull is more than milking buffalo and cross breed cow, in additional to this khillar breed has better immunity and fertility status than buffalo and cross breed cow. So in near future it seems difficult to replace this khillar by milking animal. Berg(1990), also stated same thing that local breed of animal should never be underestimated because it has some strong advantage at local circumstances, he also stated that crossbreeding program with local breed animal can boost milk production. But here it seems that this option is also looking difficult to come into action due to above mentioned issues. So in future for improvement of cow milk production, Warana union needs to assist to producers purchase cross breed animals from other area.

4.3.2 Requirements of producers

4.3.2.1 Financial support

The producers in DLASD are expecting finance support for purchasing of animal, this expectation is from Rs 20000 to 50000 per producers on interest rate of 0 to 10 % .Currently no single milk union is providing financial support to producers but Warana Union is providing finance to milk producers for milk animal purchase on low interest of 10%(Lembhe, 2010). For finance support it is necessary to see the producer's previous performance in dairy business and roughage availability, because in DLASD 75 % producers are facing shortage of roughage in summer season and for successful dairy business ad-lib roughage availability is essential

(Berg,1990). Lembhe (2010), also stated same things that Warana union purchased number of Murrha buffaloes from other state but because of high yielding capacity and heavy size farmers could not feed adlib fodder to Murrha buffalo leading to fertility problems and culling of animal.

Opinion 8: Warana union expertise told that previously union made some mistake in dairy animal purchase policy, union was giving money for dairy animal purchase on subsidy and without interest. Under this scheme many farmers bought animals who had not any experience of rearing dairy animals and had not made any arrangement of fodder availability resulting into low milk production and fertility problems.

4.3.2.2 Better milk prices

Milk producers in DLASD are asking average prices for cow milk Rs 19 /liter and for buffalo milk Rs 25/liter, however Warana union already is offering average milk prices for cow milk Rs17/liter and for buffalo milk Rs27.5/liter In addition to this Warana is also giving bonus milk price of Rs. 0.25 -1.20 /liter Looking at producers demand in DLASD and Warana's milk prices it seems that there is only need for negotiation in cow milk prices.

4.3.2.3 Inputs and veterinary services

Producers in DLASD are asking cheap inputs and veterinary services, the requested price of concentrate is Rs 9/kg. Presently Warana is supplying concentrate at the rate of Rs 9.60/kg and concentrate prices in DLASD are Rs 13.67/kg. If we compare these concentrate prices it is clear that concentrate prices in DLASD are Rs. 4 expensive than Warana area. So it can be concluded that it is not difficult task for Warana union to convince milk producers for concentrate price demand.

In DLASD there is the serious problem of veterinary service, the average requested cost of veterinary service is Rs.78/visit while Warana union is offering this service at the cost of Rs. 50/visit (Lembhe, 2010), so to meet this requirement is not a difficult task for Warana union

4.3.3 Threats at milk production level

DLASD is a drought prone area. During the period of year 2003, there was a severe drought in this area and there was huge shortage of fodder resulting into high prices of fodder and sale of dairy animals for slaughter (www.cidi.org/report). Same thing can happen in future and good milking animals can go for slaughter and producers can face serious economic losses and also affecting milk procurement of union. So Warana Union must have plan ready to handle such situation successfully.

4.4 Opportunities for Warana union at milk procurement level

4.4.1 Positive aspects for Warana union at milk procurement level

4.4.1.1 VMCC Non contract with union

In DLASD no single VMCC has contract with union while in Warana union area all VMCC have contract with processors, in contract procedure 0.20 Rs./ liters money deduction is done from VMCC milk payment as a deposit money and only interest on that money is given back to VMCC annually. In Lembhe (2010) research, he puts hypothesis that Warana union milk procurement is decreased due to diversion of VMCC, but he found that actual diversion of VMCC was not so much, might be due to this contract, but VMCC members have formed new society and delivered their milk to another Milk Union. In DLASD such contract does not exist so for Warana union it will be comparatively easy task to divert VMCC.

4.4.1.2 VMCC willingness to join Warana union and Milk procurement quantity

DLASD 36 % VMCC are interested to join Warana union. Currently total milk procurement in DLASD is 94000 liters./day, that means Warana union has chance to get about 26000 liters milk per day, if we compare this predicted milk procurement quantity with previously established units milk procurement quantity(38000& 15000 liters/day) then it seems good start for Warana.

4.4.2 Strong points of Warana union at milk procurement level

4.4.2.1 Strong logistics arrangement

In DLASD, Milk transportation is done by VMCC, while in Warana area milk transport is arranged by Warana Union itself. The major disadvantages of first type of transport system is that information flow goes only from chilling center to VMCC but from VMCC to chilling center information flow is less as a result chilling center fails to make strong attachment with VMCC and producers which affects negatively on milk procurement quantity and quality, similar statement is given by Chandra and Jain (2007), they stated that Amul union is unique example of logistics system for milk procurement from small holder farmers, in which small holder delivers their milk at village milk collection centre, then it transferred to either chilling Center or directly processing unit, the logistics information is provided through personal contact, internet or telephone, this system makes milk union to collect high quality milk efficiently.

4.4.2.2 Marketing problem and procurement

All milk chilling centre in DLASD do not have their own marketing channel, they are supplying milk on commission basis to other big milk processors like Warana union, so they can procure more milk if there is demand from those milk processor, but if there is no demand from processor or they offer low prices (specially this can happens in flush period), in this situation chilling centers cannot procure more milk. This can be positive aspect for Warana union to divert VCMM and producers by assuring the milk procurement. A Similar observation was made by Thirunavukarasu and Sudeepkumar (2005), in Tamilnadu state; they stated that one reason for change in milk selling channel from Vendors to co-operative was that Vendors did not assure to procure milk from producers in flush season, simply because vendors could not find market in flush season.

4.4.2.3. Better milk prices and input services

For 4 % fat chilling centers in DLASD are offering Rs 16.90/liter while Warana union is offering Rs 17.90/liter. The Warana union is also providing fat testing machine, computer on 50% subsidy while none of chilling center in DLASD is providing inputs on subsidy. Both this points will help for Warana union to divert VMCC specially those are functioning transparently

4.5. Needs for Warana union at milk procurement level

4.5.1 Negative aspects for Warana union at milk procurement level

4.5.1.1 Non transparency of VMCC

In DLASD about 85 % VMCC are giving milk payment to the producers on the species basis (cow& buffalo), but they are getting selling price on fat percentage. If we compare DLASD and Warana area VMCC milk prices, then it shows that there is more difference in added value of VMCC in DLASD than Warana area. (See Table No.24)

Table 24: VMCC Milk buying and selling rate in Warana union area

	Cow milk (4% fat)		Buffalo milk (7%)	
	DLASD	Warana union	DLASD	Warana union area
Milk buying rate in Rs./liter	14.60	17	21	26
Milk selling rate in Rs./liter	16.90	17.90	25.90	26.90
Added value in Rs /liter	2.30	0.90	4.90	0.90

In DLASD 83% VMCC are not giving milk record sheet to producers. These all three facts indicate that VMCC in DLASD are not transparent.

In Warana union area every village has the five to six co-operatives and private VMCC (Lembhe 2010), these co-operatives are following rules and giving better milk prices to the producers and because this private VMCC are enforced to give competitive milk prices to milk producers, so both cooperative and private VMCC in Warana area are transparent.

In DLASD every village has average 2 VMCC and out of that 87 % not registered means they are private owned. They are deciding prices given to producers because of having power of transport facilities, they are getting more profit than Warana union area only because of arranging this transport facility, similar thing stated by KIIT and IIR (2010), that, at Chepokorio place in keiyo district of Kenya the middlemen /vendors were doing only one function of milk transport and taking maximum benefit in milk chain. In that situation Elreco development

organization mobilizes producers to build co-operative and arranges transport for delivering milk, as a result of these activities those producers get more benefit.

Berg (1990), also stated that, prices given to farmers depend upon the competition within the middle man, if there is monopoly of middleman or they are few in numbers, the milk prices given to farmers are not favorable.

4.5.1.2 VMCC non willingness to join Warana union

In DLASD 46 % VMCC are not interested to join Warana union, reasons explain by VMCC representatives were strict rules and low margin from Warana. Table No.24 shows VMCC at dry land area of Satara district are getting more margin than Warana union area. In DLASD milk chilling centers do not have any control over milk prices given to producers and because of this 46% VMCC want to continue the same situation in future, so they can earn more money without any regulations, similar situation expressed by KIIT and IIR, they stated that at Chepokorio in keiyo district of Kenya, farmers was not getting fair milk prices from vendors and there was mistrust relation between farmers and vendors, but when Elreco development organization mobilizes the farmers to build co-operative society for dairy business, then producers start to get better milk prices as a result vendors also started to give good milk prices to producers and some vendors also start to deliver their milk to processors.

4.5.1.3. Low quality Milk supply

In DLASD Milk chilling centers are paying transport cost to VMCC on per liter basis, so for saving fuel cost and earning more money, 90% VMCC are supplying milk to chilling centers once a day, this might hamper the milk quality (Berg, 1990). Average milk rejection per VMCC is 14 times/year while average milk rejection in Warana union area is 9 times/year, although Warana union is strict on milk quality issue. In DLASD 9 % VMCC are doing adulteration in milk, this two fact indicate there is more quality problem in DLASD than Warana union area, this problem might be due to absence of strict rules and transparency in quality checking system. None of milk chilling center employee is coming for checking milk quality at VMCC level and some of VMCC are doing adulteration by managing chilling center employee. In Warana union area regularly each day Warana's employee is coming to visit VMCC through transport vehicle so as to avoid adulteration and doing extension activities resulting into better quality milk in Warana area than DLASD.

Berg(1990) also stated that there are different method of milk transporting, it can be transported by supplier themselves or can be picked by dairy plant, but it is always advisable to organize milk collection by dairy plant itself, it has the advantages that plant has full control of running, the collection can done according to casual and the plant can collect milk as early as possible and it will help to maintain quality The transport cost for milk collection can be reduced by applying effective milk collection method

4.5.2. Demand of VMCC

Finance support is major demand expressed by VMCC, this demand varies from Rs 25000 to 100000/100 liters of milk supply on interest rate 0 to 10%, out of this 65% VMCC are going to use this support for personal purpose while 35% are going to use for purchasing of dairy animals for producers, this second category VMCC will be more favorable for Warana union than first category because Warana union can full fill demand of both VMCC and producers at a

time by giving finance support for animal purchasing, this strategy will be helpful to develop milk procurement chain. This finance support can be arranged like Reliance Fresh company arranged in Tamilnadu state of India (KIIT&IIR2010), they make contract between farmers, VMCC and company that they will assures milk delivery to company and company will assures the loan repayment .The same formula can be used to first category of VMCC by making contract and checking quantity of milk supply.

4.5.3. Strong points of competitors at milk procurement level

Strong point of competitors in DLASD is that they are local and have already networking with VMCC, they are able to sell low quality milk to other processors, so they can accept even low quality milk from VMCC, this strategy will help them to make stronger relation with VMCC, while for Warana union it is not possible to accept such low quality milk, so VMCC will not be happy with Warana with this kind of milk procurement strategy. For this problem Warana union needs to follow strategy stated by Berg(1990), he stated that for good quality milk extra rewards should be given, so that supplier will pay much more attentions to supply high hygienic quality milk.

4.5.4. Threats for Warana union at milk procurement level

There are several big milk processors in surrounded area of Satara district and they are competing strongly to each other (Ghanekar, 2007), every big processor is looking opportunities to capture new area to enhance milk procurement. In future they can enter in this area for milk procurement, so for Warana union it is needed to make strong network with milk producers by making contract and providing competitive prices, inputs and services to supplier (Ghanekar, 2007)

4.6. Opportunities for Warana union at milk chilling center level

4.6.1. Positive aspects for Warana union at milk chilling Center level

4.6.1.1. Partners Availability

Bhaskar and Harnai two milk chilling centers in DLASD are agreed to make partnership with Warana union, current location of this chilling Center is in eastern part, so water and electricity supply is satisfactory. Currently Bhaskar's milk procurement is 7000 liters/day while Harnai's procurement is only 3000 liters/day. Chilling capacity of Bhaskar is 50000 liters/day while Harnai's processing capacity is 25000 liters/day, so Bhaskar chilling center can become good partner for Warana union, because it has more procurement and capacity than Harnai, same statement is also given by Berg(1990), that it is always advisable for chilling center to have the excess capacity than actual collection, so in future growth in collection can be cover.

The demanded rent of Bhaskar is lower than current operating chilling Center (See Table 16 &18), so it will be cheaper deal for Warana union.

4.6.1.2. Satisfactory Third party services

Water supply and ground water availability in eastern part of DLASD (Man sub-district) is in safe position whiles in western part is semi critical. Out of eight chilling Center six chilling Centers are in this eastern part of DLASD and they have a sufficient amount of water for running chilling

Center, while two chilling Centers are in the western part of DLASD and out of these two one chilling Center is facing shortage of water, looking at this scenario Center location will favorable in eastern part of DLASD.

4.6.1.3. Non Political interference

According to chilling Center Managers opinions, there is no political interference in dairy sector. This situation will help Warana union to do dairy business safely, there are several examples that due to political interference organizations collapse, one of the example was in Kenya that due to political interference the co-operative sector in Chepokioria of keiyo district collapsed badly (KIIT and IIR,2010).

4.6.1.4. Cheap Manpower availability

In DLASD Unskilled manpower availability is enough while there is a shortage of skilled manpower availability. If salary of employees in DLASD compared with Warana union employee salary, it seems almost half of the Warana union employees. Hence Warana union has the opportunity to get staff at cheaper rate.

Table 25: Staff salaries in Warana union and DLASD

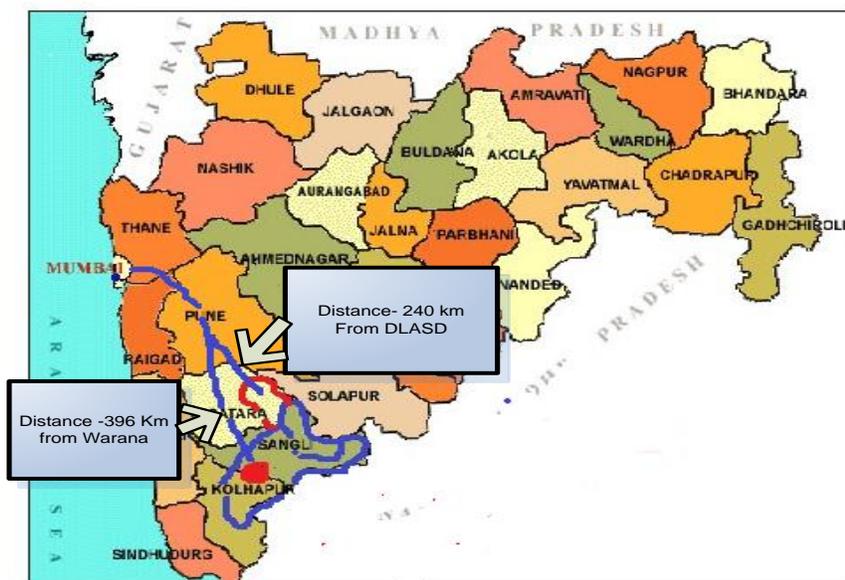
Salary given to staff in DLASD/month			Salary given to staff in Warana union /month		
Labor	Officer	Manager	Labor	Officer	Manager
3187	6046	12000	11000	24000	40000

Source: Field interview 2011.

4.6.1.5. Center location and saving of transport cost

As described in Chapter No. 2.1, For Mumbai market Warana union is sending chilled milk to Mumbai plant through milk tanker. This DLASD is close to Mumbai than Warana area, so transport cost can be saved by sending milk directly to Mumbai plant, ultimately it increases profit margin for Warana union (See Figure 29)

Figure 29: Location of chilling Center from Mumbai



4.6.2 Corporate social responsibility

The main goal of Warana union is to improve the socio-economic condition of producers through dairy business, In Maharashtra state since from year 1999 up to 2007, nearly 90,000 farmers committed suicide due to economic losses in agriculture business (Jadhav, 2008) and more than 95% suicides were from drought prone areas of Maharashtra state.

If Warana union develops dairy sub-sector strongly in this area, it will be a role model for other drought prone area of state, it will help to improve economic condition of producers, as experienced in kolar district of Karnataka state (Rajendran, 2009), which is drought prone but it provides almost 20 % whole state milk production and this only happen due to strong co-operative development.

4.6.3 Comparatively Weak competitors in DLASD

In DLASD all eight milk chilling centers are private and their daily milk chilling capacity is not more than 50000 liters, they are doing only one function of milk chilling and does not have own marketing channel, they are not giving any inputs and support services to producers, while In Warana union area there are 9 milk processors, in which three milk unions are co-operative and captured domestic as well as international market. In Lembhe (2010), research found that Warana's main competitor Gokul has more procurement than Warana union and competing with Warana in every part of chain. If we compare these strong competitors, the competitors in DLASD are very weak for Warana union.

4.7 Needs for Warana union at milk chilling Center level

4.7.1 Negative aspects for Warana union at chilling Center level

4.7.1.1 Number of chilling Centers

There are total eight milk chilling centers in DLASD and procuring milk from 3000 liter to 17000 liters/day, due to this small quantity, the procurement and marketing cost is high and they are unable to develop their own marketing channel. The other bad effect of having more number of chilling centers is VMCC have several options for selling their milk, low quality milk rejected by one chilling center is accepted by other one, as result milk quality is not improving in this area, similar statement is given by Ghanekar (2008), that in Maharashtra state, in one district several milk union are competing to each other, as result of this the marketing and procurement cost is increasing, He recommended that for further dairy development in Maharashtra state, there should be better co-ordination between different milk unions for the milk procurement and marketing,

Looking at above two research finding, Warana union is needed to make co-ordination /partnership with other chilling centers to reduce milk procurement cost and improve milk quality

4.7.1.2 Skillful labor shortage

In DLASD 75% milk chilling Centers have the shortage of skillful labor, the one reasons might be that, the salary has given in this area is low as compare other milk Chilling Center, another reason is this area is not well developed, due to this reason skillful employees might not be interested to work in this area, so for Warana union in future it is required to hire skillful employee and give better facilities and salary to them.

4.7.2 Threats at chilling Center level

Although currently there is satisfactory electricity supply in DLASD, but in future their might be shortage of electricity supply because industrial development in other parts of state is going very fast which can affect electricity supply in this area, for this Warana union will be needed to make arrangement of electricity supply.

This is drought prone area and irrigation system is not well developed. It may happen that in coming years there will be low rainfall and can cause shortage of water for chilling Center. To overcome this problem Warana union needs to arrange promising water resources to the chilling Center.

4.8 Chilling Center Economic Viability

The cost benefit analysis in table No. 21 shows that chilling Centers having milk procurement more than 11750 liters /day are economically viable in this area. If Warana union take chilling Center on rent or establish own chilling Center and the milk procurement is more than 11750 liters, then chilling Center will function in profit.

If Warana union procures milk as per according survey assumption (26000 liters/day), then union has the opportunity to earn big profit. (See Table No.22 and 23).

Chapter 5: Conclusion and Recommendations

5.1 Milk chains in dry land area of Satara district

In Dry land area of Satara District, formal milk chain is stronger than informal milk chain mainly due to unavailability of easily accessible urban market. Procurement milk chain is co-ordinate by private milk chilling centers and they do not have their own market channel. There is a weak linkage among actors involved in milk procurement chain. In addition, there are no proper rules and regulations by chilling centers, no proper information flow and lack of transparency resulting into mistrust relationship among actors involved in the milk procurement chain

5.2 Opportunities for Warana union at producer level

1. In DLASD 62% producers are interested to join Warana union, indicating that Warana union has an opportunity to enhance milk procurement by diverting these producers through existing VMCC or by building up co-operative milk collection societies.
2. Milk production Performance of cross-breed cow is better in DLASD than Warana area, showing that Warana union has an opportunity to enhance milk procurement by increasing number of cross-breed cows in DLASD.
3. In DLASD Producers have more land holding than Warana area and producing good quality roughage. By taking advantage of more land holding, fodder production can be increased and quality can be improved by using new improved varieties of fodder, thus number of animals and milk production can be increased
4. Competitors milk prices and support services at producers' level are comparatively weaker than Warana union, so there is an opportunity for Warana union to divert producers on milk price and support basis.

5.3 Needs and recommendations for Warana union at producer level

1. Buffalo milk production is very low mainly due to low yielding local ND buffalo and inadequate nutrition, so there is a need to increase buffalo milk production by breed up-gradation and nutritional development program.
2. In DLASD number of buffaloes and cross breed cows are 42% and 17% respectively however milk procurement is 15% and 85% respectively, indicating that there is need to replace local buffalo by cross breed cow.
3. There is a shortage of roughage in summer season and in order to compensate this shortage, Warana union needs to conduct various extension activities like use of different fodder preservation methods, urea straw treatment and use of industrial by product. There is also need to give concentrate and UMB on fair price.

5.4 Opportunities for Warana union at procurement level

1. In DLASD 36% VMCC are interested to join Warana union and there is a possibility to get 26000 liters of milk per day from those VMCC.

2. There is no contract system between chilling centers and VMCC in DLASD, so there is an opportunity to divert those VMCC towards Warana Union.
3. The competitors does not have own marketing channel and market power, so there is a chance to get these competitors milk or to make partnership with them
4. The competitor at procurement level is weaker than Warana area, so more chances to dominate on competitor at milk procurement level.

5.5 Needs and recommendations for Warana union at procurement level

1. Milk quality is low at procurement level due to pouring of stale milk, one time procurement and adulteration has done by VMCC. To avoid this, Warana needs to arrange own transport for two time milk collection, or to establish bulk milk cooler (BMC) at village level. To control adulteration Warana has to enforce its own system with strict rules and regulations like Warana area. Also there is a strong need of extension activities at procurement level and give extra reward to those VMCC supplying good quality milk.
2. In DLASD 46% VMCC are not interested to join Warana, in this case it is necessary for Warana union to build co-operative milk collection Centre in same villages and give competitive milk prices and support services to milk producer.
3. VMCC are demanding financial support for animal purchasing and private use but it is advisable to give this financial support to those VMCC who are going to purchase animals.

5.6 Opportunities for Warana union at milk chilling Center level.

1. In DLASD two chilling Centers are ready for partnership on cost saving basis, so Warana union does not need big investment for expansion in this area and another opportunity is to get those partners milk.
2. Third party services and cheap labor availability is satisfactory in DLASD, these can reduces the running cost of the chilling Center.
3. There is a scope for dairy development because of low political disturbance in DLASD.
4. There is also opportunity to improve Warana's union social image by giving better milk prices, supports to producers and employment to rural poor people in this area.

5.7 Needs and recommendations for Warana union at milk chilling Center level

1. In DLASD number and capacity of handling milk of chilling Centers is high but quantity of milk procurement is low leading to high procurement cost. It is essential for Warana union to co-ordinate among all chilling Center, in order to reduce the cost of milk procurement and marketing.
2. There is a threat for the shortage of electricity in future, so Warana union needs to arrange its own electricity source.

Overall field and desk research findings conclude that Warana union has more positive aspects at milk production and chilling Center level. On the contrary, at milk procurement level, there are certain challenges like low milk quality supply, non-transparency of VMCC and 46% VMCC are not interested to join Warana.

The research shows that expansion of WARANA UNION procurement chain in DLASD will be socially, technically and economically viable. It is recommended for the organization to take steps before competitors grab the opportunity.

5.8. Further research

During this research project, in literature review, it found that in neighboring Karnataka state, Kolar district is drought prone but it produces 20 % milk of whole Karnataka state (Rajendran, 2009), so it will be interesting to do further study, why and how this district is successful in dairy business in adverse circumstances, this study will help to develop dairy business in many drought prone districts of Maharashtra state.

5.9. Limitations of the Thesis

The research may not represent the entire range of stakeholders. At producer level data has been not collected sufficiently due to shortage of time. The cost benefit analysis may change over the time. My own experience, which is mostly at field level, may also lead to lack of clarity in expressing the concepts related to research in an academic language.

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ANNEX

ANNEX1: Questionnaire for Milk Producers

Name of producer:

Date:

Sex:

Age:

Village:

Name of VMCC:

Name of milk union:

No.	Questions	Options	Answers
Q.1	Number and Breeds of animal		
	1.1. How many animals you have?	1.Crossbreed cows	
		2.Murrha/Meshana buffaloes	
		3.local buffaloes	
		4.local cows	
		5.other /bulls/calfs	
		Total	
	1.2. Please explain reasons for keeping local breed?		
Q.2.	Feeding trend		
	2.1. How many acres you have land?		
	2.2. How many acres you keep land for fodder purpose?		
	2.3. What types of fodder is grown in your land?		
	2.4. How is roughage availability in three seasons? a)Sufficient b)Not sufficient	Summer	
		Winter	
		Rainy	
	2.5. What type of feeds you give to animals in each season? a)green only b) dry only c) both	Winter	
		Rainy	
		Summer	
	2.6. What type of concentrate you feed to animals?	concentrate from feed company	
		grains from home production	

		other sources	
	2.7. How many kg concentrate you feed to animals?		
	2.8. What is price of concentrate?	Grains	
		Concentrate	
Q.3	Milk quantity ,quality and prices		
	3.1What is average per day and per lactation yield?	Crossbreed cow	
		Local cows	
		Local buffalo	
		Murrha/Meshana Buffalo	
	3.2. What is normal distribution of produced milk?	Home consumption	
		Sell to VMCC	
		Sell to vendors	
		Calf feed	
	3.3. What is average milk prices you get?	Buffalo milk	
		Cow milk	
	3.4. What is a criterion for this milk price?	Fat percentage	
		on species base (buffalo./cow)	
	3.5. What is milk delivering mode?	Deliver to VMCC	
		Home collection	
	3.6. What is distance for milk delivering?		
	3.7. How many times you deliver milk to VMCC every day?	One/day	
		Twice/day	
	3.8. Do you wash udder of animal before milking?	Yes /No	
Q.4	Fertility status		
	4.1What is average inter calving period of yours animals?	Crossbreed cow	
		Local cow	
		Local buffalo	
		Murrha/Meshana buffalo	
		Cross breed buffalo	
	4.2. Which method of breeding you use?	AI	
		natural service	
		Both	

	4.3. Reason for using natural breeding service?	Not timely availability	
		Better conception rate	
		Both	
	4.4. Do you feed minerals to animals and how much?	Yes/No	
		Quantity	
Q.5	Support Services		
	5.1. Do you get support from Government? If yes then of what kind?	Yes/No	
	5.2. How far is a veterinary service from your place?		
	5.3. How many time vets visit you in a Month / year?		
	5.4. What is average veterinary cost per visit?		
	5.5. What is average cost per AI?		
	5.6. Do you get finance support from VMCC /union for animal purchasing?	Yes	
		No	
	5.7. How many animals you purchased this year?	cow	
		Buffalo	
	5.8. If no why?	Financial problem	
		low milk prices	
		Not interested	
	5.9. What is source of finance support?	1.Bank 2.Local person 3.Through dairy	
	5.10. How easy to access loan?	1.easily available	
		2.not easy	
Q.6	Warana union joining survey		
	6.1. Which constraints you face in animal husbandry?	1.Finance support	
		2.Input services	
		3.Long distance	
		4.Low price	
		Total	
	6.2.Do you know Warana union co-operative milk union	Yes/No	
	6.3.Are you willing to deliver to your milk to Warana union	Yes / No	
	6.4. If no why?	Political	

		Relationship	
		Satisfied with current milk prices	
		Other	
	6.5. On which basis you are going to deliver your milk	good milk prices	
		good input services	
		Transparency	
		All	
	6.6. What is your Expectation from Warana union? Please specify.	Finance support	
		Input services	
		Home milk collection	
		Good milk prices	
		All	
	6.7. How much milk price you expect from Warana union?	Cow milk	
		Buffalo milk	
	6.8. Do you willing to buy cross breed cow? If no then why not?		
	6.9. On which basis your delivering milk to current channel ?	Political influence	
		Religious	
		prices	
		Collection at home	
		Advance payment	
Q.7.	PESTEC		
	7.1. Do you have any political pressure to deliver milk and if yes from whom?	Yes /No	
		From Whom	
	7.2. Who are involved in maximum in dairy husbandry	Women	
		Men	
		both	
	7.3. Who get milk selling money?	Women	
		Men	
Q.8	Information flow		
	8.1. Do you know name of your milk delivering union?	Yes	
		No	
	8.2. Do you have milk delivering record sheet?	Yes/No	

ANNEX 2: Questionnaire for Village milk collection Center's

Name: -----

Type –co-operatives / private

Village name:

Date-

Milk union Name:----

No.	Questions	Options	Answers
1	How much quantity milk your VMCC procure every day?	Buffalo milk	
		Cow milk	
		Total	
2	What are milk selling channel? And how much quantity?	milk processor	
		local sell	
		direct consumer	
3	How much milk is procured during summer and other seasons?	Summer	
		Other	
4	What are methods of milk procurement?	home collection	
		at bulking place	
		Both	
5	How many times you procure milk per day?	single time	
		both time	
6	How many producers are supplying milk?		
7	What is maximum milk quantity supplied by any milk producer?		
8	What are average prices given to supplier milk?	Buffalo milk	
		Cow milk	
9	What are average milk selling prices?	Buffalo milk	
		Cow milk	
10	On which basis you fix milk price?	Fat	
		On species base (cow/buffalo)	
11	Which quality tests you conduct before receiving milk?	Lactometer	
		Organoleptic	
		Other	

12	What you think about adulteration done by producers?	Not agree	
		Partial agree	
		Agree	
		Strongly agree	
13	How many percentage producers doing adulteration?		
14	What type milk can use in VMCC?	German	
		Stainless steel	
		plastic	
15	What support you get from milk processor? And to what extent?	finance	
		training	
		Inputs	
16	How many times yours milk was rejected by processor or milk union.		
17	What is actual duration of delivering milk to organization		
18	Do you know Warana milk union?		
19	Are you willing to deliver milk to Warana union?	Yes	
		No	
		Cannot answer	
20	If yes on which basis?	Better milk prices	
		Inputs and supports	
		Both	
21	If no why?	Strict rules	
		Low profits	
		Others	
22	Which problems you face and why?		
23	What are demand from Warana union to deliver milk?	Better Milk prices	
		Financial support	
		Transport facilities	
		Inputs on subsidy	

24	Please quantify how much?	Milk prices	
		Financial support/100 lit	
		Transport facilities	
		Inputs on subsidy	
25	What will be use of financial support by you?	animal purchase	
		personal use	
26	Are you willing to make contract with Warana union for deliver milk?	Yes /No	
27	How many options you have to sell your milk and which one you prefer?		
28	What services you offer to your suppliers?	Input services	
		Financial support	
		Vet services	

ANNEX 3: Questionnaire for Milk Chilling Centers

Name of Milk Chilling Center:

Date-

Address:

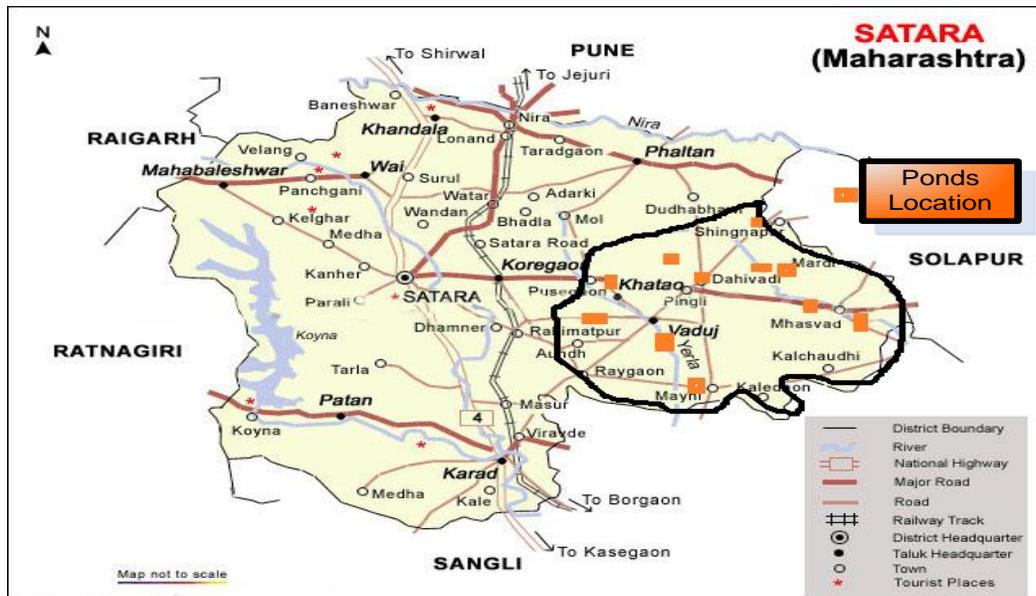
Name of Respondent:

Position of Respondent:

No.	Questions	Options	Answers
1.	What is Capacity of Unit?		
2	What is daily milk procurement quantity?	Cow	
		Buffalo	
		Total	
3.	What is average fat percentage of supplied milk?	Cow	
		buffalo	
4	What is standard milk fat percentage of sale milk?	Cow	
		buffalo	
5.	What is a standard milk selling price?	Cow	
		Buffalo	
6	What are trends at milk payment system?		
7	Where your union is selling milk product and why?	Wholesalers	
		Other processors	
		Direct sell	
8	Do you have milk marketing problem? Please explain		
9.	What are logistics arrangements? Please explain.		
10	What is cost of logistics?		
11	How is information flow managed in milk chain?		
12.	What are supports given to Producers and VMCC?		
13.	What are political Influences in milk chain?		
14	How is skillful and non skillful labors availability?		
15	What are Average salaries to given to labors and officers?		
16	What is fixed cost of chilling Center?		

17	Do you have any quality certification? If yes which one?	yes	
		No	
18	Do you have any control on VMCC for milk prices offer to producers?	No	
		Partial	
		Strong	
19	What you think about adulteration?	No problem	
		Partial problem	
		Problem	
		Serious problem	
20	How much percent of VMCC are doing adulteration?		
21	What is source of water?		
22	How is availability of water sources?		
23	What is quality of third party services?		
24	What are land prices?		
25	What is constraints and challenges in milk procurement chain?		
26	What is your future strategy for dairy business?		
27	Do you willing for partnership?	Strongly agree	
		Partly agree	
		May be	
		Strongly disagree	
28	How much commission/rent you expect from Warana union?		
29	What are other demand from Warana union?		

ANNEX 4: Ponds location in dry land area



Annex5: State government Milk production enhancement policy

No	Criteria	Amount
1	Six cross breed cow /buffalo	40000/animal=240000
2	For construction farm	30000
3	Chaff cutter	25000
4	Feed storage shed	25000
5	Insurance (5.75%)	15184
	Total	335184
	Subsidy by government =50%	167592
	Number of beneficiaries /sub district /year	60

Source: livestock sub district department

