

Final Report

On

Dairy Value Chain Study in Bangladesh



Heifer International Bangladesh

www.heiferbangladesh.org

March 2013

Dairy Value Chain Development in Bangladesh

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EXECUTIVE SUMMARY

Background of the study

Livestock sector particularly the dairy sub-sector provides significant opportunity for income generation and livelihood improvement of the rural mass. There have been wonderful scopes for dairy rearing, dairy product development where large number of people may find employment. Small and marginal farmers across the country with particular emphasis to the Char lands may find alternative windows for rearing dairy cattle. Bangladesh produces 2.95 million metric ton (MMT) milk against the annual requirement of 13.32 MMT (DLS, 2012) and the deficiency is about 78%. Consumption of milk in Bangladesh among the SAARC countries is the least (55 ml/h/day) as stated by Joshi (2007). Under these circumstances, there is scope to initiate intervention on dairy and Heifer International may come forward to facilitate dairy intervention in Bangladesh. Due to huge production deficiency per consumption requirement in Bangladesh, the dairy sub-sector promotion appears to be one of the most potential areas of future intervention for ensuring food security, nutrition, and poverty alleviation and import substitution to meet the demand and supply gap. To understand the prevailing value chain and potential for growth of the dairy sub-sector, Heifer Bangladesh country program has planned to conduct a study highlighting the dairy value chain in Bangladesh recognizing the necessity to undertake an integrated value chain approach to address the issues and constraints of all actors involved in the supply chain vis a vis to help to improve productivity and profitability of small dairy farmers and in particular the socio-economic advancement of women and better nutrition for the children.

Objectives of the study

The main objectives of this study were to review the existing milk production, consumption and marketing situation in Bangladesh and to develop policy issues/implications on the improvement in the market.

Methodology and approaches

The study was conducted as specific identified cluster approach in combination with desk review of various secondary sources of information included websites, reports, case studies of various natures, national & international journals, book documents and field interview with relevant stakeholders, functionaries and others involved in the entire supply/value chain through talking points and discussion meetings for collection of primary data. Both qualitative and quantitative investigation was made using the participatory techniques to identify the thrust areas for further interventions. Assessment was made to determine the current status of dairy sub-sector in the country, its constraints, challenges and identify the potentials for future intervention. Besides above, a combination of methods such as Key Informants and participants observations (focus group discussion) was also used. Information/data gathered through these methods, which was supplemented and cross-verified using the secondary sources like various study reports, official documents, proceeding of meetings and related information available in the country.

Major Findings of Dairy Sub-sector Review

Dairy farms and their clusters

A review of the commercial dairy sector revealed that there were about 79847 dairy farms operated by SMEs in FY2009-2010, a great majority of which were small farms. The original clusters of dairy farms were in and around Shahjadpur and Ullahpara upazila of Sirajganj district, Bera upazila of Pabna district, Sreenagar and Munshiganj sadar upazila of Munshiganj district, Phulbaria upazila of Mymensingh district, Kaliakoir and Kapasia upazila of Gazipur district which were considered as 'dairy clusters' of the country. Nowadays, commercial dairy farms of SMEs are spread all over the country although still there are some zones where concentrations of farms are found to be higher. Places where clusters of dairy farms are still found in Khulna, Jessore, Kushtia, Bogra, Natore, Rajbari, Faridpur, Madaripur, Dinajpur, Rangpur, Tangail, Kishoreganj, Narshingdhi, B. baria, Sylhet, Comilla, Chittagong districts and buffalo milk clusters are concentrated in Noakhali, Patuakhali, Feni, Bhola, Bagerhat, Ishwardi and Pabna districts.

Characteristics of dairy sector in Bangladesh

The dairy sector of Bangladesh has certain characteristics, common to many developing countries in Asia. Bangladeshi dairy farmers are pre-dominantly small-holder producers with a majority of them owning small amount of land and one to three animals. Unlike many major developed dairying countries where grain/pasture is used for feeding, the dairy animals in Bangladesh are largely fed on agricultural by-products and residues. Household members carry out most of the dairy farming operations by themselves, with women contributing significantly to these operations. The demand for milk and milk products is increasing because of the rapid increase in population, the spread of education, economic growth and growing nutrition awareness. National milk production can only meet about 20-22% of the current milk consumption. For these reasons, dairy development has assumed a position of paramount importance in the rural economy of Bangladesh. It is essential that this sector, like every other sector of tropical agriculture should be modernized and made more productive as quickly as possible.

Milk producing animals

Cattle, buffalo and goat are considered as dairy animals of the country. Out of total milk production about 90% is coming from dairy cows and the remaining 10% from buffaloes and goats (DLS, 2005). According to the latest record of DLS (2011), there are about 23.121 million cattle, 1.394 million buffaloes and 24.149 million goats in the country. Among the total cattle population, about 6.0 million are dairy cattle of indigenous (about 85-90%) and crossbreds (about 10-15%) cows. However, the growth rate of cattle is slower as compared to Buffalo and Goat.

Size of dairy farms

Majority of dairy farms in the country are private which can be categorized into five different groups: i. Dairying for home consumption (1-3 cows), ii. Rearing of cows for dual purposes (draft and milk, 2-6 cows including bulls), iii. Small-scale dairy farming (2-5 cows), iv. Medium sized commercial dairy farming (6-25 cows) and v. Private large commercial dairy farms (26+ cows).

There are also eight government dairy farms; these are basically used as breeding farms for supplying of heifers to small-scale farmers.

Milk production status

The production of milk was expected to show a significant increase during the perspective plan (1996-2010) period. It was estimated that milk production will increase from 1.41 million metric tons (1999-2000) to 3.34 MMT (2004-2005) and 5.38 MMT in (2008-2010). But the target did not achieve. Although milk production was increasing slowly up to 2007-08 but thereafter production dropped sharply from 2.65 MMT to 2.29 MMT. This indicates that in the year 2008-09 growth rate of milk production was negative (-13.89%), although growth rate was positive (+16.23%) in 2007-08. Thereafter in the year 2009-10, milk production increased by 3.5% but dramatic increase in milk production (2.95 million metric ton) is seen (24.89%) in the year 2010-2011, which is the highest increment rate during the last ten years.

Requirements and availability of milk

It is recommended that an adult people require at least 250 ml milk every day. But our availability is only about 54.65 ml/h/d. This indicates that we are in serious shortage of milk. Total milk production of the country in 2010-11 was 2.95 MMT/year but our requirement is about 13.32 MMT/year. The country is running with huge deficiency of milk of about 78%. Due to shortage huge amount of milk in our country, private enterprises are taking importing milk from abroad. In 2011-12, milk and dairy products import amount was Taka 1750 Crore.

Supply and value chain analysis of dairy sub-sector

A value chain analysis is done to identify the actors involved in the supply chain of dairy farming to improve access of inputs, markets and services by mobilizing the poor farmers and policy environment towards facilitation of the chain. A number of market intermediaries are involved in the supply chain of commercial dairy farming which has made the marketing channel much more complex. Involvement of so many middlemen in the marketing channel increases cost of products. It has been observed that farmers lack bargaining power of their produce and sometimes incur loss whereas middlemen are always gaining profit. In Bangladesh, generally two different types of supply chain for the dairy industry are noticed. One is the informal sector and the other is formal. In the informal sector, milk is transferred from one end to another as either raw status or as dairy product. For dairy product development, sweet makers are the major market players. In the formal sector, milk is being processed and processed milk is marketed. Several dairy processing entrepreneurs are associated with milk processing. Ultra heat treated milk is the major product of processed milk. In Bangladesh, this industry has been developed with innovative technologies. Milk are being processed through cooling technologies and transported through refrigerated van across the country.

Value chain generally starts with the raw materials supply at the farm level and ends with consumers who make the choice to buy, or not to buy, the finished product. Any value chain has several links between the farm and the consumer such as procurement, transportation, processing, commodity storage, conversion packaging, distribution, retailing, and other services. A supply chain and value chain analysis is precondition to identify the constraints and opportunities of the selected commodity.

In this study, a value chain is developed involving the dairy farmers Baghabari, Pabna district linking with a big milk processing industry of Bangladesh. PRAN facilitated dairy farmers of Baghabari in terms of feed, veterinary services, quality control along the supply chain and

collect milk at their chilling plant. It has seen from the analysis that farmers earned gross margin of Taka 38395 rearing one cow in a year. Farmers are constrained by lack of easy access to the finance, unavailability of green grass during monsoon, inadequate quality of the feeds.

Constraints in dairy sub-sector

- Inadequate knowledge on dairy farm management
- Lack of high yielding dairy animals
- Scarcity of feeds, fodder and pasture land
- Lack of organized marketing system
- Lack of milk preservation and quality control facilities of dairy inputs and outputs
- Frequent occurrence of diseases on dairy animals
- Absence of regulatory body
- Lack of coordination within relevant agencies

Opportunities in dairy sub-sector

- In Bangladesh, about 85-90% of the dairy populations are indigenous; their milking ability is only 2-2.5 liters/day. Improving the dairy populations through cross breeding will increase the milk production in the country
- Cow dung may be used to produce energy like gas plant
- Production of organic foods through using compost can be enhanced
- Most of the rural women are involved with dairy rearing. They can be more intensified through increasing and improving dairy cultivation
- In FY2011-12, Taka 1750 Crore has been spent for milk and dairy products importation. With increasing production of milk, dependence of importing milk can be reduced gradually.

Major Findings of Field Study

Data were collected from four different areas of Bangladesh, where farmers are well adopted with dairy farming. The areas were Sreenagar upazila of Munshiganj district, Kapasia upazila of Gazipur district, Gurudashpur upazila of Natore district and Kashiadanga upazila of Rajshahi district. Data from small (1 to 5 cows), medium (6 to 25 cows) and large dairy farms (26+ cows) were collected by direct interview method by using pre-structured questionnaire. Data were collected from fourteen small, six medium and four large farms. The focus group discussion (FGD), meeting with stakeholders and key informant interview (KIIs) were also used for generating information regarding various aspect of dairy production and marketing.

Farm owner's occupation and education level

It was observed that business, agriculture and both agriculture + business was the main occupation of different types of dairy farm owners. In case of small holder dairy farms, occupation of 21% farmers were business, 58% agriculture and 21% were engaged in both agriculture + business. But in case of medium farms, occupation of 13% farmers was business and 83% farms were agriculture. On the other hand 25%, 50% and 25% owner's occupation in large farm categories were business, agriculture and both agriculture + business. Regarding education level, analysis showed that 17% farm owners were illiterate, 21% primary education level, 29% from class Six to Ten, 12% S.S.C level, 8% H.S.C and 13% Bachelor degree level.

Land size, sources of fund and training of farm owners

The land size of different categories of farm owners revealed that 50% of small holder dairy farmers had below 0.5 acres of land while medium and large farms were 16 and 25% respectively. It was observed that 98, 12, 29, 08 and 13% farm owners of different categories own below 0.5 acres, 0.5 to 1.0 acres, 1.0 to 2.0 acres, 2.0 to 5.0 acres and above 5.0 acres of land respectively. Regarding sources of fund, it was observed that 100% small holder dairy farmers started their business from own sources of fund but in case of medium and large farms, the figure was 83% and 75% respectively. Overall analysis showed that 92% dairy farmers establish their farm from own source and 8% farmers source of fund were both bank loan & own source. For training, it was found that only 14% small dairy farms had training but 86% had no training at all. But in case of medium and large size farms, 100% and 25% farms got training respectively. It was found that only 38% farm owners had training and 62% farms owners had no training regarding dairy farms operation in the study area.

Type of dairy animals

Considering all type of dairy farms (small, medium and large), it was found that 35% was milking cows, 3% dry cows, 17% pregnant cows, 10% heifers, 8% yearling bull, 8% bull calf, 16% heifer calf, 1% bullock and 2% breeding bulls. All dairy animals belong to Holstein-Friesian cross bred; no indigenous dairy animals are seen in farming condition anywhere in the study area.

Cowshed and housing pattern

In case of small holder farms, 86% farms were made of tin shed and 14% were straw and bamboo shed. But in case of medium farms, 83% tin shed and 17% half building was seen. On the other hand in large farms operation, 75% shed were tin shed and 25% half building. No straw and bamboo made shed was seen in medium and large farms. Overall analysis showed that 33% farms were open system, 8% closed system and 59% was semi-closed system.

Feeding system of cows and calves

64% small holder dairy farms fed their animals in stall and 36% farms depends on grazing system for their animals. In case of medium and large farms, 100% stall feeding system are in practice. Calf receives milk from their mother by suckling just before and after each milking time. No milk and calf stratus were fed to calves. Some farmers reported that they used to supply small amount of concentrates after two to three weeks of birth.

Fodder cultivation

Napier, Para, German and Maize grasses are cultivated by large scale dairy farmers. Only 29% farms belonging to small holder groups were found to cultivate German grass for feeding their cows. Most of the small holder dairy farmers do not prefer to cultivate high yielding grass. Scarcity of land is the major constraints for all types of dairy farmers (71%), followed by lack of knowledge (16%) and scarcity of seed/cutting (13%).

Types of animal feeds

Both roughage and concentrates are used by farms for rearing dairy animals. Straw and green grass is the major roughage source. It was observed that, 100% farms of different categories used untreated rice straw for feeding their dairy animals. None is found to use treated rice straw to fed their animals. On the other hand, wheat bran, rice polish, master oil cake and *khesari* (pulse) bran are the common concentrates feeds used for rearing dairy animals. Vitamin-Mineral Premix was used by 100% large farms, 50% medium farms and 14% small holder dairy farms.

Insemination method and bull/semen chosen

The study analysis showed that 84% of the farmers used Artificial Insemination (AI) techniques to inseminate their cows. About 16% farms inseminate their cows through natural and AI system. Regarding bull selection it was observed that 100% small, medium and large dairy farms used semen/bull of Holstein-Friesian for breeding their cows.

Milking system and selling of milk

In the study area, all farms of small, medium and large dairies milk their cows manually by hand milking procedure i.e. 100% is hand milking system. Cows are milked in morning and afternoon. Milk producers sell their milk to *paiker* (traders/milk collector), local market, sweet makers and milk processing industries like Milk Vita, PRAN dairy. Small portion of milk is sold by house delivery system (about 12%). Milk is usually sold at the rate of Taka 40 to 55/liter depending on demand of the area.

Disposal/culling of animals and manure

Main reason for disposal of animal is unproductiveness (63%), old age (33%) and Infertility (4%). Overall analysis showed that about 17% farmers sold their cow dung, 29% used as manure, 21% used as fuel and 33% used manure in bio-gas plant.

Treatment facilities, vaccination & de-worming

About 86% small, 100% medium and 100% large farmers are aware on the treatment of their dairy populations and treated cows as and when required. Only 14% small holder reported that they keep their cows out of treatment facility. On an average 54% farmers treat their sick animals by veterinary surgeon but others (46%) prefer Quake (locally trained veterinary service provider) for this purpose. It was observed that farmers vaccinate their cows with BQ and FMD vaccine. 100% farmers of all categories vaccinate their cows with FMD. None was found to use GTV and HS vaccine. 100% farmers both medium and large farms are de-worming their cows regularly.

Productive performance of cows

On an average per day milk production of cows in small, medium and large farms were 5.0, 6.0 and 10.0 liter respectively. On the other hand per lactation average milk yield was 1520, 2240 and 2800 liter for small, medium and large farms respectively.

Cost benefit analysis of dairy farms

An economic study was conducted to monitor the net income from each categories of farm. The analysis appears that net benefit for each small, medium and large farms were Taka 95167.00, Taka 406213.00 and Taka 2484790 per year respectively. This figure strongly indicates that dairying is a profitable business and an important tool for income generation and poverty reduction in the rural area of Bangladesh.

Seasonality in milk production

Naturally cow lactates throughout the lactation period. However, quantity and quality varies depending on period of milking of the cow. In Mandra village of Sreenagar upazila under Munshiganj district, the farmer milking thrice a day, first at 6-7am, second at 12-01pm and third at 4-5pm and milk quantity varies accordingly as 6 liters, 2.5 liters and 3.5 liters respectively. Similarly milk quantity is also varied on season. December, January is the highest milking season

and September, October is the least. There is phasing out in quantity of milk production. At the first phase of lactation (3 months), quantity of milk is more. The quantity of milk decreases on the subsequent phases of lactation each having 3 months. Amount of fat content which is the most important criteria for quality milk is also varies on time of milking. Fat content in afternoon is more than milking at other time.

Observation made during the FGDs

- There is no guarantee of making profit by the dairy SMEs as the price of feeds, medicines, vaccines, veterinary doctor fee and other inputs are quite high and increasing regularly and the price of their milk are not increasing accordingly
- Veterinary doctors usually suggest a lot of medicines/vaccines and different diagnostic tests to treat diseases which are very much expensive
- Most of the farmers usually treat their own cows on the basis of their general knowledge/experience and Quake (*locally trained veterinary service provider*) as this is less expensive
- Financial institutes are less interested to finance in dairy SMEs
- No access of diagnostic laboratories locally
- There is no regulatory body to regulate the market
- There is no quality control system prevailing in the market
- Price of milk is fixed up by the channel partners, not by the producers themselves
- Sometimes low quality feed, medicine/vaccine affects farm operation and sustainability

Farmers' expectation

Many farmers claimed that sometimes production cost of milk is more than the selling price. They inferred that Government should set a policy of price fixing so that under any circumstances farmers can get fair price. Since the farmers are small and many marginal farmers find their livelihood through dairy farming, Govt. may develop dairy scheme to provide small term loan to the dairy beneficiaries having easy reimbursement policies. As grass is the main feed for dairy population in the village level, DLS may provide support facilitating grass cultivation of improved varieties at low cost.

Suggested strategies for future intervention

- Development of high yielding dairy breed
- Review of national breeding policy
- Increased feeds and fodder production
- Discouraging import of milk powder
- Proper health care/management
- Improvement of facilities for the diagnosis of diseases
- Adequate marketing and infrastructure development
- Emphasis of small scale dairy production
- Emphasis on dairy buffalo rearing
- Capacity building training for small holding dairy farmers and technicians
- Strengthening national research and international collaboration
- Attracting foreign investments, joint ventures and encouraging existing processors to increase investment in the sector
- The Tax, tariff and trade - Policy needs analysis for the dairy sector – As case for business advocacy

- Introducing modern farm management through model farms
- Development of mobile milk collection system
- Control adulteration and hygienic issues for milk
- Emphasis on dairy food safety standards

Acronyms

AI	Artificial Insemination
BBS	Bangladesh Bureau of Statistics
BER	Bangladesh Economic Review
BLRI	Bangladesh Livestock Research Institute
BMPCUL	Bangladesh Milk Producers Cooperative Union Limited
BQ	Black Quarter
BRAC	Bangladesh Rural Advancement Committee
BSTI	Bangladesh Standards and Testing Institution
CCBS	Central Cattle Breeding Station
Cdip	Centre for Development Innovation and Practices
C&F	Clearing and Forwarding
CIF	Clearing, Insurance and Forwarding
DLS	Department of Livestock Services
DVC	Dairy Value Chain
DVM	Doctor of Veterinary Medicine
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FMD	Foot and Mouth Disease
FY	Fiscal Year
GDP	Gross Domestic Product
GTV	Grass Tetany Vaccine
HS	Haemorrhagic septicemia
KIIs	Key Informant Interviews
MMT	Million Metric Tons
MOFL	Ministry of Fisheries and Livestock
NATP	National Agricultural Technology Project
RCC	Red Chittagong Cattle
SAARC	South-Asian Association for Regional Cooperation
SCDC	Supply Chain Development Component
SME	Small and Medium Enterprise
SP	Service Provider
UHT	Ultra Heat Temperature
UMB	Urea Molasses Block
UMS	Urea Molasses Straw
UTS	Urea Treated Straw

Limitations of the Study

While conducting this study, the authors identified few limitations and as such generalization and recommendation based on this data cannot claim to be perfectly complete. The specific limitations of the study are as given below:

- i. Inadequate budget and time frame for the study. Due to limited budget and time allocation, the study could not address wide areas for collection of necessary information from the different dairy stakeholders like diversified dairy enterprises, large industrial farm, milk processors, goala/milk collector, dairy product developers, milk cream producers, input suppliers and other service providers involved in the supply chain. The study would have covered in depth value chain analysis showing input and output impacts of different stakeholders along the chain.
- ii. The availability of data in secondary sources has been very limited. It was either outdated or of a questionable quality.
- iii. The specific questions on cost of production and marketing proved to be challenging, partly because some respondents were not really willing to share those details.
- iv. It is very difficult to figure out the exact values. A farmer can start with one cow, he might continue to having 1 cow in each year, might sell a calf or continue rearing and it varies from farmer to farmer, difficult to identify the end point.

Despite these limitations, the present study has thrown some important light on the dairy value chain in Bangladesh and one can find useful directions for future intervention to make the dairy value chain stronger.

Acknowledgement

The authors appreciated in selecting Dairy sub-sector for value chain analysis and express their sincere thanks to Heifer International Bangladesh to conduct this dairy value chain study.

We also extend our sincerest thanks to the key informants, farmers and officials of public and private organizations for valuable contributions in terms of relevant information on dairy sub -sector starting from production to marketing. Special thanks are due to the dairy farmers who spent their valuable time for sharing their experiences with us.

This study was made possible by the support of Heifer International Bangladesh.

1. Introduction of the study

1.1 Background

Heifer International is a non-profit, humanitarian organization dedicated to ending world hunger and poverty and saving the earth by providing livestock, trees, training and other resources to help poor families around the globe become self-reliant. Heifer International's most striking qualities are its simplicity and effectiveness.

Heifer Bangladesh country office started its journey since February 2012 to end hunger and poverty in Bangladesh. Livestock sector particularly the dairy sub-sector provides significant opportunity for income generation and livelihood improvement of the rural mass. There have been wonderful scopes for dairy rearing, dairy product development where large number of people may find employment. Small and marginal farmers across the country with particular emphasis to the Char landers may find alternative windows for rearing dairy cattle. Bangladesh produces 2.95 million metric ton (MMT) milk against the annual requirement of 13.32 MMT (DLS, 2012) and the deficiency is about 78%. Consumption of milk in Bangladesh among the SAARC countries is the least (55 ml/h/day) as stated by Joshi (2007). Under these circumstances, there is scope to initiate intervention on dairy and Heifer International may come forward to facilitate dairy intervention in Bangladesh.

Bangladesh is predominantly an agricultural country and agriculture continues to be the driving force of the economy. Agriculture plays a dominant role in its economy in terms of sustainable land management, food security, value addition, employment and export earnings. Agriculture sector is comprised of four sub-sectors, e.g. crops, forestry, livestock and fisheries with crop sub-sector being the predominant one and livestock is an essential component of the rural economy and the livelihood development of the subsistence farmers. The contribution of livestock sub-sector to the country's economy is 2.73 percent as against 14.07 percent of agriculture (DLS, 2011). Its share of agricultural GDP represented by livestock in Bangladesh rose from 7.8% in 1974 to 12.9% in 1998-99, mainly due to the growth of poultry sub-sector and to a lesser extent in dairy sub-sector. Livestock sub-sector provides full time employment for about 25% and part time employment for 50% of the population. The demand for milk and milk

products is increasing because of the rapid increase in population, the spread of education and growing nutrition awareness. National milk production can only meet about 20-22% of the current milk consumption. Among many, the major constraints restricting the expected growth of dairy sub-sector is lack of proper information, inappropriate breeding, feeding, farm management, disease control and in efficient marketing.

Due to huge production deficiency per consumption requirement in Bangladesh, the dairy sub-sector promotion appears to be one of the most potential areas of intervention for ensuring food security, nutrition, and poverty alleviation and import substitution to meet the demand and supply gap. It is worthily mentioned here that dairy farmers have limited access to utilize improve varieties of fodder and management practices. The uses scope of supplementary feed is also limited choice. The quality of feed is generally poor due to adulteration, very high price and the livestock health services are poor.

To understand the prevailing value chain and potential for growth of the dairy sub-sector, Heifer International Bangladesh country program has planned to conduct a study highlighting the dairy value chain in Bangladesh recognizing the necessity to undertake a integrated value chain approach to address the issues and constraints of all actors involved in the supply chain vis a vis to help to improve productivity and profitability of small scale dairy farmers and in particular the socio-economic advancement of women and better nutrition for the children.

1.1 Objectives of the study

This study describes the overall situation of milk production, consumption and marketing in Bangladesh. Special emphasis has been given to the processing and marketing of fresh milk which is an emerging area in urban agribusiness.

The main objectives of this study were to review the existing milk production, consumption and marketing situation in Bangladesh and to develop policy issues/implications on the improvement in the market.

Specific objectives of the task are as follows:

1. to review and document existing milk production and marketing systems (informal and formal) of milk and milk products in rural Bangladesh;
2. to illustrate current consumption patterns of milk amongst different groups, sources of milk consumed and their extent of processing;
3. to identify the constraints and opportunities associated with dairy industry in Bangladesh;
4. to identify key interventions across the different layers of the DVCs to improve dairy value chain efficiency and governance to meet the gap in demand and supply of milk and milk products;
5. Recommend key actions to be taken to strengthen dairy sub-sector in Bangladesh.

CHAPTER-2

2. Materials and Methods:

The study was conducted in a specific identified cluster approach with the review of secondary sources of information. The major reviewed sources/documents included websites, reports, case studies of various natures, national & international journals, books and other relevant documents. Primary data were collected through field interview with relevant stakeholders, functionaries and others involved (**Annex 1-5**) in the entire supply/value chain through talking points and discussion meetings for collection of primary data. Both qualitative and quantitative investigation was made using the participatory techniques to identify the thrust areas for further interventions. Assessment was made to determine the current status of dairy sub-sector in the country, its constraints, challenges and identify the potentials for future intervention.



Besides above, a combination of methods such as Key Informants and participants' observations (focus group discussion) were also used. Information/data gathered through these methods, was supplemented and cross-verified using the secondary sources like various study reports, official documents, proceeding of meetings and related information available in the country.

2.1 Expected outcome of value chain analysis

- Develop value chain map with number of actors, volume, profitability of each steps
- Constraints and opportunities in the supply chain as well as value chain of selected commodities
- Identify marketing channels and trends within the sub-sector

- Identify final sales market (s) and market segments (end market structure and conduct)
- Identify the primary actors in the sub-sectors, their roles and interrelationship
- Identify business services that can address sub-sector constraints
- Design profitable intervention to overcome the constraints
- Facilitate different stakeholders to build their capacity in implementing the interventions.

2.2 Methodology of Value chain analysis

- Organized meetings with different stakeholders (farmers, traders, entrepreneurs, officials of Govt. and private sectors).
- Collected information on chain of activities starting from sourcing of raw materials to marketing of the particular value chain (produce/product) up to consumers
- Collected information from primary and different secondary sources
- Value chain study and research
- Workshops with sub-sector/Value chain representatives
- Market research/studies
- Validated the information through workshop/meetings.

The study methodology has comprised of the following phases:

- Structuring of survey
- Review of documents
- Qualitative information collection
- Quantitative information collection
- Data analysis
- Report writing

2.3 Structuring of survey

The primary data on different types of dairy farms (small, medium and large), dairy animals, milk production, consumption, marketing, transportation, storage, treatment, feeding, breeding, farm management and housing were collected through structured questionnaire (Annex 6 and 7). Two Animal Husbandry Graduates from Bangladesh Agricultural University were engaged in data collection. The data collectors were imparted training before being send to the field for data collection. The required technical support was also obtained from the District and Upazila Livestock Officer of the Department of Livestock Services (DLS). Support services were also obtained from Heifer International Bangladesh during collecting data.. The quality of information gathered being largely varied and collected data was supplemented by the information collection through focus group discussion.

2.4 Review of documents

The purpose of the documents review was to adequately comprehend the status of dairy industry in Bangladesh including type and number of livestock; past, present and planned initiatives related to dairy sub-sector development, role of public and private sector institutions, nature and type of support service, policy and regulatory environment, development incentives.

2.5 Qualitative information collection

The study team used the following techniques for collecting qualitative information:

- Focus Group Discussion (FGD)
- Meeting
- Personal Observation
- Key Informant Interview (KII)

2.6 Quantitative information collection

The questionnaire was pre-tested and finalized in consultation with Heifer Bangladesh team. The pre-testing and evaluation of the questionnaires provided an opportunity to ensure that the information collected was relevant and it was well understood by the respondents. It also ensured that it conformed to the requirements and objectives of the study.

For making the data collection more reliable, the study team members were concerned about the following important points:

- *Overview of the assignment*
- *Mode of addressing the village elders/chiefs/opinion leader and government officials*
- *Explaining study background and its future impact*
- *Method of asking questions*
- *Complete understanding of each of the terms employed*
- *Practice reading questionnaires to be used during field survey*
- *Detailed instructions on procedures and questionnaires*
- *Method of recording responses and discussions*
- *Editing of the information*

CHAPTER-3

3. Results

3.1 Role of livestock in Bangladesh economy

Among the four agricultural sub-sectors, most of the development efforts in the past were concentrated on crop production, and therefore, the livestock sub-sector remained under developed.

Although proper emphasis was not given in the past on livestock sub-sector but still this sub-sector is growing due to the efforts of public entrepreneurs and playing a very vital role for the development of agriculture in conjunction with crops. At present, the magnitude of contribution of the livestock sub-sector to country's gross domestic product (GDP) is 2.58 percent (BER, 2012). The growth rate of GDP in 2003 for livestock was the highest of any sub-sector at 4.5%, compared to 3.2% for crop and 2.3% for the fisheries sub-sector (MOFL, 2005). These changes have been accelerated by a rapid growth in demand for livestock products due to increases in income, rising population number and urban growth. This phenomenon has been referred to as the Livestock Revolution. Similar trend is also seen in other agricultural sub-sectors (DLS, 2011 and BER, 2012).

The relative contribution of livestock and other sub-sectors of agriculture (crops, forestry and fisheries) to national GDP and their changing patterns during the last five years are shown in **Table 1 and 2**.

Table-1: The relative contribution of livestock sub-sector to the national economy

In total agricultural gross domestic products (GDP)	14.07%
In countries gross domestic products (GDP)	2.73%
Foreign exchange earnings (from hides and skin)	3.67%
Full time employment	25%
Part time work provision	50%

Nutrition (combined with fisheries sub-sector)	80%
Draft power in agriculture	50%
Draft power in rural transport	50%
Manure production	80 million MT
Organic manure production	10% of chemical fertilizer
Household fuel	25%

Source: MOFL (2005) and DLS (2011)

Table-2: Contribution of agricultural sector in national gross domestic products (GDP)

Source	Parameter	Years					
		2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
i. Crop and Horticulture	GDP%	12.28	12.00	11.64	11.55	11.42	11.32
ii. Livestock		2.92	2.88	2.79	2.73	2.65	2.58
iii. Fishery		4.88	4.73	4.65	4.57	4.49	4.43
Total for Agricultural		20.06	19.61	19.08	18.80	18.59	18.33

Source: Bangladesh Economic Review (BER), 2012

Contributions from the livestock sub-sector to the economy have been largely underestimated in the past although the sub-sector is providing for a wide range of human needs. The challenge now is to increase the productivity of livestock and improve the quality of livestock products and provide access to markets to assist in maintaining food security and relieving poverty while maintaining the physical environment and protecting human health from Zoonotic diseases.

3.2 Overview of dairy sub-sector

Dairying is one of the major components of livestock sub-sector. It is a profitable occupation as no part of the bovine is wasted as live or dead. In Bangladesh, Dairying is nearly always a part of mixed farming system and is the prominent source of income generation (Saadullah, 2001; Miyan, 1996). Hemme *et al.* (2005) mentioned that milk

production is a livestock enterprise in which small scale farmers can successfully engage in order to improve their livelihoods.

The dairy sector of Bangladesh has certain characteristics, common to many developing countries in Asia. Bangladeshi dairy farmers are pre-dominantly small scale producers with a majority of them owning small amount of land and one to three animals. Unlike many major developed dairying countries where grain/pasture is used for feeding, the dairy animals in Bangladesh are largely fed on agricultural by-products and residues. Household members carry out most of the dairy farming operations by themselves, with women contributing significantly to these operations.

The demand for milk and value added a milk product is increasing rapidly. For these reason, dairy development has assumed a position of paramount importance in the rural economy of Bangladesh. It is essential that this sub-sector, like other sub-sector of tropical agriculture should be modernized and made more productive as quickly as possible.

3.3 Milk producing animals

Cattle, buffalo and goat are considered as dairy animals of the country. Out of total milk production, about 90% is coming from dairy cows and the remaining 10% from buffaloes and goats (DLS, 2005). According to the latest record of DLS (2011), there are about 23.121 million cattle, 1.394 million buffaloes and 24.149 million goats in the country (**Table 3**). Among the total cattle population, about 6.0 million are dairy cattle of indigenous (about 85-90%) and crossbreds (about 10-15%) cows. Indigenous cows consisted of a) Non-descriptive type, b) Red Chittagong cattle, c) North Bengal Gray and d) Munshiganj white cows. On the other hand, crossbred cows are the results of crossing between local cows and exotic bulls. Exotic bulls are mainly Holstein and Jersey, although in the past-Sindhi and Sahiwal was the major component of breeding bulls. Cows are inseminated through artificial insemination and semen is collected either from bulls reared by CCBS, BRAC and Milk Vita in the country or imported from abroad (Islam and Akbar, 2009). However, the growth rate of cattle is slower as compared to Buffalo and Goat.

Table-3: Population of dairy animals and growth rate (%)

Year	Cattle		Buffalo		Goat	
	Number	Growth	Number	Growth	Number	Growth
2002-03	22.53	-	1.01	-	17.69	-
2003-04	22.60	0.31	1.06	4.95	18.41	4.07
2004-05	22.67	0.31	1.11	4.72	19.16	4.07
2005-06	22.80	0.57	1.16	4.50	19.94	4.07
2006-07	22.87	0.31	1.21	4.31	20.75	4.06
2007-08	22.90	0.31	1.26	4.13	21.56	3.90
2008-09	22.98	0.33	1.30	3.49	22.40	3.90
2009-10	23.051	0.15	1.35	3.85	23.275	3.91
2010-11	23.121	0.30	1.394	3.26	24.149	3.76
Average growth rate (%)		0.32		4.15		3.97

Source: DLS (2011)

3.4 Size of dairy farms

Majority of dairy farms in the country are private which can be categorized into five different groups:

- i) **Dairying for home consumption:** The large and medium size farmers keep 1-3 cows to meet primarily their household demand for milk products, the surplus being sold in the local market.
- ii) **Rearing of cows for dual purposes (draft and milk):** Households depending mainly on draft power for cultivation usually keep 2-6 cows including both bulls and dairy cows and often have to use their dairy cows for ploughing. During the off season when cows are free from agricultural farm use they produce milk which is usually sold in the market.
- iii) **Small scale dairy farming:** The small and medium sized livestock households with financial and technical support from the government, NGOs and cooperatives manage to procure 2-5 cows. They usually sale all their milk and milk products in the market.

- iv) **Medium sized commercial dairy farming:** The medium sized households receiving mostly government incentives or cooperative support establish dairy farms where they usually rear 6-25 cows for market sale of milk and milk products.
- v) **Private large commercial dairy farms:** These commercial operations establish modern dairy farms and keep 26+ cows (Halder and Barua, 2003).

There are also eight government dairy farms; these are basically used as breeding farms for supplying of heifers to small scale farmers. Number of farms and self employment record are shown in **Table-4**.

Table-4: Number of farms and self employment in private sector

Year	Dairy Farm		Goat Farm	
	Number	Employment	Number	Employment
1979-80	227	2270	-	-
1997-98	29,649	29,6490	20,833	1,04,165
2000-01	32,614	32,6140	24,940	1,24,700
2004-05	52,041	52,0410	26,000	1,30,000
2009-10	79,847	98,470	56,147	2,80,735

Source: DLS (2011)

3.5 Milk production status

Milk production trend along with its growth rate (%) is shown in **Table-5**. Although Department of Livestock Services (DLS) is trying hard to increase the milk production in the country practically the result is not satisfactory. The production of milk was expected to show a significant increase during the perspective plan (1996-2010) period (MOFL, 2005). It was estimated that milk production will increase from 1.41 million metric tons (1999-2000) to 3.34 MMT (2004-2005) and 5.38 MMT in (2008-2010). But the target could not be achieved. Although milk production was increasing slowly up to 2007-08 thereafter production dropped sharply from 2.65 MMT to 2.29 MMT. This indicates that in the year 2008-09 growth rate of milk production was negative (-13.89%), although growth rate was positive (+16.23%) in 2007-08 (**Table 5**). Thereafter in the year 2009-10, milk production increased by 3.5% but dramatic increase in milk

production is seen (24.89%) in the year 2010-2011, which is the highest increment rate during the last ten years.

Table-5: Yearly milk production and growth rate (%)

Year	Milk	
	Production (MMT)	Growth rate (%)
2002-03	1.82	-
2003-04	1.99	9.34
2004-05	2.14	7.54
2005-06	2.27	6.06
2006-07	2.28	0.44
2007-08	2.65	16.23
2008-09	2.29	-13.89
2009-10	2.36	3.5
2010-11	2.95	24.89
Average growth rate (%)		6.76

Source: DLS (2011) and growth rate was calculated

3.6 Requirements and availability of milk

It is recommended that an adult person requires at least 250 ml milk every day. But our availability is only about 54.65 ml/h/d. This indicates that we are in serious shortage of milk. Total milk production of the country as per 2010-11 data is 2.95 MMT/year but our requirement is about 13.32 MMT/year. The country is running with deficiency of milk of about 78% (**Table 6**). Due to shortage huge amount of milk in our country, private enterprises are taking importing milk from abroad. Milk is mainly imported from abroad in powder form. The powder milk which is coming in this country with the cost of huge amount of foreign currency is not totally safe for human consumption as because of presence melamine, a hazardous chemical dangerous for human health was detected in the powdered milk in China.

Table-6: Requirements, production and deficits of milk

Status	Per day	Per year
Requirements	250 ml/h/d	13.32 MMT
Production/Availability	54.65 ml/h/d	2.95 MMT
Deficiency	195.35 ml/h/d (78%)	10.37 MMT (78%)

Source: DLS (2011)

3.7 Consumption pattern of milk in Bangladesh and other SAARC countries

As the availability of milk in Bangladesh is less, its consumption is also less as compared to other SAARC countries. Buying capacity of the people may be other reasons for less consumption of milk. **Table-7** shows the consumption level of milk among the SAARC countries.

Table-7: Consumption of milk in SAARC countries

Countries	Milk consumption
Bangladesh	54.65 ml/h/d
India	227 ml/h/d
Nepal	140 ml/h/d
Pakistan	520 ml/h/d
Sri Lanka	142 ml/h/d
Maldives	188 ml/h/d

Source: Adopted from Joshi (2007) and other sources

3.8 Milk production of dairy cows of Bangladesh and other countries

Milk producing ability of Bangladeshi cows and buffaloes are very poor in comparison with other countries. **Table-8** represents the milk production status of different countries.

Table-8: Milk production per animal (kg/lactation)

Country	Cattle	Buffalo
Bangladesh	207	407
Bhutan	257	400
Nepal	415	850
Sri Lanka	627	496
India	987	1450
Pakistan	1195	1909
Australia	4926	-
New Zealand	3974	-

Source: FAO, 2004

3.9 Import of milk powder

Among other sources, milk is one of the major sources for protein diet across the globe. However, due to inadequacy between demand and supply of milk, Bangladesh has to import milk to compensate the demand (**Table 9**). Milk is mainly imported in powder form. It is likely that there are scopes to enter diseased animals to Bangladesh and might be a cause of spreading contagious disease.

Table-9: Import status of milk and dairy products in Bangladesh

Period	Amount in Crore Taka
1993-1994	148
1994-1995	165
1995-1996	217
1996-1997	226
1997-1998	205
1998-1999	269
1999-2000	302
2000-2001	333
2001-2002	339
2002-2003	353
2003-2004	359
2004-2005	532
2005-2006	489
2006-2007	572
2007-2008	943
2008-2009	664
2009-2010	736
2010-2011	1153
2011-2012	1750
2012-2013	
July	190
August	154
September	174
October	99
November	102
December	94

Note: Import data on C&F and CIF basis

Source: Statistical Department, Bangladesh Bank 2013

The microbial status of the most commercially available powdered milk were studied by Rahman, *et al.* (1987) and found that total bacterial population were higher than the standards due to contamination during handling, transportation and storage. High number of Coliform bacteria was detected in imported milk powder which indicated that they might have been either contaminated by fecal materials or improper storage or unhygienic packaging.

3.10 Formal milk marketing channels in Bangladesh

Apart from the informal or traditional milk marketing system in Bangladesh, several milk and milk product enterprises started milk marketing since long. Among the milk enterprises, Milk Vita is probably the first venture to initiate milk marketing through cooperative farming in Bangladesh. The market share of different milk enterprises is shown in **Table-10**.

Table-10: Amount of milk processed by different companies

Processing companies	Establishment year	Average milk collection ('000 liters/day)	Market share (%)
BMPCUL	1973	200	52.08
BRAC dairy	1988	80	20.83
PRAN dairy	2001	40	10.42
Amomilk	1996	10	2.60
Bikrampur dairy	1998	10	2.60
Ultra Shelaida dairy	1998	10	2.60
Aftab dairy	1998	8	2.08
Tulip dairy	1998	3	0.78
Grameen/CLDDP	1999	7	1.82
Grammen-Danone	2007	1	0.03
Rangpur dairy	2007	8	2.08
Akij dairy	2007	4	1.04

Source: Adopted from Raha (2009) and other sources

3.11 Government assistance to the industry

The Bangladesh government has set up quite a few agencies to cater services to the needs of the livestock industry. First, there is the Ministry of Fisheries and Livestock which is responsible for the policies and overall direction of the industry. In addition, the Department of Livestock Services (DLS) is responsible for providing extension

services to farmers. A third body is the Bangladesh Livestock Research Institute (BLRI) which is responsible for conducting research on breed improvement and development of feeding strategies for dairy animals.

Government of the People's Republic of Bangladesh, Ministry of Fisheries and Livestock has declared, National Livestock Development Policy (MOFL 2007) , with emphasis on the following areas for the dairy development of country:

- i. Cooperative dairy development (Milk Vita model) would be expanded in potential areas of the country;
- ii. Successful pro-poor models for community-based smallholder dairy development including appropriate contact farming schemes would be replicated;
- iii. Smallholder dairy farming integrated with crop and fish culture would be promoted;
- iv. Supply chain based production and marketing of milk and milk products would be promoted;
- v. A National Dairy Development Board would be established as a regulatory body promote dairy development;
- vi. "National Dairy Research Institute" would be established to carry out research in various aspects of dairying.

CHAPTER-4

4. Supply chain and Value chain analysis of dairy sub-sector

4.1 Dairy Value chain :

Value chain is a chain of activities. Product pass through all activities of the chain in order and at each activity the product gains some value. The chain of activities gives the product more added value than the sum of added values of all activities. A value chain analysis is done to identify the actors involved in the supply chain of that commodity, to improve access of inputs, markets and services by mobilizing the poor farmers and policy environment towards facilitation of the chain. Value chain generally starts with the raw materials supply at the farm level and ends with consumers who make the choice to buy, or not to buy, the finished product. Any value chain has several links between the farm and the consumer such as procurement, transportation, processing, commodity storage, conversion packaging, distribution, retailing and other services. A supply chain and value chain analysis is precondition to identify the constraints and opportunities of the selected commodity. Entrepreneurs including the farmers and traders are operating their business by their existing knowledge. They might have lack of knowledge on market information and process of operations in the chain. That limits the growth of the market, profitability of the entrepreneurs and ultimate satisfaction of the end consumers. The value chain analysis gives greater understanding of the market players, their roles and interrelationship of the sub-sector/value chain in project area. For this, a sub-sector Map is needed to be prepared after collecting the information of the whole value chain. Sub-sector map is a schematic diagram that describes the product flows and contractual relationships among farms in a sub-sector/Value chain. One of the key constraints in designing any intervention in the agribusiness sector is the lack of sufficient and reliable information on the size of the enterprises and values generated as well as its sub-sectors such as crops, livestock and fisheries. The process will provide deep understanding of constraints and opportunities in each sub-sector (commodity) and lead to development of activities for interventions. It will also illustrate roles and responsibilities of each stakeholder.

4.2 Supply chain map of dairy industry in Bangladesh

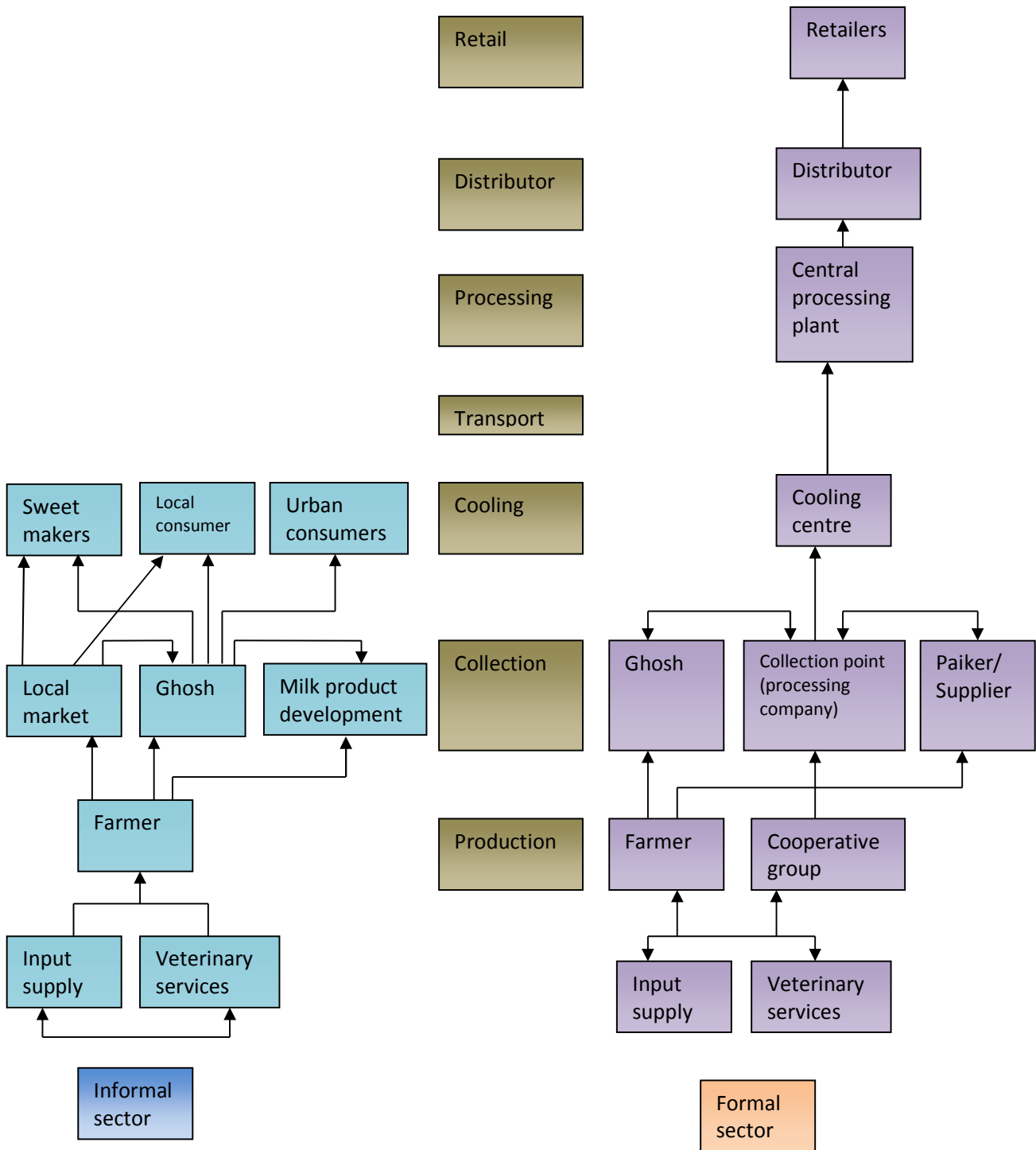


Figure-1: Supply chain map for the dairy industry in Bangladesh

In Bangladesh, generally two different types of supply chain for the dairy industry are noticed. One is the informal sector and the other is formal. In the informal sector, milk is transferred from one end to another as either raw status or as dairy product. For dairy product development, sweet makers are the major market players. In the formal sector, milk is being processed and processed milk is marketed. Several dairy processing entrepreneurs are associated with milk processing. Ultra heat treated milk is the major product of processed milk. In Bangladesh, this industry has been developed with innovative technologies. Milk are being processed through cooling technologies and transported through refrigerated van across the country.

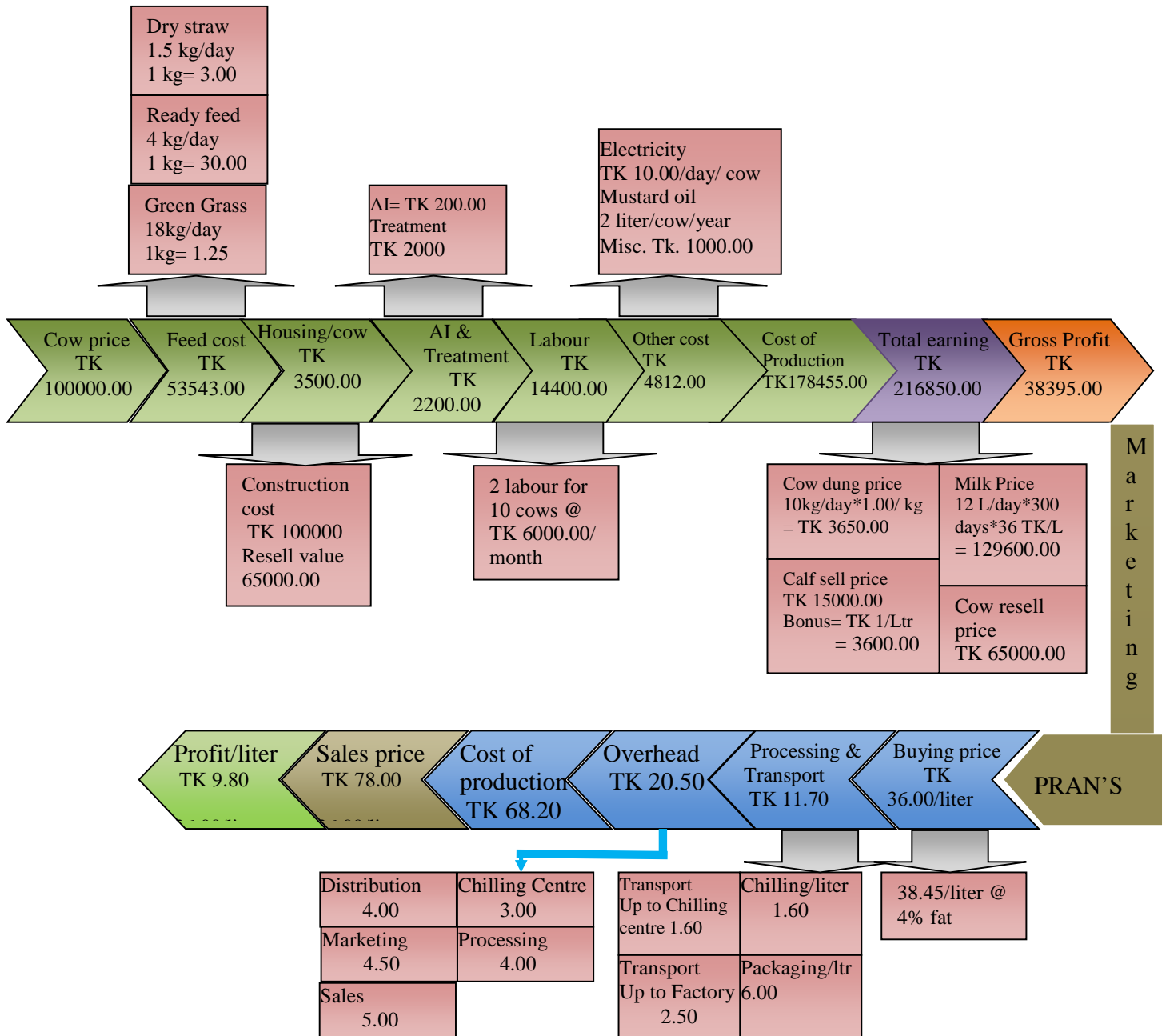
4.3 Dairy value chain

Dairy value chain is rather very complex as several market players are associated in the chain. It is very difficult bring all the market players and their marketing channels in single value chain. Farmers are involved with dairy rearing and milk production. Majority of the dairy cattle grower's livelihood is directly depends on the profitability on milk production. Here, the dairy value chain is developed involving the dairy farmers Baghabari, Pabna linking with a big milk processing industry of Bangladesh. PRAN facilitated dairy farmers of Baghabari in terms of feed, veterinary services, quality control along the supply chain and collect milk at their chilling plant. The value chain is presented in **Figure-2**. It has seen from the analysis that farmers earned gross margin of Taka 38395 rearing one cow in a year. Farmers are constrained by lack of easy access to the finance, unavailability of green grass during monsoon, inadequate quality of the feeds etc. Although, PRAN provided extension services and preparation of quality feeds. Many of the farmers opined that Government disputed land can be given to the dairy farmers in any forms to produce grass and fodder cultivation.

Bangladeshi private milk processing enterprises including PRAN felt that since Milk Vita is a Government supported dairy industry, they cannot compete with Milk Vita in marketing milk. Private sector companies have to pay heavy duties (Vat, taxes etc) on importing packaging materials, milk tanker and allied materials. Investment cost is very high and needs financial support with low interest. Private sector has to pay the

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corporate tax of 5% per liter of milk. PRAN urged to exempt the corporate tax and reduces VAT and taxes in importing machineries and raw materials.



Note:
This value chain has been developed having the information from PRAN's dairy areas at Baghabari, Pabna starting from Farmers to PRAN's marketing.

Disclaimer:
This may not represent entire dairy sector across Bangladesh.

Figure-2: Value chain analysis of dairy milk at Baghabari (Farmers associated with PRAN)

4.4 Other milk marketing chain

4.4.1 Traditional milk trader model

At the present moment, majority of farmers who are mainly small holder dairy owners selling their milk by traditional (informal) marketing system and cooperative milk marketing system. In traditional marketing system, milk is sold on the basis of volume without giving any emphasis on fat content of milk. Usually vendors and other milk collectors are involved in this marketing system. For this reason, farmers could not get fair price for their milk. At the same time there is no guarantee of fixed price and milk price varies day to day. Model for traditional milk marketing system is shown in

Figure-3.



Source: Haque, A.S.A.M. (2007)

Figure-3: Traditional milk trader model

4.4.2 Milk Vita cooperative model

Milk Vita has developed cooperative marketing system in Bangladesh. In this system payment of milk is done on the basis of fat content of milk at a fixed price. At the village level dairy farmers are organized society. Individual members deliver milk to a common collection point and from the collection point milk is brought to a chilling plant. Milk Vita has about 24 plants in the country and from their chilling plants; milk is collected daily to its central factory at Mirpur (Dhaka). In this system, farmer's exploitation by middlemen is avoided. Moreover, farmers get bonus price at the end of each year on their supplied milk and also get lot of other facilities for rearing their cows. Payment of milk is done on the basis of fat percent of milk. Model for Milk Vita system is shown in

Figure-4.

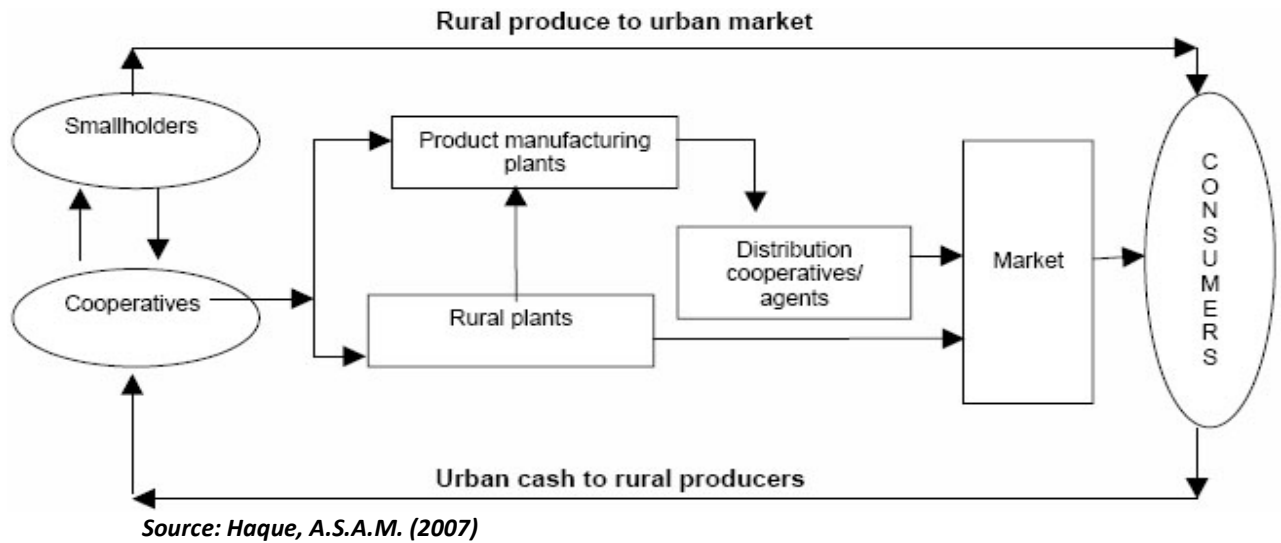


Figure-4: Milk Vita cooperative model

4.4.3 Private entrepreneur model

Private dairies, some owned by NGOs such as BRAC, Akiz and PRAN, usually operate through milk supplier-middlemen (*Ghoshes or Dudhwalas*) in place of rural groups or cooperatives. They collect milk for the assigned dairy and smallholders involved in the system do not receive any value addition benefit, just the basic price for their milk. A number of private companies and NGO's follow the same basic procedure of collecting milk from farmers through their agents who in turn collect milk from farmers. The price of milk is set on the basis of its fat content.

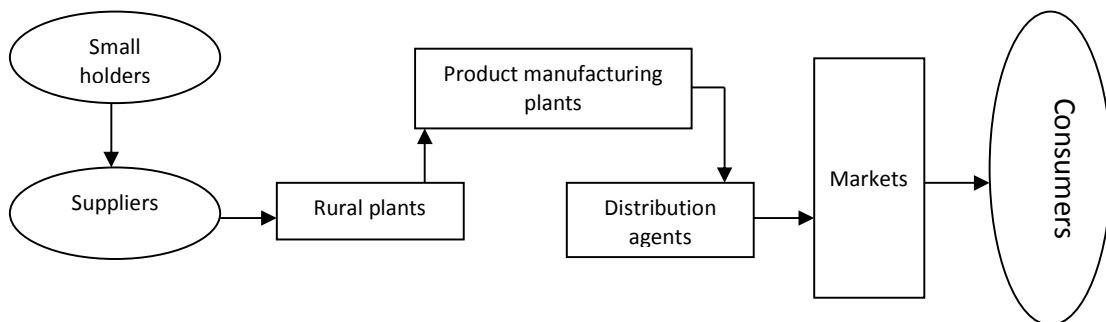


Figure-5: Private entrepreneur model

4.4.4 Grameen-Danone model

Grameen-Danone Foods Limited was set up in 2006 and is in an innovative joint social venture between the Grameen Bank and Danone, a large French multi-national dairy corporation renowned for its functional **Bio-Yoghurts**. It's a community based enterprise, collected from the poor farmers under the concept of social business. They prepare Yoghurts and marketed both rural and urban markets.

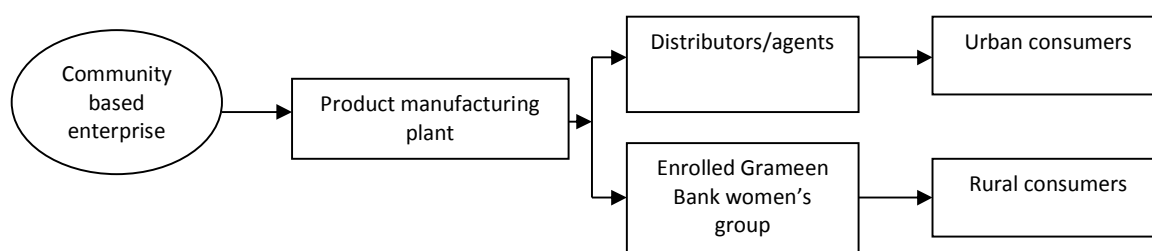


Figure-6: Grameen Danone model

4.5 Constraints identified in dairy sub-sector of Bangladesh

- a) Inadequate knowledge on dairy management system
- b) Lack of high yielding dairy animals
- c) Scarcity of feeds, fodder and pasture land
- d) Poor quality of feeds
- e) Lack of organized marketing system
- f) Lack of milk preservation and quality control facilities
- g) Frequent occurrence of diseases of dairy animals
- h) Lack of low interest credit support
- i) Limited knowledge and technical skills of farmers
- j) Lack of insurance coverage
- k) Limited coverage of animal production services
- l) Limited facilities for quality control of vaccine and other drugs
- m) Absence of regulatory body
- n) Lack of coordination within research organizations, government organization, universities, NGO's and beneficiaries.

4.6 Opportunities prevailed in dairy sub sector of Bangladesh

1. About 85-90% of the dairy populations are indigenous; their milking ability is about 2-2.5 liters per day. Improving the dairy populations through cross breeding will increase the milk production in the country.
2. On an average 10kg cow dung is being produced from each of the cattle population. This cow dung may be used to produce energy like bio-gas plant.
3. Production of organic foods through using compost can be enhanced.
4. Most of the rural women are involved with dairy rearing. They can be more intensified through increasing and improving dairy cultivation.
5. In 2011-12, Taka 1750 Crore has been spent for milk and dairy products importation. With increasing production of milk, dependence of importing milk can be reduced gradually.
6. Contribution of livestock sector to the national GDP can be increased.

CHAPTER-5

5.0 Findings of the analysis

Data were collected from four different areas of Bangladesh, where farmers are well adopted with dairy farming. The areas were Sreenagar upazila of Munshiganj district, Kapasia upazila of Gazipur district, Gurudashpur upazila of Natore district and Kashiadanga upazila of Rajshahi district.

Data from small (1 to 5 cows), medium (6 to 25 cows) and large dairy farms (above 26 cows) were collected by direct interview method by using structured questionnaire. Data were collected from fourteen small, six medium and four large farms (**Table 11**).

Table-11: Herd size categories of dairy farms under study

Herd size	No. of farm	Percentage
i) Small (1 to 5 cows)	14	58
ii) Medium (6 to 25 cows)	6	25
iii) Large (above 26 cows)	4	17
Total	24	100%

The focus group discussion, meeting with stakeholders and key informant interview were also used for generating information regarding various aspect of dairy production and marketing supply chain.

5.1 Farm owner's occupation and education level

From the survey data analysis it was observed that business, agriculture and both agriculture + business was the main occupation of different types of dairy farm owners. In case of small holder dairy farms, occupation of 21% farmers were business, 58% agriculture and 21% were engaged in both agriculture + business. But in case of medium farms, occupation of 13% farmers was business and 83% farms were agriculture. On the other hand 25%, 50% and 25% farms owner's occupation in large categories farms were business, agriculture and both agriculture + business. Details of all results are shown in **Table 12**.

Table-12: Farm owner's occupation

Occupation	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large(n=4)			
	No.	%	No.	%	No.	%	No.	%
i) Service holder	-	-	-	-	-	-	-	-
ii) Business	3	21	1	17	1	25	5	21
iii) Job seeker	-	-	-	-	-	-	-	-
iv) Agriculture	8	58	5	83	2	50	15	63
v) Agriculture + Business	3	21			1	25	4	16
vi) Others	-	-	-	-	-	-	-	-

Regarding education level, it was observed that education level of farm owners of all categories farms within the range of illiterate to Bachelor degree level. Overall analysis showed that 17% farm owners were illiterate, 21% was Primary education level, 29% was from class Six to Ten, 12% was S.S.C level, 8% was H.S.C and 13% was Bachelor degree level. This is an interesting finding which gives a clear usage that all categories of people were engaged in dairy farming.

5.2 Land size, sources of fund and training of farm owners

The land size of different categories of farm owners evident that 50% of small holder dairy farmers had below 0.5 acres of land while medium and large farms were 16 and 25% respectively. From overall analysis it was observed that 98, 12, 29, 8 and 13% farm owners of different categories own below 0.5 acres, 0.5 to 1.0 acres, 1.0 to 2.0 acres, 2.0 to 5.0 acres and above 5.0 acres of land respectively. Regarding sources of fund it was observed that 100% small holder dairy farmers started their farm from own source but in case of medium and large farms the figure was 83 and 75% respectively. Overall analysis showed that 92% dairy farmers establish their farm own source and 8% farmers source of fund were both bank loan & own source (Table 13).

Table-13: Sources of fund

Sources	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large(n=4)			
	No.	%	No.	%	No.	%	No.	%
i) Bank loan	-	-	-	-	-	-	-	-
ii) Own sources	14	100	5	83	3	75	22	92
iii) Both	-	-	1	17	1	25	2	8

Table-14: Training received from different organizations

Training	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large(n=4)			
	No.	%	No.	%	No.	%	No.	%
i) Training received	2	14	6	100	1	25	9	38
ii) No training	12	86	-	-	3	75	15	62

Concerning Training it was found that only 14% smallholder dairy farms had training but 86% had no training at all. But in case of medium and large size farms 100% and 25% farms got training respectively. From overall analysis it was found that only 38% farm owners had training and 62% farms owners had no training regarding dairy farms operation (Table 14).

5.3 Distribution pattern and type of dairy animals

Distribution pattern of different types of dairy animals are shown in Table 17.

Considering all farms together it was found that 35% was milking cows, 3% dry cows, 17% pregnant cows, 10% heifers, 8% yearling bull, 8% bull calf, 16% heifer calf, 1% bullock and 2% breeding bulls. In all categories of farms (small, medium and large) it was found that all dairy animals belong to Holstein



Friesian cross bred, no indigenous dairy animals are seen in farming condition anywhere in the study area.

Table-15: Number of dairy cattle in the farms under study

Type of animal	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large(n=4)			
	No.	%	No.	%	No.	%	No.	%
A) Crossbred animals								
i) Milking cows	19	20	21	23	53	57	93	35
ii) Dry cows	-	-	2	22	7	78	9	3
iii) Pregnant cows	11	24	5	5	29	65	45	17
iv) Heifer	12	46	7	27	7	27	26	10
v) Yearling bull	6	30	-	-	14	70	20	8

vi) Bull calf	1	5	2	10	18	85	21	8
vii) Heifer calf	12	29	8	20	21	51	41	16
viii) Bullock	-	-	2	100	-	-	2	1
ix) Breeding bull	3	25	2	17	7	58	12	2
Total	64	24	42	16	156	60	262	-
B) Indigenous cows	-	-	-	-	-	-	-	-

5.4 Types of cowshed and housing pattern

Table 16 and Table 18 shows the detailed of cow shed and housing system. In case of small holder farms, 86% farms were made of tin shed and 14% were straw and bamboo shed. But in case of medium farms, 83% tin shed & 17% half building was seen. On the other hand in large farms, 75%



shed were tin shed and 25% half building. No straw and bamboo made shed was seen in medium and large categories of farms. Overall analysis showed that 33% farms were open system, 8% closed system and 59% was semi-closed system. Regarding floor it was found that floor of 38% farms were *pacca* and 62% farms were *kacha*.

Table-16: Types of cows shed

Cows shed	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large(n=4)		No.	%
	No.	%	No.	%	No.	%		
i) Building	-	-	-	-	-	-	-	-
ii) Half building	-	-	1	17	1	25	2	8
iii) Tin shed	12	86	5	83	3	75	20	84
iv) Straw and bamboo shed	2	14	-	-	-	-	2	8

Table-17: Patterns of housing

Housing system	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)		No.	%
	No.	%	No.	%	No.	%		
A. House type								
i) Open	6	42	2	33	-	-	8	33
ii) Closed	2	16	-	-	-	-	2	8
iii) Semi-closed	6	42	4	67	4	100	14	59

B. Floor type								
i) Paved	-	-	-	-	-	-	-	-
ii) Unpaved	-	-	-	-	-	-	-	-
iii) <i>Pacca</i>	9	65	-	-	-	-	9	38
iv) <i>Kacha</i>	5	35	6	100	4	100	15	62

5.5 Feeding system of cows and calves

Feeding system of cows and calves in the study area are presented in **Table 18** and **Table 19**. 64% small holder dairy farms fed their animals in stall and 36% farms depends on grazing system for their animals. In case of medium and large farms, 100% stall feeding system are in practice. Calf receives milk from their mother by suckling just before and after each milking time. No milk and calf stratus were fed to calves. Some farmers reported that they used to supply small amount of concentrates after two to three weeks of birth.

Table-18: Types of feeding system of cows

Feeding system	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)		No.	%
	No.	%	No.	%	No.	%		
i) Stall	9	64	6	100	4	100	19	80
ii) Stall and Grazing	-	-	-	-	-	-	-	-
iii) Grazing	5	36	-	-	-	-	5	20
iv) Others	-	-	-	-	-	-	-	-

5.6 Fodder cultivation

Napier, Para, German and Maize grasses are cultivated by large scale dairy farmers. Only 29% farms belonging to small holder groups were found to cultivate German grass for feeding their cows (**Table 20**). Most of the small holder dairy farmers do not prefer to cultivate high yielding grass. Scarcity of land is the major constraints for all types of dairy farmers (71%) followed by lack of knowledge (16%) and scarcity of seed/cutting (13%). These are shown in **Table 20** and **Table 21**.

Table-20: Types of fodder cultivation

Name of fodder	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)			
	No.	%	No.	%	No.	%	No.	%
i) Napier	-	-	-	-	1	25	1	4
ii) Para	-	-	1	17	1	25	2	8
iii) German	4	29	3	50	1	25	8	34
iv) Maize	-	-	-	-	1	25	1	4

Table- 21: Constrains of fodder production

Constraints	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)			
	No.	%	No.	%	No.	%	No.	%
i) Scarcity of land	11	79	4	67	2	50	17	71
ii) Scarcity of seed/cutting	1	7	-	-	2	50	3	13
iii) Lack of knowledge	2	14	2	33	-	-	4	16

5.7 Types of animal feeds

Both roughage and concentrates are used by farms for rearing dairy animals. Straw and green grass is the major roughage source (**Table 22** and **Table 23**). It was observed that 100% farms of different categories used untreated rice straw for feeding dairy animals. None is found to use treated rice straw to fed their animals. On the other hand wheat bran, rice polish, master oil cake and *khesari* (pulse) bran are the common concentrate feeds used for rearing dairy animals. Vitamin-Mineral Premix was used by 100% large farms, 50% medium farms and 14% small holder dairy farms.

Table-22: Types of roughage used

Types of roughage	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)			
	No.	%	No.	%	No.	%	No.	%
i) Straw (treated)	-	-	-	-	-	-	-	-
ii) Straw (untreated)	14	100	6	100	4	100	24	100
iii) Green grass	7	50	6	100	4	100	17	70

Table-23: Types of concentrate used in feeding

Types of concentrate	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)			
	No.	%	No.	%	No.	%	No.	%
i) White bran	10	71	6	100	4	100	20	83
ii) Rice polish	12	86	6	100	4	100	22	92
iii) Soybean meal	-	-	-	-	-	-	-	-
iv) Master oil cake	8	57	4	67	3	75	15	63
v) <i>Khesari</i> (pulse) bran	6	43	4	67	4	100	14	58
vi) Common salt	14	100	6	100	4	100	24	100
vii) Vit. –Min.-Premix	2	14	3	50	4	100	9	38
viii) Readymade concentrate feed	-	-	-	-	-	-	-	-

5.8 Insemination method and bull/semen chosen

From **Table 24** and **Table 25** illustrates the nature of breeding process or insemination method adopted by the farmers and bull chosen for this purpose. Overall analysis showed that 84% of the farmers used Artificial Insemination (AI) techniques to inseminate their cows. About 16% farms inseminate their cows through natural and AI system. Regarding bull selection it was observed that 100% small, medium and large dairy farms used semen/bull of Holstein Friesian for breeding their cows.

Table-24: Insemination method

Types of insemination	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)			
	No.	%	No.	%	No.	%	No.	%
i) AI	13	93	4	67	3	75	20	84
ii) AI and natural	1	7	2	13	1	25	4	16
iii) Only natural	-	-	-	-	-	-	-	-

Table-25: Bull chosen for artificial insemination

Types of bull	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)		No.	%
	No.	%	No.	%	No.	%		
i) Holstein Friesian	14	100	6	100	4	100	24	100
ii) Jersey	-	-	-	-	-	-	-	-
iii) Shindi	-	-	-	-	-	-	-	-
iv) Sahiwal	-	-	-	-	-	-	-	-

5.9 Milking system and selling of milk

In the study area all farmers of small, medium and large dairies milk their cows manually by hand milking procedure i.e. 100% is hand milking system. Cows are milked in morning and afternoon (**Table 26**). Milk producers sell their milk to paiker (traders), local market, sweet making companies and milk processing industries like Milk Vita, PRAN dairy. Small portion of milk is sold by house delivery system (about 12%). Milk is usually sold at the rate of Taka 40 to 55/liter depending on demand of the area.

Table-26: Milking system

Milking (Type and Time)	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)		No.	%
	No.	%	No.	%	No.	%		
A) Type of milking								
i) Hand milking	14	100	6	100	4	100	24	100
ii) Machine milking	-	-	-	-	-	-	-	-
B) Time of milking								
i) Morning	12	86	6	100	4	100	22	92
ii) Noon	-	-	-	-	-	-	-	-
iii) Evening	2	14	6	100	4	100	12	50

5.10 Disposal/Culling of animals and manure

Main reason for disposal of animal is unproductiveness (63%), old age (33%) and Infertility (4%) which is shown in **Table 27**. Overall analysis found that about 17% farmers sold their cow dung, 29% used as manure, 21% used as fuel and 33% used manure in bio-gas plant (**Table 28**).

Table-27: Disposal of animal

Causes of disposal	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)			
	No.	%	No.	%	No.	%	No.	%
i) Unproductive	8	57	4	66	3	75	15	63
ii) Accident	-	-	-	-	-	-	-	-
iii) Old	6	43	1	17	1	25	8	33
iv) Sterility	-	-	-	-	-	-	-	-
v) Infertility	-	-	1	17	-	-	1	4

Table-28: Disposal of manure

Uses	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)			
	No.	%	No.	%	No.	%	No.	%
i) Sold out	2	14	1	17	1	25	4	17
ii) Used as manure	5	38	2	33	-	-	7	29
iii) Used as fuel	5	38	-	-	-	-	5	21
iv) Threw away/Bio-gas	2	10	3	50	3	75	8	33

5.11 Treatment facilities, vaccination & de-warming

About 86% small, 100% medium and 100% large farmers are aware on the treatment of their dairy populations and they treated their cows as and when required. Only 14% small holder reported that they do not adopt preventive and curative measures in need. On an average 54% farmers treat their sick animals by veterinary surgeon but others (46%) prefer Quake for this purpose (**Table 29**). It was observed that farmers vaccinate their cows with BQ and FMD vaccine. Hundred percent (100%) farmers of all categories vaccinate their cows with FMD. None was found to use GTV and HS vaccine (**Table 32**). 100% farmers both medium and large farms are de-warming their cows regularly.

Table-29: Treatment facilities

Treatment	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)		No.	%
	No.	%	No.	%	No.	%		
A) Treatment facilities								
i) Yes	12	86	6	100	4	100	22	92
ii) No	-	-	-	-	-	-	-	-
B) By whom animals are treated								
i) Veterinary surgeon	5	38	3	50	3	75	11	46
ii) Quake	7	50	1	17	1	25	9	38

Table-30: Prevention by vaccine and de-warming

Vaccine	Type of farms						Overall (n=24)	
	Small (n=14)		Medium (n=6)		Large (n=4)		No.	%
	No.	%	No.	%	No.	%		
i) GTV								
ii) BQ	8	57	4	67	4	100	16	67
iii) HS	-	-	-	-	-	-	-	-
iv) FMD	14	100	6	100	4	100	24	100
v) De-warming	7	50	6	100	4	100	17	71

5.12 Productive and reproductive performance

On an average per day/cow milk production of cows in small, medium and large farms were 5.0, 6.0 and 10.0 liter respectively (is it per cow/day or total/HH?). On the other hand per lactation average milk yield was 1520, 2240 and 2800 liter for small, medium and large farms respectively. Other parameters i.e. dry period, calving interval, service per conception, calving to first service, highest & lowest milk production/d/cow and lactation period are shown in **Table 31**.

Table-31: Productive and reproductive performances of dairy cows (cross bred)

Parameters	Type of farms			Overall (n=24)
	Small (n=14)	Medium (n=6)	Large (n=4)	
A) Crossbred				
i) Dry period (days)	95	80	85	86
ii) Calving interval (days)	360	300	290	316
iii) Service per conception	2.5	2.4	2.1	2.3
iv) Calving to first service (days)	80	65	65	70

v) Highest milk production (Liter/d)	8	12	18	13
vi) Lowest milk production (Liter/d)	3	6	7	5
vii) Milk yield (Liter/lactation)	1520	2240	2800	2185
viii) Lactation period (days)	270	280	290	285
Average milk production (Liter/lactation)	4	6	10	7
B) Indigenous cows	-	-	-	-

5.13 Cost benefit analysis of small, medium and large dairy farms

An economic study was conducted to monitor the net income from each categories of farm. A detail of it is given in **Table 32**. From the Table it appears that net benefit for each small, medium and large farms were Taka 95,166/=, 4, 06,213/= and 24, 84,790/= per year respectively. This figure indicates that dairying is a profitable business and a tool for income generation and poverty reduction.

Table-32: Cost-benefit analysis

A. Cost (per farm/year)

Items	Type of farms			Remarks
	Small	Medium	Large	
i) Feed cost				
Roughage	17400	26786	211750	
Concentrates	86485	206453	924000	
ii) Labour cost	-	95958	308000	
iii) Housing cost	4414	22866	57750	
iv) Repair and maintenance	7285	5308	13475	
v) Veterinary cost + AI cost	4200	20416	32725	
viii) Others	-	-	-	
Electric bill	-	31850	46200	
Transport	10200	24500	1925	
Tools and equipments	1714	6533	30800	
Interest on capital	-	-	34650	
Total	131698	440670	1661275	

B. Return (per farm/year)

Selling items	Type of farms			Remarks
	Small (n=14)	Medium (n=6)	Large (n=4)	
i) Milk	177793	735000	3891965	
ii) Calf	7286	58800	50050	
iii) Culled animals	34286	24500	115500	

iv) Cow dung	3214	16333	38500	
v) Gunny bag	4286	12250	50050	
Total	226865	846883	4146065	

C. Net profit (per farm/year)

Particulars	Type of farms			Remarks
	Small (n=14)	Medium (n=6)	Large (n=4)	
i) Total return	226865	846883	4146065	
ii) Total cost	131698	440670	1661275	
iii) Net profit	95,167/=	4,06,213/=	24,84,790/=	

5.14 Cost benefit analysis through value chain analysis

A value chain analysis has been conducted at Baghabari, Pabna district. The analysis has been made considering 01 year of cow rearing (Table 35).

**Table-33: Income analysis of dairying through value chain analysis (One year)
At farmers level (Associated with PRAN)**

A. Cost of production

Cost segment for one cow	Cost (TK)
Cow price/cow	100000.00
Feed (concentrate) cost/cow (4 kg/day)/year @ TK 30.00/kg	43800.00
Dry straw/year/cow (1.5 kg/cow/day @TK 3/kg)	1643.00
Green grass/year (18kg/day*1.25/kg)	8100.00
Housing of cow/year (considering construction of housing for 10 cows= 100000, resell value after one year 65000=35000/10)	3500.00
AI cost/year/cow	200.00
Labour/cow/year (2 labour for 10 cows @ TK 6000/month/labour)	14400.00
Electricity/cow/year (TK 10/day)	3600.00
Medicine/treatment/year/cow	2000.00
Mustard oil 2 liter/cow/year @TK 106/liter	212.00
Miscellaneous	1000.00
Total cost of production/cow/year	178455.00

B. Return

Income segment for one cow	Income (TK)
Milk price/year (12 liter/day*300days*36 TK/liter)	129600.00
Bonus (TK 1.00/liter)	3600.00
Cow dung price/year (10kg/day*1.00/kg)	3650.00
Cow resell price or meat sale 250kg/cow @ 260/kg	65000.00
Calf sale price	15000.00
Total return from one cow/year	216850.00
Gross margin of farmer rearing one cow/year (B-A)	38395.00

At PRAN's milk processing and marketing

A. Cost of production

Cost segment of milk	Cost (TK)
Farmers selling price/liter (normally the price is TK 38.45/liter @ 4% fat)	36.00
PRAN's chilling cost/liter	1.60
Transport cost to farmer/liter up to chilling plant	1.60
Transport cost from chilling centre to factory gate/liter	2.50
Chilling centre OH/liter	3.00
Processing cost for UHT milk (Utility, OH etc)/liter	4.00
Packaging/liter	6.00
Distribution OH/liter	4.00
Marketing OH/liter	4.50
Sales OH/liter	5.00
Cost of value added (Ready to drink) production/liter (Tetra Pack) (A)	68.20
(B) PRAN's sales price/liter	78.00
Gross profit of PRAN's UHT milk/liter (B-A)	9.80

5.15 Seasonality in milk production

Naturally cow lactates throughout the lactation period. However, quantity and quality varies depending on period of milking of the cow. In Mandra village of Sreenagar upazila under Munshiganj district, the farmer milking thrice a day, first at 6-7am, second at 12-1pm and third at 4-5pm and milk quantity varies accordingly as 6 liters, 2.5 liters and 3.5 liters respectively. Similarly milk quantity is also varied on season. December, January is the highest milking season and September, October is the least. There is phasing out in quantity of milk production. At the first phase of lactation (3 months), quantity of milk is more. The quantity of milk decreases on the subsequent phases of lactation each having 3 months. Amount of fat content which is the most important criteria for quality milk is also varies on time of milking. Fat content in afternoon is more than milking at other time.

5.16 Findings on discussion meeting, FGD, KIs, Govt. Body and NGO

5.16.1A Findings on discussion meetings and KIs

Please start like this:

Potential dairy clusters were identified and prioritized through KI and FGD exercises. Findings of the discussion meetings relevant to dairy farming are included briefly in the following section.

1A Major dairy (cow) clusters in Bangladesh

- i. Pabna district (Bera upazila)
- ii. Sirajganj district (Shahjadpur and Ullahpara upazila)
- iii. Munshiganj district (Sreenagar and Munshiganj sadar upazila)
- iv. Satkhira district (Tala and Satkhira sadar upazila)
- v. Khulna district (Paikgacha upazila)
- vi. Jessore district (Abhaynagar and Jessore sadar upazila)
- vii. Mymensingh district (Muktagacha and Phulbaria upazila)
- viii. Kushtia district (Kumarkhali upazila)
- ix. Bogra district (Sherpur upazila)
- x. Natore sadar upazila
- xi. Rajbari sadar upazila
- xii. Faridpur sadar upazila
- xiii. Madaripur district
- xiv. Dinajpur district (Chirirbandar and Birganj upazila)
- xv. Rangpur district (Pirganj upazila)
- xvi. Tangail district (Delduar upazila)
- xvii. Gazipur district (Kaliakoir and Kapasia upazila)
- xviii. Kishoreganj district
- xix. Narshingdhi district (Belabo upazila)
- xx. B. baria district (Nabinagar upazila)
- xxi. Sylhet district (South surma area)
- xxii. Comilla district (Laksam and Chauddagam upazila)
- xxiii. Chittagong district (Patiya upazila)

1B Major buffalo milk clusters in Bangladesh

- i. Noakhali
- ii. Patuakhali
- iii. Feni
- iv. Bhola
- v. Bagerhat
- vi. Ishwardi
- vii. Pabna

1C Major constraints in dairy sub-sector

- Problems in reproductive capacity and artificial insemination
- Acute problems of mastitis disease in the dairy farm and unavailability of mastitis detection kit
- Unavailability of quality vaccine
- Low quality of imported vaccines
- High price of cattle ready feed and medicines/vaccines
- Lack of fodder cultivation and grazing field
- Very high charges of veterinary (DVM) doctor as single visit in the farm
- Inappropriate treatment received by farmers from locally trained veterinary service provider (Quake)
- Lack of manpower especially of DLS and other related organizations
- Arrangement of training without proper assessment of need
- No bargaining power of dairy farmers
- Low price of milk and no price control for inputs and outputs
- Lack of modern technology at Govt. and private all level
- Lack of record keeping during the course of farming as well Govt. level for national update data/info
- No seriousness in the maintenance of bio-security at dairy farms
- No practice of waste management
- Lack of space at dairy shed
- Shortage of quality breed
- Milk adulteration
- Difficulty in easy access to information and service
- Lack of floor/housing management in dairy farms

1D Suggestions to overcome the problems in dairy farming

- For milk safety point of view, control mastitis by providing appropriate technology and creating awareness
- Low cost technology to be ensured for milk preservation
- Hiring technology for lactometer alternative
- For removing added water in milk, Portable Near Infrared Reflectance (NIR) machine should be arranged in different milk clusters (*Fosstecator and Milkoscan machine may be considered in this case*)

- Portable ultra sonogram machine should be arranged for detecting cattle pregnancy appropriately
- Ensuring test kit for melamine detection in milk
- Ensuring quality concentrated feeds and fodder (*sweet jumbo, sorghum, napier species may be considered*)
- Developing new marketing channel for fair price of SMEs
- Fresh to pasteurized milk may be introduced
- Different value added milk products should be introduced
- Updated technology like milking machine, cream separator, chopping machine, electric/hand cutter should be arranged in dairy clusters for SMEs
- Need based training should be arranged for different stakeholders to update SMEs knowledge and overcome the challenging problem in the dairy sector
- DLS should be strengthened with adequate number of dairy extension officers and workers to support technical services free of cost to the SMEs
- Supply of quality feed, medicine and vaccine should be ensured and government should control the price of all dairy inputs
- Develop transparent rules and regulations for dairy sub-sector and follow accordingly
- Collaboration/joint program should be arranged among the Universities, research institutes, private agencies, NGOs, associations and DLS for disseminating updated knowledge on new technology
- Development of insurance policy for dairy SMEs is needed to protect their valuable investment
- Ensuring easy access to finance/loan for dairy farming should be made on low interest rate with easy terms and conditions by commercial banks, financial institutes, NGOs and micro-credit loan recovery method should be calculated by descending order for minimizing their specific flat rate of interest
- Micro-credit loan size should be increased as per SMEs requirement
- Media should play vital role on awareness, environment & waste management, prevention of diseases, knowledge dissemination to the SMEs and their pro-active role should be maintained by increasing more dairy related programs in electronic media on new technology
- Development of effective ties among the producers, market intermediaries, researchers, extensionist and the journalists

- Development of own sustainable local dairy breeds
- Introducing community based bio-security and waste management system
- Establishment of regional dairy training institutes for effective training
- Production and distribution of updated version of dairy farming books, booklets, leaflets and relevant publications to SMEs
- Develop skilled man power as an entrepreneurship approach
- Composting, bio-gas project may be introduced in dairy clusters

5.16.2A Findings on discussion meeting with Centre for Development Innovation and Practices (Cdi) on status of dairy farming at Sreenagar upazila of Munshiganj district

- Traditional farming following indigenous techniques
- 300-350 nos. dairy farm exists in Sreenagar upazila
- Average farm size 5-30 cows/farm
- Major dairy clusters in Sreenagar upazila are Mandra, Balashur, Kobutor Khola and Bhagghalaxmikul village
- 20 Ghosh involving in Sreenagar upazila for milk collection from dairy farmers and supply to the sweet makers and milk processors
- One chilling centre prevail under Milk Vita
- Generally farms are running by profitable, but profit rates always fluctuating due to high feed, medicine/vaccines, professional doctor (DVM) visit cost
- Farming mainly by crossbred (*milk production 8-16 liter/day/cow*), very few local breed
- From crossbred cow, milk collection three times daily on morning, noon and afternoon
- Bagsha fodder mainly used in the dairy farms as natural grass
- Cdi credit limit to dairy farms at Sreenagar upazila Taka 50000-1000000 @ 25% of flat interest
- Others NGOs like BRAC, ASA, Padakhep and different Commercial banks are also financing to dairy business in the area
- Generally farmers are selling their milk by the following marketing channels:
 - a. *Channel-1: Farmer-Local Ghosh-Processors in Dhaka market making sweets, curd, ghee-Consumers*

- b. Channel-2: Farmers directly sale to the representative of national sweet makers like Rosh, Bhagghakul making milk chana locally by pre-fixed rate and without any Fat% checking (milk rate Taka 43.50/liter for one year)-Milk Chana in Dhaka Factory making sweets-Consumers*
- c. Channel-3: Farmer-Local Milk Vita (very low price Taka 37.25/liter @ 4% Fat, meanwhile BSTI standard at least 3.5% Fat)-Consumers*
- d. Channel-4: Farmer-Ghosh/Middlemen-Local Sweet Shop making chana, sweets, curd, ghee-Consumers*
- e. Channel-5: Farmer-Local Market-Consumers (local consumer pay about Taka 50-55/liter without any quality compliance)*

5.16.2B Findings of discussion meeting with Milk Vita chilling centre on status of dairy farming at Sreenagar upazila, Munshiganj district

- The chilling centre's major operation are milk collection, chilling and finally raw milk send to Milk Vita at Mirpur/Dhaka for packaging and marketing
- Milk chilling capacity: 5200 liter/day but utilization only 1500-3000/day due to shortage of Milk and offer low price for SMEs
- 17 associations developed by Milk Vita in Sreenagar and Sirajdhikhan upazila of Munshiganj district (05 primary cooperative and 12 ghosh samity) for milk collection by own transport offering @ Taka 37.25/liter for 4% Fat and Taka 0.78 will be added if Fat % increment one unit like 4.1
- Milk Vita provided different services to the SMEs like treatment, de-warming and vaccination by free of cost, loan facility for cow purchase @ 5% of interest
- Milk Vita provided bonus to their association farmers after three months interval @ Taka 01/liter
- Milk CAN delivery by Milk Vita @ Taka 1000 as refundable deposit money
- In FY2011-2012, Milk Vita Sreenagar chilling plant delivered total of 0.68 million liter milk to Mirpur/Dhaka Milk Vita for packaging and marketing to the consumers

5.16.2C Findings on FGD with dairy SMEs at Mandra village under Sreenagar upazila of Munshiganj district

Group discussions with dairy SMEs at Mandra village under Bhagghakul union (lowest administrative unit in Bangladesh) of Sreenagar upazila of Munshiganj

district were held on March 16/2013 to know about the current status of their farm operation, costs and profitability. The farmers were allowed to discuss freely so that relevant points could be recorded for the study purpose. The farmers were found to be very friendly and cooperated very nicely making the FGD very much successful. On the basis of discussion, numbers of dairy farms are situated in the area, types of breed, feeding, breeding, nutrition, veterinary services, milk production, problems of milk marketing, status of reproductive capacity & artificial insemination, value added dairy products, the average cost of production, farm gate price, profit were calculated out. It may slightly vary as shown in value chain map as the farmers provided a general idea on the subject. In addition, current constraints and their suggestions were also recorded.

Status of dairy farming at Mandra village, Sreenagar upazila

- 60 dairy farm exists at Mandra village of which 90% are crossbred (*major Holstein-Friesian*) and their farm types as under:
 - 1-5 cows: 06 nos.
 - 6-25 cows: 30 nos.
 - 26-50 cows: 20 nos.
 - Above 50 cows: 04 nos.
- Major feed use bagsha grass, straw (*mainly use November and December months due to shortage of natural grass*), ready feed (daily needed 08 bag @ Taka 5200 for 26 no. *Holstein-Friesian breed cow*), coconut oil cake
- Milk production by 01 Holstein-Friesian breed cow in morning 7-14 liter/day, noon 4-8 liter/day and in afternoon 6-7 liter/day and average 7000-10000 liter/day milk supplied by Mandra village individually to different stakeholders
- Major diseases FMD, mastitis, repeat bleeding case, suddenly stop feeding
- Farmers are usually used very low quality vaccines three times annually on FMD (*like Indian Raksha due to unavailability of local vaccine*)
- Milk consumption rate of farmers for their own family members @ 0.5 liter/day/person

- No wastage of milk
- High mortality rate of calf due to tiger heart disease and cows died by FMD
- Very low reproduction capacity (average 3 calf/crossbred cow)
- Milk are adulterated at middlemen level
- Farmers are selling their milk by the following marketing channels:
 - a. *Channel-1: Farmer-Local Ghosh/Paiker/Middlemen-Sweet makers like Rosh, Bhagghakul*
 - b. *Channel-2: Farmers directly sale to the representative of national sweet makers like Rosh, Bhagghakul by pre-fixed rate without any Fat% checking*
 - c. *Channel-3: Farmer-Local Milk Vita*
 - d. *Channel-4: Farmer-Middlemen-Local Sweet Shop*
 - e. *Channel-5: Farmer-Local Market (local consumer pay about Taka 45-60/liter in morning and Taka 40-50/liter in afternoon)*

Major problems at Mandra village: very low reproduction capacity and short space in farm house shed, very low price of milk, lack of communication for easy treatment, very high veterinary doctor (DVM) fee (*Taka 1000/farm visit*), absence of free treatment system except local Milk Vita service, very high electricity bill (*average Taka 1000/month*), no use of cow dung for further uses, no waste management facility, no facilities for value added product development, high service rate for receiving Artificial Insemination (AI) from Milk Vita (*Taka 200/cow at farmers shed*), lack of farm management training facility, traditional manual system of milking.

5.16.2D Findings of focus group discussion at Gurudashpur upazila of Natore district

In this focus group discussion meeting, fifteen participants of different categories were attended. According to their opinion, major problems of dairy sector and their suggestions to overcome are presented below:



Major problems

- Shortage of straw, green grass and other dairy feeds
- Good quality dairy animals are not available
- Low fat content of milk
- Milk price is low
- Shortage of land for grass cultivation
- Shortage of fund
- Low conception rate of dairy cows
- No facility for training
- Vaccine not available
- Parasitic infestation cows
- Milk marketing problems
- Milk storage and transportation problem
- Spoilage of milk during summer due to high temperature
- Shortage of skilled manpower
- High price of medicine
- Doctor's visit fee is high
- Milk CAN for transport is not available

Suggestions

- Require high yielding dairy cows
- Cultivation of green grass
- Net cutting and seeds of high yielding grass
- Low interest loan from bank, NGO's will be helpful
- Require training on milk production, value added products development and dairy farm management practices
- More FMD vaccine is required
- Organized milk marketing system required
- Milk chilling centre is needed

- Regular de-warming programme by Government will be helpful
- Government subsidy is needed on dairy feeds and equipments
- Arrange low cost milk cream separator machine
- Incubator for making dahi (Yoghurt)
- AI facility should be available

5.16.2E Findings of focus group discussion at Kashiadanga upazilla of Rajshahi district

Eight participants of different categories were present in the discussion meeting. Major problems encountered and possible remedial measures as suggested by the discussant members are presented below:



Major problems

- Lack of adequate finance
- Scarcity of land
- Lack of animal feeds
- High feed cost
- Lack of training
- Milk adulteration
- Low price of milk
- Spoilage of milk
- Accidental loss of milk
- Lack of storage facility
- Lack of high yielding dairy cows
- Incidence of disease
- Shortage of green grass
- High price of vaccine and medicine
- Shortage of skilled AI technician
- Inefficient milk marketing system

Suggestions

- Easy access to credit having easy terms and conditions
- Capacity building of farmers including other stakeholders for efficient farm management and value added products development
- Regular supply of vaccine at low cost
- Seed/cutting for high yielding grasses to be made available
- Development of own dairy breeds
- Availability of high yielding dairy cows
- Storage facility for milk
- Low cost machineries for dairy plant
- Quality control of milk and milk products
- Low cost supplementary feed
- Milk replacer for calves
- Adjusting price of milk and development pricing policy/strategy
- Availability of dairy feeds

5.17 Observation made during the focus group discussion (FGD)

- There is no guarantee of making profit by the dairy SMEs as the price of feeds, medicines, vaccines, veterinary doctor fee and other inputs are quite high and increasing regularly and the price of their milk are not increasing accordingly
- Veterinary doctors usually suggest a lot of medicines/vaccines and different diagnostic tests to treat diseases which are very much expensive
- Most of the farmers usually treat their own cows on the basis of their general knowledge/experience and Quake (locally trained veterinary service provider) as this is less expensive, according to their opinion
- Financial institutes are less interested to finance in dairy SMEs
- No access of diagnostic laboratories locally
- There is no regulatory body to regulate the market
- There is no quality control system prevailing in the market

- Price of milk is fixed up by the channel partners, not by the producers themselves
- Sometimes low quality feed, medicine/vaccine affects farm operation and sustainability.

5.18 Farmers' expectation

Dairy farmers in general are small and marginal in Bangladesh. Adequate information can not be reached to their door steps. They are not aware about the market information on different aspects of production and marketing. Many farmers claimed that sometimes production cost of milk is more than the selling price. They inferred that Government should set a policy of price fixing so that under any circumstances farmers can get fair price. Since the farmers are small and many marginal farmers find their livelihood through dairy farming, Govt. may develop dairy scheme to provide small term loan to the dairy beneficiaries having easy reimbursement policies. As grass is the main feed for dairy population in the village level, DLS may provide support facilitating grass cultivation of improved varieties at low cost.

CHAPTER-6

6.0 Future interventions:

6.1 Discussion

In this study data were collected from small, medium and large farms from four selected areas of Bangladesh. For collecting field data through interview method a set of structured questionnaire was developed by team members of the study. Two M. S. student of the Department of Dairy Science, Bangladesh Agricultural University were appointed for collection of data. The data collectors were trained before starting work. After collection of data, they compiled data and analyzed as per need of the study.

Simultaneously data were also collected from different stakeholders by focus group discussion, key informant interview method. From the primary data as generated and from secondary data collected from different sources clearly indicates that Bangladesh's milk production is very low as compared to the SAARC countries as well as to the European countries. Bangladesh can satisfy fulfill only 22% of its requirement lacking behind the deficit of about 78%. Bangladesh stands at the bottom comparing the milk consumption data with other neighboring and SAARC. Constraints of different nature are associated with lower production of milk. The major reasons are lack of high yielding dairy breeds, scarcity of animal feeds, poor marketing channel for selling milk and milk products, lack of dairy equipments and regular supply of vaccine for preventive diseases.

In Bangladesh, concentration of indigenous animals is very high but their milk production capacity is very low. In order to increase milk production, Bangladesh has to give more emphasis for development of own dairy breeds. Simultaneously breed up gradation process should be strengthened.

Milk production of indigenous dairy cows varies from 3.0 kg/d with an average figure of 1.5 kg/cow/day. On the other hand crossbred dairy cows produced more milk. In most cases well managed crossbred dairy cows are producing 10 to 25 liters of milk/cow/day. With local animals it is not possible to establish commercial dairy farms. Economic analysis of dairy farms of study area indicates that dairying is a profitable business. Milk

producing capacity of large farms in the study area were better than small and medium farms as most of the owners of large farms are rich and has procured good quality dairy animals for their farms and managed their cows in better than conventional ways.

There is no established milk marketing system in the study area. Farmers used to sell their milk in informal market chains which is dominated by vendors and goals. Milk is sold on the basis of volume. Bangladesh Milk Producers Cooperative Union Limited (BMPCUL) has established modern milk marketing system where milk is sold on the basis of fat content, not on the basis of volume. This gives a better option to check adulteration of milk to some extent.

In most cases farmers pointed out that they are not getting fair price for their milk because of higher dairy feeds cost that increases production cost of milk. On the other hand huge volume of powdered milk is coming from abroad which is another cause of low price of fluid milk. The quality of milk powder which is coming from abroad is questionable. They might have contained hazardous chemical like melamine. It is, therefore recommended that import of powder milk should be discouraged by imposing high tax on import and improves the indigenous dairy populations through cross breeding.

Limited availability of vaccine is a limiting factor in reducing the mortality rate of dairy cattle including the cows and growth of dairy population is restricted. FMD and Anthrax are more prevalent in our country. More vaccine should be produced in our country for this purpose.

Milk prices are not stable and often fluctuate. It has become necessary to incorporate a viable price fixing strategy so that farmers and other channel partners can get benefit of it. Market monitoring should be strengthened on feed marketing, ensuring fair price and making availability of vaccine.

Giving emphasis on the issues above the milk production can be increased, bargaining capacity of farmers will improve, quality inputs will be available to the farmers' doorstep and contribution of dairy sub-sector to the Bangladesh GDP will greatly be enhanced.

7.0 Recommendations:

7.1 Development of High Yielding Dairy Breed

Bangladesh is running with serious shortage of quality animals. Only Red Chittagong Cattle (RCC) and Black Bengal Goats are our own livestock breeds. Although Red Chittagong Cattle have the ability to produce calf in each year and have more disease resistance capacity than the exotic breeds, but their milk production is not up to the mark for commercial dairy farming system. Average per day milk production of RCC cattle is around 2.5 to 3.0 liters but to make commercial dairy farm profitable, a dairy cow with a capacity of at least 7 to 10 liters milk per day with about 300 days lactation period, 12 to 13 months calving intervals and age at first calving is about 28 to 33 months is necessary (Khan and Siddique, 2006).

RCC could be suitable for small holder dairy farmers under village areas. Development of graded animals by Artificial Insemination (AI) techniques is a short time solution but for sustainable and profitable dairying, country has to develop a dairy breed which can adjust with our environment. A dairy breed could be developed in our country using the best producers of our indigenous cows through Open Nucleus Breeding System that will take about 10 to 12 years ((Bhuiyan (1992).

7.2 Review of national breeding policy

In 2007, breeding policy has been revised by DLS. In breeding policy, it is recommended that in urban and peri-urban areas, cows should be breed in such a way that the offspring should maintain 50% indigenous blood and 50% Holstein Friesian bloods. For rural areas it is recommended that quality of the indigenous animals should be improved through selective breeding within the indigenous best to best crossing.

Limitations are also noticed in new breeding policy. In the new policy, Jersey bull was totally omitted. But in the past, its performance in our country was satisfactory. Our neighboring country, India has been using Jersey blood for improving their dairy animals. Recently, Milk Vita has imported pure Jersey bulls from abroad and inseminating their cows by Jersey bull's semen and obtaining satisfactory results. It is claimed that Jersey breed can tolerate more heat than that of Holstein Friesian. Their

size is small, require less feed and produce about 30 to 40 liters of milk in a day with highest concentration of fat in milk. In the new policy decision meeting this can be taken into consideration.

7.3 Increased feeds and fodder production

Fodder production has to be increased in order to achieve dairy development in the country. The farmers have to be encouraged to grow high yielding fodder. Due to shortage of land and high demand for food crop production, integrated rice/forage production technology had been developed. This technology has to be disseminated among the rural farmers. Cultivation of grass on roadside, embankment of ponds and rivers could help partially to overcome feed crisis to some extent. Modern technologies have to be developed for improving the nutritive value of low quality fibrous feeds. Generated technologies like Urea Molasses Block, (UMB), Urea Molasses Straw (UMS), and Urea Treated Straw (UTS) should be transferred to farmer's door steps by extension workers. Establishment of feed manufacturing mills can be encouraged by providing zero interest credit from Government Banks. Prepared pelleted feeds by different industries should be strictly monitored to ensure their quality, otherwise farmers will be loser.

7.4 Discouraging import of milk powder

Import of milk powder should be discouraged, every year Bangladesh is spending huge amount of foreign currency (US\$ 106.00 million, Bangladesh Bank, 2010) for this purpose. It should be noted that powder milk which is coming from abroad are not completely safe for human consumption. There is every possibility of coming melamine tinted low quality powder milk in our country. Discourage of import of milk powder could be done by imposing a higher rate of tax on imported milk powder and also strict monitoring on smuggling of milk powder in the country from outside.

7.5 Proper health care/management

Regular vaccination and de-worming is very much important to reduce the incidence of outbreaks of contagious diseases. For this purpose high quality vaccine is required. Unfortunately we do not know the quality of vaccine coming from abroad. For this purpose establishment of quality control laboratory for testing the quality of vaccines and veterinary drugs imported in the country is very important. It is better to produce vaccine in the country, as there is huge shortage of different types of vaccines at the present moment. Establishment of vaccine production centre and veterinary drug testing laboratory in each division of country could solve the burning problem.

7.6 Improvement of facilities for the diagnosis of diseases

The climatic conditions of Bangladesh, particularly high temperature and humidity are major factors favoring the spread of disease producing bacteria, viruses and parasites. Bangladesh has huge number of large animals and dairy sector is expanding but facilities for diagnosis of diseases of dairy animals are very much limited. Although Government and private sectors have established some diagnostic centers in the country but these endeavors are not enough to address the ever increasing demands of disease diagnosis. Therefore, more diagnostic centers with adequate manpower should be established in areas where livestock farms are located at high concentration.

7.7 Marketing and infrastructure development

In Bangladesh, the most important factor having the adverse effect on livestock production is the lack of well-organized marketing system, particularly in case of milk and meat which are perishable. The marketing system in the country is not uniform, may vary from area to area and even within a particular area. Milk Vita model which was found successful for work on dairy value chain of smallholder farmers should be replicated throughout the country especially in milk pocket areas (clusters). Simultaneously Indian Amul milk marketing model could be established throughout the country, although Milk Vita is partially adopting Amul concept but full implementation would get priority. Supply Chain Development Component (SCDC) of National

Agricultural Technology Project (NATP), Hortex Foundation concept of Commodity Collection Marketing Centre (CCMC) in rural areas could also be a good attempt to provide market facilities and fair price to the farmers.

7.8 Emphasis of small scale dairy production

Although commercial dairy farming has recently emerged in different areas of the country but till they are unable to satisfy nation's demand. For large scale operation, it requires huge involvement in terms of land, labour, capital, animals, skilled manpower and organized marketing system. Most of the developing countries across globes are giving emphasis on small scale dairy production system. We have to remember that till now rural dairy is holding more than 60% share of milk production in national grid. Therefore, government should give proper attention by giving training & providing low interest credit facilities to smallholder livestock producers and entrepreneurs.

7.9 Emphasis on dairy buffalo rearing

Buffaloes have been used for draught purpose in Bangladesh from ancient times. The importance of buffaloes for draught is, however, reducing due to mechanization, and farmers are becoming more interested in their use for milk production (Akbar *et. al.* 2009). Buffalo dairy farms have not commercially started yet in Bangladesh due to many limitations. Bangladesh do not have good dairy buffalo stocks and for this reason attempts should be made to upgrade our water type dairy buffaloes by introducing exotic high yielding dairy buffalo blood. India's 70% milk production is coming from buffalo. Similar is the case in Pakistan. But in Bangladesh the contribution of buffalo milk is about 7 to 8% of our national production and major portion of milk is producing by dairy animals (90 to 92%). We should keep in mind that buffaloes are docile animals, can consume poor quality fibrous feeds efficiently, fat content of milk is very high. To capture high fat content and facilitate more production emphasis should be given on commercial buffalo farming in Bangladesh.

7.10 Capacity building training for small holding dairy farmers and technicians

Dairy farmers and technicians are key players in the field of dairy development. They should be well equipped by providing training and demonstration. Although Department of Livestock Services (DLS) and other NGO's are sporadically giving training to dairy farms and technicians but this is not enough. It is worthwhile to mention here that Pakistan Government through their "The White Revolution" project has taken initiative to train 10,000 semi-skilled persons, particularly Artificial Insemination (AI) Workers and Animal Health Workers (AHW). Further they will address 2, 00,000 dairy farmers through information and dissemination processes on basic farm practices (Fakhar, *et. al.* 2006). This sort of Training & Demonstration Programme should be initiated by DLS of Bangladesh through a pilot project.

7.11 Strengthening national research and international collaboration

Collaboration between national and international research organization is necessary to exchange ideas and generated technologies between them. Recent developments in the field of biotechnology have aroused much interest in scientific communities in developing counties. Some biotechnology may be used as a tool by scientists to enhance or accelerate the improvement of smallholder animal production, such as in the fields of vaccine production and nutritional improvement.

7.12 Attracting foreign investments, joint ventures and encouraging existing processors to increase investment in the sector

Foreign investors can change and improve the whole structure of the dairy sector. For example, Nestle employs 5000 permanent employees and buys milk from 1, 35,000 farmers in Pakistan. If we can attract good foreign investors the economy will not only uplift but the dairy farm structure of Bangladesh as a whole will be developed. Apart from the foreign investment it will remain crucially important to have the existing processors reinvest in the sector. As drivers of the industry their growth and investment remains of utmost importance in the short and the medium term.

7.13 The Tax, the tariff and the trade - policy needs analysis for the dairy sector – as case for business advocacy

A rational tax and tariff policy can either develop a sector or alternatively assist its destruction. There is a need to change the tax and tariff regime of Bangladesh for an efficient and investor friendly dairy sector. An unfair tax regime that discriminates between the organized and un-organized sector is a huge obstacle to re-investment by major companies. Also in light of the industry restructuring that is taking place and the changes happening due to the multilateral and regional trading system, a complete tariff rationalization of existing policies is needed. In lieu of the above following steps could be followed-

- Zero rating of vat on selling milk and milk products
- Tax and duty free facility for importing equipments, machineries and packaging materials for dairy industry and feed manufacturing industry
- Tax holiday on new investment in commercial dairy farm
- Zero duty and tax for import of semen
- Zero duty and tax for import veterinary vaccines
- Zero interest loan from Government Commercial Banks for establishing dairy farms, dairy plants & feed manufacturing industry
- Tariff rationalization

7.14 Introducing Modern Farm Management through Model Farms

A pilot project could be initiated by the Government to upgrade at least one dairy farm in each upazila of the progressive farmers. This could be done by:

- Improving existing farms into model farms with full management support
- Developing the capacity of dairy farmers for getting financial credit from banks for their farm needs
- Demonstration of model dairy farms as best practice models and gearing up more farmers towards modernization
- Provide a grant amount of 30% with a soft loan of 70% to progressive farmers for dairy farm development

- Each farm could be equipped with the necessary assets to support modern farm management techniques:
 - a) Better quality animals
 - b) Mechanization
 - c) Building and shed design
 - d) Training

The process will provide awareness and technical support to farmers for adopting best farm practices and build necessary infrastructure for improved animal care, improved breeding and overall improved yield of milk. Additionally the introduction of model farms will develop entrepreneurial skills in them for commercial dairy farming.

7.15 Development of mobile milk collection system

Due to unscientific transport system in Bangladesh, a good amount of milk undergoes spoilage every year. For this reason it is necessary to develop entrepreneurs by enabling them to own a vehicle with chilled infrastructure (Mobile Chiller Tank) which will help them to conserve quality of milk collected from flung areas and provide to consumers at a premium price. In doing so, project could be initiated with following objectives:

- To ensure better quality milk to the consumers by providing better chilling facilities
- To create rural entrepreneurs who can work in a self-sufficient manner
- To reduce milk spoilage caused by high bacteria load due to high temperature
- To improve the price of the milk earned by the farmer through better quality milk and better linkage to the market.

About 70% soft loan and 30% grant could be provided to this type of entrepreneurs for purchasing mobile vehicles.

7.16 Adulteration and hygienic issues for milk

Adulteration of milk is one of the most serious issues that the dairy sector of Bangladesh is facing, causing not only major economic losses for the processing industry, but also major health risks for the consumers. Due to the spread of small

holding farmers and consequent supply chain complexities, milk handling processes in the traditional system are extremely unhygienic and there is no enforcement of standards. This results in poor quality products. The middle man of the milk supply chain carry out a successive adulteration process; in the form of water addition, ice, sugar, flour, vegetable oil, air exposure in order to increase their margins and preserve the milk. There is no punishment or incentive system in milk quality hence the middleman is mostly unaccountable. The regulatory structure currently in place in the milk sector is quite inadequate for modern times. Bangladesh Standards and Testing Institution (BSTI) are responsible for formulation and monitoring of standards of milk and milk products. In this context, activities of BSTI should be expanded and analytical laboratory should be established in each district to monitor the quality of milk and milk products sold in rural markets and city centers.

7.17 Emphasis on dairy food safety standards

Milk and Dairy products are rich and convenient source of nutrients for customer/consumers. The purpose of this Food Safety Standard is to provide guidance to ensure the safety and suitability of milk and milk products to protect consumers' health and to facilitate trade. All foods have the potential to cause food borne illness, milk and milk products are no exception as dairy animals may carry human pathogens. Such pathogens present in milk may increase the risk of causing food borne illness. Moreover, the milking procedure, subsequent cooling and the storage of milk carry the risks of further contamination from man or the environment or growth of inherent pathogens. Furthermore, the composition of many milk products makes them good media for the outgrowth of pathogenic microorganisms. Potential also exists for the contamination of milk with residues of veterinary drugs, pesticides and other chemical contaminants.

Attention should be given on quality standards to increase milk production to maintain sustainability of dairy sector of Bangladesh.

7.18 SWOT analysis of Bangladesh dairy

Dairy cattle farming – A potential income source for both commercial and backyard farmers which in turn expedite the rural growth. Economic activities prosper as dairy cluster emerge. Some improvements have been observed in existing dairy clusters, such as availability of nutritious and affordable food in the community, increase in assets as animals multiply and flow of cash through milk sales. This farming-based venture also creates jobs in rural areas. Aside from job creation and income generation, dairying addresses another important development issue – improved nutrition.

Bangladesh dairy sector possesses a number of strengths and weaknesses. At the same time, it has a lot of opportunities and threats. Production of safe food for human consumption should be the prime objective of the policy makers by allowing the SMEs to operate the production systems in a congenial and healthy environment. While the private sector has created opportunities in one hand, it has created many threats to SMEs on the other. The sector has its own strength to survive provided weaknesses are removed and threats are duly considered as obstacles for the development. The following **Table 36** shows a SWOT analysis of the commercial dairy sector based on primary and secondary information collected for this study.

Table-36: SWOT analysis of dairy sector in Bangladesh

<u>Strengths</u>	<u>Weakness</u>
<ul style="list-style-type: none"> ➤ Milk are acceptable to all people irrespective of age ➤ Milk are animal nutrition required for the nation ➤ Dairy farming is profitable ➤ A number of farms has already established in the country ➤ GoB and NGOs are involved in promotion of this sector ➤ Availability of potential entrepreneurs and they have keen interest for investing in dairy sector. 	<ul style="list-style-type: none"> ➤ SMEs are scattered throughout Bangladesh in an unplanned way ➤ Lack of enough processing facilities for producer, investment is needed ➤ Improper health care and services, vital from a food safety point of view ➤ No access of diagnostic laboratories locally ➤ No quality control system prevailing in the market ➤ Low quality inputs affects farm productivity ➤ Lack of technological development at SME level, education and training is required ➤ Prevalence of traditional marketing system, adds to the costs ➤ Lack of communication for easy treatment ➤ Lack of R&D activities in order to assist in long-term policy development.

<u>Opportunities</u>	<u>Threats</u>
<ul style="list-style-type: none"> ➤ Improving the dairy populations through cross breeding will increase the milk production in the country ➤ Production and consumption of milk are still below the standard requirements of rising consumption, leading to an upward pressure on prices ➤ Scientific farm management can increase production, there is a scope for using existing resources in a better way ➤ Development of own sustainable local dairy breed for Bangladesh would greatly assist in minimizing risks and popularizing production ➤ Utilization of unconventional feed to reduce import dependence on feed ➤ Value added products export possibilities exist provided domestic market situations are analyzed ➤ Composting, bio-gas project may be introduced in dairy clusters ➤ Production of organic foods through using compost can be enhanced ➤ DLS may provide support facilitating grass cultivation of improved varieties at low cost 	<ul style="list-style-type: none"> ➤ Farming mainly by crossbreed, very few local breed ➤ High mortality rate of calf due to tiger heart disease ➤ Very low reproduction capacity ➤ Poor bio-security at SME level can lead to major problems ➤ Poor waste management practice adds to costs and pollution ➤ Acute problems of Mastitis, FMD disease remains a very real threat ➤ Use of vaccines in dairy cattle, greater care is required to ensure emerging international standards ➤ Instability in market price of inputs and outputs, causing price instability ➤ Quality control of imported and locally produced inputs and outputs to ensure consumer safety ➤ Financial institutes are less interested to finance dairy SMEs.

On the basis of SWOT analysis, it could be concluded that the policy makers in dairy sector will need to remove the weaknesses and threats in order to pave the way of profitable farming for SMEs in Bangladesh.

CHAPTER-7

7.2 Conclusion

Dairying is a major component of animal agriculture and contributing a significantly in the national economy. Milk, the nature's most perfect food for building intelligent nation is coming from this sector. Annual milk production of the country is far below the normal requirement. At present we are producing only 2.95 MMT of milk annually but our requirement is 13.32 MMT. Bangladesh has to increase milk production up to six times to meet the national demand. The major constraints to milk production are the shortage of feeds and fodder, both in terms of quality and quantity, lack of genetically improved dairy cows, poor management and health care, as well as unorganized marketing system for most dairy farmers. The role of women in farm activities, especially dairying and investment in the homestead and cultivated lands needs to be assessed. Development of small-scale farming operations remains at a very early stage, although these farms are producing a reliable and steady source of each income for their owner's subsistence. Establishment of small scale dairy enterprises and processing units should be encouraged through appropriate policy and institutional support. Production of value added milk products and quality control of them should also be encouraged. Development of mobile milk collection system by using cold infrastructure vehicle will reduce post-harvest loss and will also help to improve the shelf life of milk. Hortex Foundation concept of Commodity Collection Marketing Centre (CCMC) could help to improve the marketing system of poor village dairy farmers. Capacity building of different stakeholders along the chain including farmers needs to be strengthened. Establishment of National Dairy Development Board and National Dairy Research Institute will strengthen the overall dairy development activities of the country.

ANNEXES

Annex-1: List of persons met/communicate

SL. No.	Name, designation and organizations
01	Dr Salim Kayser Tuhin, Deputy Manager (Marketing & Sales), Planet Pharma Ltd, House 143, Road 13/B, Block E, Banani, Dhaka-1213, Bangladesh, Tel: +88-02-9840585, 8836295, Fax: +88-02-9852988, Mobile: 01755540914, E-mail: drkayser@planet.com.bd, Web: www.planet.com.bd
02	Dr Mohammed Ruhul Amin, Livestock Statistical Officer, Focal Point: ECRRP (Livestock), Department of Livestock Services (DLS), Krishikhamar Sarak, Farmgate, Dhaka-1215, Bangladesh, Tel: +88-02-9118312 (off), 8055808 (res), Mobile: 01911737086, E-mail: mdruhul.amin@yahoo.com
03	Dr Md. Azizur Rahman, Assistant Director (Production), Department of Livestock Services (DLS), Krishikhamar Sarak, Farmgate, Dhaka-1215, Bangladesh, Tel: +88-02-9111181, Mobile: 01711135300
04	Dr Golam Mohiuddin (Kajol), Assistant Director (NATP), Project Implementation Unit (PIU), Department of Livestock Services (DLS), 1 st Building, Krishikhamar Sarak, Farmgate, Dhaka-1215, Bangladesh, Tel: +88-02-9131284, Fax: +88-02-9128872, Mobile: 01711626073, E-mail: babakajol68@yahoo.com
05	Dr Tomiz Uddin Ahmed, Director (PIU), NATP, Project Implementation Unit (PIU), Department of Livestock Services (DLS), 1 st Building, Krishikhamar Sarak, Farmgate, Dhaka-1215, Bangladesh, Tel: +88-02-8143128, Fax: +88-02-9128872, Mobile: 01712621066, E-mail: ahmedtuah@yahoo.com
06	Dr A.B.M Khaleduzzaman, Upazila Livestock Officer (Leave/Deputation/Reserve Post), Animal Nutrition Section, Department of Livestock Services (DLS), 1 st Building, Krishikhamar Sarak, Farmgate, Dhaka-1215, Bangladesh, Tel: +88-02-9138903, Mobile: 01716001137, E-mail: abmk5566@gmail.com
07	Dr Md. Akhteruzzaman (Liton), Office-in-Charge, Sreenagar Milk Factory and Area, Sreenagar, Munshiganj, Bangladesh Milk Producers Cooperative Union Limited, Mobile: 01683802168, E-mail: maktar2003@yahoo.com

08	Mr. Preetam Kumar Das, Senior Assistant Manager (Society), Milk Vita Head Office, Dugdha Bhaban, 139-140 Tajgaon Industrial Area, Dhaka-1208, Mobile: 01711359372, E-mail: preetambd@yahoo.com
09	Mr. Abu Khaled, Zonal Manager, Centre for Development Innovation and Practices (Cdip), Zonal Office, Dhaka Zone, Chanpur, Modonpur, Bandor, Narayanganj, Mobile: 01712953847
10	Mr. Dilip Kumar Bakali, Branch Manager, Centre for Development Innovation and Practices (Cdip), Sreenagar Branch, Joshurgaon (Babul Mollah Vila), Sreenagar, Munshiganj, Mobile: 01713093905, 01754777824
11	Md. Hasmot Ali, Field Officer, Centre for Development Innovation and Practices (Cdip), Sreenagar Branch, Joshurgaon (Babul Mollah Vila), Sreenagar, Munshiganj, Mobile: 01759902310, 01933867144
12	Md. Zillur Rahman, Assistant Director (Farm), 1 st Floor, Department of Livestock Services (DLS), Krishikhamar Sarak, Farmgate, Dhaka-1215, Bangladesh, Tel: +88-02-9114587
13	Mr. Nipen Ghosh, Goala, Sreenagar, Munshiganj, Mobile: 01717133259
14	Mr. Abdul Jalil, Milk Collector under Nipen Ghosh, Sreenagar, Munshiganj, Mobile: 01762826047
15	Dr Md. Emdad, Upazila Livestock Officer (ULO), Sreenagar, Munshiganj, Mobile: 01711131689
16	Md. Sadrul Muktadir (Sabuj), Deputy Director, Human Resources Department-1, Bangladesh Bank, Head Office, Motijheel, Dhaka-1000
16	Mr. M.H Farid Mir, Dairy Farmer, Shafayesree, Kapasia Sadar, Gazipur, Mobile: 01712-863552
17	Prof. Dr Shankar Kumar Raha, Department of Agribusiness & Marketing, Faculty of Agricultural Economics & Rural Sociology, Bangladesh Agricultural University (BAU), Mymensingh-2202

Annex-2: Identification of actors in dairy value chain study

In order to conduct the dairy value chain study, the following actors/sub-sectors has been identified:

1. Dairy Enterprises

(Small farm: 1-5 cows, Medium farm: 6-25 cows and Large farm: above 26 cows)

2. Integrated Dairy Producers (large industrial farm, i.e. Milk Vita, BRAC Dairy & Food Products, PRAN)

3. Milk processors

4. Goala (milk collector from small and medium farms)

5. Dairy product developers (i.e. sweet makers, creamy/processed cheese producer, chana producers, ghee producers)

6. Milk cream producers (The cream can be used to thicken all types of sauces, including sauces with acidulous ingredients. Furthermore, it is perfect in desserts, cakes, ice cream and whipping cream. To achieve the best results when whipping, refrigerate the cream before usage (max 5⁰C)

7. Input suppliers:

7.1 Feed, Feed Ingredient and Feed Additive Manufacturers, Importers and Marketing Companies

7.2 Pharmaceuticals and Vaccine Manufacturers, Importers and Marketing Companies

8. Service Providers (SPs) for Small and Medium Enterprises (SMEs):

8.1 Financial Institutions (among four factors of production i.e. land, labor, capital and organization financing the capital input plays the most paramount role in running any business enterprises. Therefore, in the development of dairy sub-sector in Bangladesh financing aspects need to be taken into consideration with due importance)

8.2 Dealers and Agents as dairy inputs seller

8.3 Consulting Firms (like poultry sub-sector, yet not established in dairy sub-sector as providing service to the commercial SMEs)

8.4 Service Providers for Waste Management

8.5 Laboratory and Diagnostics

8.6 R&D Organizations (Bangladesh Agricultural University, Bangladesh Livestock Research Institutes)

8.7 Extension Service Providing Organization (Department of Livestock Services)

8.8 Policy Issues (Ministry of Fisheries and Livestock, Government of Bangladesh)

In addition to the above mentioned actors, electronic and print media, professional associations, other agricultural universities, training centers, research institutes and some coordinating organizations (including government organizations) have some roles in the growth and development of SMEs. These areas were covered by means of various tools such as KIIs, discussion meeting and consultants' personal communication.

Annex-3: List of participants attended in the FGD at Village: Mandra, Union:

Bhagghakul, Upazila: Sreenagar, District: Munshiganj as on March 16, 2013

SL. No.	Participant name	No. of dairy cattle	Contact address with number
01	Md. Sirajul Islam Bepari	26	M/S. Sathi Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01924746244
02	Md. Montu Bepari	60	M/S. Montu Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01727222366, 01913303888
03	Md. Moslem Bepari	11	M/S. Moslem Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01718022480
04	Md. Latif Bepari	10	M/S. Sayma Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01737043177
05	Md. Johurul Islam	14	M/S. Johurul Dairy Farm Village: South Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01754652325
06	Md. Akhter Hossain	07	M/S. Akhter Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01771030857

07	Md. Kabir Sheikh	06	M/S. Samir Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01718206145
08	Md. Lutfor	09	M/S. Ridoy Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01729399372
09	Md. Kaiyum Sheikh	02	Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01736248671
10	Md. Moslem Sheikh	13	M/S. Shadin Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01775116217
11	Md. Tomizuddin Sikder	15	M/S. Tomiz Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01716673650
12	Abdur Rouf Kazi	01	Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01771970371
13	Abdur Rashid	06	M/S. Rashid Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01836805513
14	Mojibor Rahman Bepari	30	M/S. Mojibor Dairy Farm Village: Mandra, Union: Bhagghakul Upazila: Sreenagar, District: Munshiganj Mobile: 01730190891

**Annex-4: List of participant attended at focus group discussion of Kashiadanga
upazila of Rajshahi district**

Name of participant	Address
1. Sudha Rahi	Vill – Kashiadanga Post – Kashiadanga Upazila – Kashiadanga District – Rajshahi
2. Kanchan Singh	Vill – Kashiadanga Post – Kashiadanga Upazila – Kashiadanga District – Rajshahi
3. Md. Israil Islam	Vill – Kashiadanga Post – Kashiadanga Upazila – Kashiadanga District – Rajshahi
4. Md. Mozamal Hoque	Vill – Kashiadanga Post – Rajshahi code Upazila – Poba District – Rajshahi
5. Sree Mohadev Ghoss	Vill – Kashiadanga Post – Rajshahi code Upazila – Poba District – Rajshahi
6. Md. Makek	Vill – Balia Senpukur Post – Rajshahi code Upazila – Rajshahi District – Rajshahi
7. Md. Ekramul	Vill – Horipur, Post – Horipur Upazila – Poba District – Rajshahi
8. Arifur Rahman	Vill – Horipur Post – Horipur Upazila – Poba District – Rajshahi

**Annex-5: List of participant attended at focus group discussion of Gurudaspur
upazila of Natore district**

Name of participant	Address
1. Ahdam Ali	Vill –Kandail Post – Ahmmedpur Upazila – Gurudashpur District – Natore
2. Md. Abul Kader	Vill –Kandail Post – Ahmmedpur Upazila – Gurudashpur District – Natore
3. Md. Arfan Ali	Vill –Kandail Post – Ahmmedpur Upazila – Gurudashpur District – Natore
4. Md. Anamul Hoque	Vill –Kandail Post – Ahmmedpur Upazila – Gurudashpur District – Natore
5. Abdul Auaal	Vill –Kandail Post – Ahmmedpur Upazila – Gurudashpur District – Natore
6. Jamal Uddin	Vill –Kandail Post – Ahmmedpur Upazila – Gurudashpur District – Natore
7. Karim Shek	Vill –Tirayl, Khamar Para District – Natore
8. Robiul Islam	Vill –Tirayl, Khamar Para District – Natore
9. Jajar Ali	Vill –Gualkka Post – Maujara District – Natore
10. Alamgir Hossain	Vill –Tirayl, Khamar Para District – Natore

11. Md. Monsur Ali	Vill –Dhala Post – Kadilsila Upazila – Lalpur District – Natore
12. Abu Shaian	Vill –Gualpara Post – Gupalpur Upazila – Lalpur District – Natore
13. Jasangir Alam Helal	Vill –Gualpara Post – Gupalpur Upazila – Lalpur District – Natore
14. Shiten Chandra	Vill –Gualpara Post – Gupalpur Upazila – Lalpur District – Natore
15. Kajal Kasta	Vill –Malaapara Road Post – Banpara District – Natore

Annex-6: Major talking points for FGD

1. How many small, medium and large dairy farms are situated in your area?
2. What do you feel about dairy farming? Is it profitable?
3. Which type of cross breeds dairy are more liked by farmers and available in your locality and why?
4. How much milk is produced by different types of dairy cows per day and per lactation?
5. Do you have any problem in milk marketing? Please mention the problems and give your suggestions to overcome these.
6. What kind of feed you offer to your dairy cows? Mention the availability and price of dairy feeds.
7. Do you face any problem to get Artificial Insemination, nutrition and veterinary service? If yes, please specify.
8. Do you prepare any dairy products from your milk? If yes, please mention about the prospects for dairy products business in your area.
9. How many dairy sweet meat makers are available in your locality? What kind of dairy products are more accepted by customers and which product is more profitable?
10. Do you need any training on dairy cows feeding, breeding and management practices?
11. What kind of problems is related with dairy business in your area?
12. What are your suggestions to overcome the problems of dairy business?
13. Are you getting any technical and financial support from any organization? If yes, please specify?
14. Do you need any training and financial support in future for expanding dairy business?
15. Do you any idea about scientific method of milking, storage and preservation of milk?
16. How much amount of milk undergoes spoilage every year from your farm due to various reasons?
17. Do you keep some portion of milk for own consumption or selling whole milk in the market?
18. Do you follow any vaccination and de worming programme? If yes, please specify.
19. How many dairy animals died during last year?
20. Where you go when your animals are sick and what type of diseases are more predominant in your area?

Annex-7: Questionnaire on small and medium enterprises (SMEs) group for dairy value chain study in Bangladesh

Heifer international is a non-profit, humanitarian organization dedicated to ending world hunger and poverty and saving the earth by providing livestock, trees, training and other resources to help poor families around the globe become self-reliant. Heifer International's most striking qualities are its simplicity and effectiveness. Heifer International Bangladesh started its journey since February 2012 to end hunger and poverty in Bangladesh.

Objectives of the study:

In order to get better understanding of the sub-sector, plan programs and later be able to monitor progress in a comprehensive and effective manner. Heifer is commissioning dairy value chain study.

Specific objectives of the sub-sector studies are:

- to assess the existing situation and document prevailing dairy value chains in Bangladesh;
- to identify key interventions across the different layers of the DVCs to improve dairy value chain efficiency and governance to meet the gap in demand and supply of milk and milk products and
- to develop intervention strategies for sustainable livelihoods and increased income through promotion of dairy value chain enterprises.

Disclaimer:

Heifer International Bangladesh assure all the dairy enterprises that the information/data collected will be kept confidential and no individual enterprise data shall be made public in any manner. The final survey report would present the data only in aggregate form and no enterprise name will be mentioned anywhere.

Name of Enumerator:

Signature.....

Date: Time:.....

Name of Respondent:

.....

1. Farm's name with address

Farm's name:

Address:

2. No of years in dairy farming

3. Owner's name with address

Owner's name -
Sex.....

Age

Address:

Mobile No:

4. Present status of owners

a) Owner's Occupation (✓)

i) Service holder

ii) Business man

iii) Job seeker

iv) Agriculture

v) Others

b) Source of income (✓)

i) Dairy farming

ii) Business

iii) Agriculture iv) Others

c) Literacy level of owner's (✓)

i) Illiterate

ii) Primary

iii) Class 6-10

iv) S.S.C

v) HSC

vi) B.Sc.

vii) Above B.Sc.

d) Owner's land size (✓)

i) Below 0.5 acre

ii) 0.5 – 1 acre

iii) 1-2 acres

iv) 2-5 acres

v) Above 5 acres

e) Land used in dairy farming and grass cultivation (decimal)

i) Grass cultivation

ii) Farm house

f) Owners specialized training or diploma (v)

- i) Diploma ii) Training iii) Not

a) If any training/diploma, Pls. specify

g) Owners monthly income (v)

- i) 0-2 thousand ii) 2-4 thousand iii) 4-6 thousand iv) 6-above

h) Type of farm (v)

- i) Small (1-5 cows) ii) Medium (6-25 cows) iii) Large (above 26)

i) How many farms are situated in this area?

- i) Small No. ii) Medium No. iii) Large No .

5. What is your source of money for farming?

Particulars	%
i. Own source	
ii. Debt from banks/leasing companies	
iii. Debt from friends and relatives	
iv. Debt from non-institutional sources	
v. Debt from micro credit sources	
vi. Debt from cooperative sources	
vii. Goalas/dairy product developers/integrated	
viii. Others (pls. Specify)	

6. Access to credit from banks, leasing companies and informal sources

a) How much did this farm own to various institutions or individuals as of the last year?

Source of finance	Amount of loan (Tk.)	Short terms loan (Tk.)	Long term loan (Tk.)	Is it acceptable to you? Yes... No... If no why?	Long term (month)	Value of collaterals (Tk.)	Loan payment mode
Bank							
Leasing company							
Microcredit company							
Debt from cooperative							
Lending							

7. a) Cattle population

Type of animal	No. of indigenous	No. of crossbred
Milk cow		
Dry cow		
Pregnant		
Heifer		
Yearling bull (1-2 yrs.)		
Bull calf (below 1 yr.)		
Heifer calf (below 1 yr.)		
Bullock		
Breeding bull		

7. b) Sources of cattle

Sources	Number	
	Indigenous	Crossbred
Govt. farm		
Non-Govt. farm		
Market		
Reared		
Donation		
Hired		

8. Housing system

Building	Half building	Tin-shed	Straw shed	Floor type	
				Pacca	Kachha

Pattern			Drainage		Ventilation	
Open	Closed	Semi closed	Proper	Improper	Proper	Improper

9. Feeds and feeding system

- a. Source of roughage (√)
 - i) Own
 - ii) Purchase
 - iii) Both

- b. Source of concentrate (√)
 - i) Own
 - ii) Purchase
 - iii) Both

- c. Type of roughage used (√)
 - i) Road side grass
 - ii) Napier
 - iii) Para
 - iv) German
 - v) Rice straw

- d. Type of concentrate used (✓)
- i) Rice polish ii) Wheat bran iii) Oil cake iv) Fish meal v) Soybean meal
vi) Common salt vii) Bone meal viii) Vit.-Min. Premix ix) *Matikalai bushi*
x) Readymade concentrate feed
- e. Amount of feed given per cow per day
- i) Roughage..... Kg. ii) Concentrate Mix Kg.
- f. Major constraints of fodder production (✓)
- i) Scarcity of land ii) Scarcity of seed/cutting
iii) Lack of knowledge iv) Lack of awareness v) Lack of finance
- g. In which season feed crisis is more? (✓)
- i) Winter ii) Summer iii) Rainy season iv) Others
- h. Feeding system (✓)
- i) Stall feeding ii) Grazing iii) Stall-grazing v) Others
- In case of calf feeding (✓)
- i) Suckling ii) Bottling iii) Calf starter iv) Milk replacer v) Others
- j. Type of straw used (✓)
- i) Treated ii) Untreated

10. Breeds and breeding system

- a. Breeding system followed (✓)
- i) By natural (crossbred bull) ii) By natural (local bull) iii) By A.I. iv) Both (A.I and natural)
- b. Breed choice for A.I (✓)
- i) Friesian ii) Shahiwal iii) Jersey iv) Shindi

11. Overall management system

11.1 What do you do to prevent/reduce mortality?

i) Maintain bio-security	1
ii) Vaccinate/medicate to cows timely	2
iii) Disinfect farm house and premises	3
iv) Using drugs after any seasonal disease outbreaks	4
v) Using drugs before any seasonal disease outbreaks	5
vi) Others (pls. specify)	6

11.2 Overall mortality during the last year

i) Number of cows/calves died.....

If died, pls. specify.....

11.3 Sanitation and cleaning

a) Sanitizer used ((v)

i) Phenyl ii) Potash iii) Potash + Phenyl iv) Bleaching powder v) Others

b) Water sources (v)

i) Water supply ii) Tube well iii) Lake iv) River

c) Water supply (v)

i) Adequate ii) Inadequate

d) Cleaning done by

i) Hosepipe ii) Bucket

e) Cleaning (v)

i) Regularly ii) Irregularly

11.4 Milking and milk disposal

a) Dairy equipment used (v)

i) Traditional ii) Modern iii) Semi-modern

b. Washing udder before milking (✓)

- i) Cold water ii) Warm water iii) Other solution

c. Milking period and system (✓)

- i) Morning ii) Evening iii) Manual iv) Mechanical

d. Number of milking per day (✓)

- i) One ii) Twice iii) Thrice

e. Storing of milk (✓)

- i) In refrigerator ii) With preservative iii) In open environment iv) Others

f. Marketing systems of milk (✓)

- i) Broker ii) Local market iii) Sweet meat maker iv) Home service
v) Own selling center vi) Combine

g. More milk production (✓)

- i) First lactation ii) Second lactation iii) Third lactation iv) Fourth lactation v) Fifth lactation

h. Peak milk production (✓)

- i) 1-3 month ii) 4-6 month iii) Above 7 month

i. In which month milk production is high.....

j. In which season milk production is high.....

- i) Winter ii) Summer iii) Rainy season

k. Milk production performance

Breeds	Milk production (liter/day)
Holstein cross	
Jersey cross	
Red Chittagong	
Pabna	
Local	
Buffaloes	
Others (Sindhi, Shahiwal cross)	

l. Present market price of milk..... Tk./liter

m. Are you getting fair price of milk?

Yes.....

No.....

If not, why?

i) Lack of own transport	1
ii) Shortage of fund	2
iii) Selling to middlemen	3
iv) Previous contract with middlemen	4
v) Due to debt	5
vi) Low quality of milk/other (pls. specify)	6

n. Wastage of milk per day Yes..... No.....

If yes, how much/day..... liter

o. Causes of milk wastage.....

i) Handling loss ii) Transportation loss iii) Spoilage iv) Accidental loss

11.5 Disposal of manure (v)

i) Sold out ii) Used as manure iii) Used as fuel iv) Threw away v) Biogas plants vi) Others

11.6 Isolation for sick cattle (v)

i) Kept isolated ii) Not kept isolated

11.7 Preventive register (v)

i) Maintained ii) Not-maintained

11.8 Record maintained (v)

i) Maintained ii) Moderately maintained iii) Not maintained

11.9 Disposal of animal due to (v)

i) Unproductive ii) Accident iii) Old iv) Sterility v) Infertility

12. Treatment facilities

a. Treatment facilities have you got (v)

i) Yes

ii) No if not, because.....

b. Source of treatment facilities (v)

i) Veterinary surgeon ii) Quake iii) Others

c. Preventive measure (vaccination) (v)

i) Anthrax ii) R O iii) HS
iv) FMD v) GTV vi) Any others

13. Labor availability (v)

1. Available 2. Not-available

14. Productive and reproductive parameters

Items	Indigenous	Crossbred
Service per conception (%)		
Dry period (days)		
Calving to first service (months)		
Lactation length (days)		
Milk yield (liter/day)		
Calving interval (days)		
Highest milk production (liter/day)		
Lowest milk production (liter/day)		
Average milk production (liter/day)		
Total lactation yield (liter/lactation)		

15. Cost and Returns:

a) Costs per year (Last 01 year)

Items	Crossbred (Tk.)	Indigenous (Tk.)
Animal		
Feed		
Labor		
Housing		
Treatment		
Vaccination		
AI charge		
Equipments		

Repair and maintenance		
Transportation Charge		
Interest costs		
Service provider charges		
Electricity		
Others		
Total		

b) Returns per year (last 01 year)

Source of income	Crossbred (Tk.)	Indigenous (Tk.)
Milk		
Culled animals		
Cow dung		
Calf		
Empty gunny bag		
Access grass		
Others		
Total		

c) Profit and loss per year (last 01 year)

Type of breed	Yearly profit/loss (Tk.)	Profitable	Non-profitable
Crossbred			
Indigenous			

16. a) Do you think that access to finance for SMEs should be continued? Yes No

b) If yes, how much is your requirement?

c) For what purpose

17. Do any service provider come to provide technical support for your farm operation?

i) Received any support (1 = Yes; 2= No)

ii) Who is providing such service?

iii) What kind of service

iv) Service free of charge (1=yes; 2 No)

v) If use how much?

vi) If not why?

vii) Performance of service providers:

18 a) Do you need technical support during farm operation?

Yes

No

b) If yes, what sort of support?

19. a) Are you getting technical support (extension services) from the government)?

Yes

No

b) If yes, what's that support?

c) Do you think such support is adequate?

d) if not why?

20. In your opinion who can provide best technical service to you for ensuring profitability?

1= Govt. Officer, 2=NGO person, 3= Integrated dairy producers; 4= Development organization, 5=Consultancy firm, 6 = Individual consultant, 7 = Others, Pls. specify.....

21. a) How do you dispose your farm waste? (Multiple answers is possible)

i. Throwing away	1
ii. Making compost	2
iii. Selling to others	3
iv. Preparing bio-gas	4
v. Producing electricity	5
vi. Utilizing as bio-fertilizer/manure	6
vii. Others, Pls. specify	7

21 b) Is any organization helping you with waste management?

a) If yes, which organization

22. How many drop outs of dairy farms have seen in last three years in your area/location?

Year 2012 _____ Nos.

Year 2010 _____ Nos.

23. What were the reasons of such drop outs?

i. Debt	1
ii. High disease risk	2
iii. Management problem	3
iv. loss	4
v. Poor quality of cow/breed	5
vi. Poor quality of feed	6
vii. Marketing problem	7
viii. Low price of produced products	8
ix. Scarce of farm labor/others (pls. specify)	

24. Constraints you faced for running your farm?

i. Interruption in feed supply	1
ii. lack of quality cows/breed	2
iii. No technical support/disease prevention/artificial insemination	3
iv. Improper market price of product	4
v. Lack of skilled human resources	5
vi. High bank interest	6
vii. Frequent power outages	7
viii. Costs of doing business for SMEs in too high	8
ix. Acute disease outbreak	9
x. Scarcity of other raw materials	10
xi. Low price of output	11
xii. Low demand of output	12
xiii. Availability of foreign input/output at lower price	13
xiv. Lack of laboratory and disease diagnostic Centre/others (pls. specify)	14

25. Opinion of dairy farm owners in selected area for the improvement of dairy enterprise.

Opinion of farm owners	Crossbred	Indigenous
Availability of high yielding dairy animals		
Availability of feeds and fodder		
Proper marketing channels		
Availability of loan		
Training on proper management		
Artificial Insemination facilities		
Availability of medicine and veterinary services		
Increasing awareness		
Milk storage facilities		
Fair price of milk		
Others:		

Date:

Signature of surveyor:

1. Terms of Reference (ToR)

The specific responsibility of the consultants as outlined in the ToR is as follows:

- Investigate consumer preferences for milk and milk products considering qualitative and quantitative parameters of milk utilization;
- Review and analyze trends in production and consumption (yearly consumption pattern, per capita intake, wastages if any, seasonal variation in consumption if any) of milk and milk products. Assess and project annual demand and supply for the next five years;
- Review import and export situation of milk and milk products, assess its significance in national trade balance and suggest strategies for import substitution/export promotion. Compare costs of imported milk with that of domestic production and determine competitiveness of domestic milk;
- Assess current status, constraints and prospects of smallholders' integration in dairy production, processing and marketing facilities (private and public) and their participation in processing and marketing enterprises;
- Document prevailing value additions at each layer of milk production, collection, chilling, marketing liquid milk and milk product processing enterprises and recommend ways to ensure equitable distribution of profit margins among various actors of the value chain;
- Assess the quality of relationships among actors along the vertical and horizontal linkages of the dairy value chain. Suggest key project interventions/areas for building trust, reciprocity and business relationship among these value chain actors;
- Assess current status and constraints of smallholders in terms of genetics or breed, artificial insemination, veterinary service, nutrition, farm practices/management and marketing of milk;
- Analyze the present dairy market and supply chain structure – potentiality and challenges of dairy formal and informal value chain including market infrastructure, available financial and technical resources and potentiality of

commercialization through leverage from actors and suggest intervention strategies for attracting private sector to make larger investment in dairy value chain enterprises;

- Review policy framework, incentives for dairy farmers and investment environment, price policy, food aid, import duties including health and veterinary regulations.

1.1. Team members

Dr. Md. Anisur Rahman, Consultant (Team Leader)

Prof. Dr. Md. Nurul Islam, Consultant (Dairy Specialist)

Mitul K. Saha, Consultant (Agriculture Economist)

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