

**FY 13 Food for Progress Bangladesh Dairy
Enhancement Project Baseline Study**

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Innovision Consulting Private Limited

FY 13 Food for Progress Bangladesh Dairy Enhancement Project Baseline Study

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Our thanks also goes to the KII, who are the great contributors of information for this report. Secondary data sources are quite old and frequent surveys are not possible by the government due to financial constraints and lack of human resources. Updated information and statistics are rare in dairy or livestock sector in Bangladesh. Gathering information takes effort and frequent communication to the individual informants, institutions, farmers, market players, and input suppliers and so on. Projects working in dairy or livestock sectors are the only sources of latest secondary information but those are project specific because of the nature of requirement of data and may be partial in terms of sector or geographical coverage. The websites of the relevant departments are seldom updated with all information except the few. Therefore, interviews from KII to individual dairy farmers to input suppliers to market players to processors to service providers to government officials needs to confirm available data in the sector.

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List of acronyms and abbreviations

AIW	Artificial Insemination worker
ICU	Ice Cream Unit of a large industrial conglomerate
Anthrax	A bacterial disease of cattle
BBS	Bangladesh Bureau of Statistics
BDEP	Bangladesh Dairy Enhancement Project
BLRI	Bangladesh Livestock Research Institute
BQ	Black Quarter, a bacterial disease of cattle
CC	Cubic centimeter
CDVS	Community dairy and veterinary services
Chhana	Milk solids coagulated due to acidification
DD	Deputy Director of the DLS
DiD	Difference in Difference
DLO	District Livestock Officer
DLS	Department of Livestock Services
FGD	Focus Group Discussion
FMD	A viral disease of cattle
Fowl Pox	A viral disease of poultry
GDP	Gross Domestic Product
Ghosh	Individual who makes sweets out of milk
Goala	Milk collector in the village
GTV	Goat Tissue Vaccine, a vaccine against RP of cattle
Gumboro	Is a viral disease of chickens
HS	Hemorrhagic Septicemia, a bacterial disease of cattle
INNOVISION	A consulting firm registered in Bangladesh
IR	Intermediate Result
KII	Key Informants Interview
MCC	Milk Collection Center
Milk Coop	A large milk cooperative in Bangladesh aided by the government
RDA	Rural Development Academy
RP	Rinder Peste a viral disease of cattle caused by Peste Des Patits Ruminants
SNF	Solid Non-Fat
SO	Strategic Objective
ULO	Upazila Livestock Officer
USDA	United States Department of Agriculture
VAS	Veterinary Assistnat Surgeon
VAS	Veterinary Assistant Surgeon
VFA	Veterinary Field Assistant
VFA	Veterinary Field Assistant
VS	Veterinary Surgeon

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Executive Summary

The dairy sector in Bangladesh contributes 6.5% to the national GDP and employs 20% of the population (BBS, 2004). The 10 million dairy cattle, including 4 million cross-breeds, produce only 2.82 million tons of milk per year. This output is very low compared to neighboring countries such as Pakistan, where 5.5 million cattle produce 25 million tons milk per year.

To improve the productivity and expand the trade of dairy products, the United States Department of Agriculture (USDA) has awarded Land O'Lakes to implement the Bangladesh Dairy Enhancement Project (BDEP). This baseline study was conducted to: assess the prevailing conditions related to the dairy value chain, establish both qualitative and quantitative baseline information for the indicators, gather findings, set targets and get information to support the project design and implementation. The firm appointed a team comprised of local dairy experts, sociologists, data analysts and enumerators. During field visits, the team interviewed officials from division, district and upazila levels in Khulna and Rajshahi divisions. Farmers were interviewed at homes and at work. The team also conducted Key Informant Interviews (KII) with relevant key informants and the project's potential partner processing companies.

The sample-based study was conducted in 5 districts and the data was collected from 639 farming households. The respondents were divided into treatment and control groups to calculate the impact of the intervention through follow-up studies. Members of treatment groups were selected by implementers in coordination with commercial dairy processors. Members of control groups were selected based on their similar characteristics to the treatment group but care was taken to minimize spill-over effects. A detailed methodology of the study is outlined in Annex 2.

The paragraphs below summarize the findings on production techniques, herd and farm management, milk marketing, availability of finance and the role of women in the dairy sector. The survey has identified a number of opportunities for enhancing productivity and competitiveness of the milk value chain. The processor and the project jointly can address those areas to enhance dairy performance.

Production Techniques and Farm Management

The average farm size has 4.17 cattle, of which 40% are milking cows, 8% are pregnant and 4% are dry at any given time. On average, milk production is at **2.9 liters per day (LPD)**. However, production has been found to be much higher for cross-bred cows (**which average 5.77 LPD**). As milk production supply and milk prices do not offset the expenses it takes to maintain the herd, the herd suffers from malnourishment. Only 5% of the farmers procure and feed concentrates, less than 50% provide mustard/soy oil cake and about 90% feed grass and straw.

70% of cow sheds were found to be cemented which is uncomfortable for cows. Sheds were found to be inadequate in size and wet/unclean causing various diseases.

While 68% farmers vaccinate their animals, they are not satisfied with the quality. The network of paravets is accessible to 83% farmers but their expertise is not reliable. Some Paravets are trained by Department of Livestock Services (DLS) on Artificial Insemination (AI). Of four million AI doses dispensed in 2014, 65% were provided by Govt. Departments but now milk marketing companies new AI providers are becoming more active.

Milk Sales and Marketing (Farmer/Farmer Group Level)

Around 61% of the targeted farmers sell their milk to middle men (locally called Goala/ Ghosh). This is the strongest medium of selling milk for the producers in the targeted area. However, middlemen give farmers the lowest price (BDT 31.14 only). Some also sell their produce to processors (around 23%), neighbors (around 9%) and rest sell it to the tea stalls, local markets and sweetshops. Though processors are considered to be the formal channel but they do not give any better price (BDT 35) than neighbors or local markets (BDT 35.78).

In spite of receiving lower prices from the middle men, farmers choose to sell their milk to them because around 42% of the milk sellers are reported to have an agreement with the middle men. Under the agreement, farmers are obliged to sell their produce for a predetermined fixed price and/or deliver a specific amount of milk to the middle men. Most of the farmers go for agreements to confirm sales or to get loans.

Farmers rarely supply to the processors primarily due to the unavailability of processors in their localities. That is the reason only 600,000 liters, i.e. 10% of the milk daily produced in Bangladesh, is collected by formal dairy processors.

Market Linkage

A fundamental goal of the project is to link more smallholders to the formal market. In the view of Innovision, it may be an accurate statement to say that smallholders cannot be brought to the market, rather, the market needs to be brought to the smallholder. In this context, an important component of BDEP is assistance to establish Milk Collection Centers (MCCs). It is evident, however, that the intended number of MCCs to be established (42) is insufficient to link 17,000 farmers to the formal market.

According to information from processors, the necessary number to enable supply from smallholder farmers is 100.

It is recommended that the target for MCCs be substantially increased from the original design.

Milk Processing and Marketing (Value-added products)

Currently, almost 80-85% of milk in Bangladesh is consumed raw and most of the value-added products are imported.

Dairy Farmers

- A comprehensive training program for dairy farmer will help developing skill and knowledge on dairy management, feeding and nutrition, and overall dairy business.
- Promote fodder cultivation (high value grass) in areas where suitable and creating linkage with the farmers of the area where the supply is lower. Such as; Paigacha, Khulna suffers from lack of fresh feed (fodder, grass or straw) and it does not have suitable environment for producing fibrous feed; So fodder can be cultivated in other nearby areas and exported to Paikgacha.
- The training program should essentially cover the aspects of fodder cultivation, fodder preservation, urea-molasses-straw preparation and fodder production and preservation, feed

formulation from the local ingredients, herd management, milking and post-harvest hygiene and etc.

- Both women and men need to be trained on the same issues in order to put them on the same level of knowledge. Therefore, they can decide jointly on action without any confusion
- Mechanisms to enhance farmers' access to credit through alternative collateral arrangements can boost sector development over time, Care needs to be taken to ensure that finance being provided by middlemen does not inhibit farmers from supply to the formal market.

Service Provision

- Service providers in the targeted region have been found incompetent. However, they are catering to a big chunk of farmers. They should be trained by the quality input suppliers for better linkage and sustainability of the intervention.
- Train paravets to provide counseling or consultation services (on farm and herd management) to farmers besides technical services (treatment, AI etc). That will ensure more access to knowledge for the farmers regardless of beneficiary and non- beneficiary.
- Enhance linkages to financial service providers with service providers. It will increase the number of service providers in the region. More people will be inspired to open up their small business.
- An alternative and perhaps more effective and sustainable structure is to develop the advisory arms of the processors: this creates market alignment between farmer and processor needs, and the more effective the processor advisory arm becomes, the more milk its farmers should provide in a mutually reinforcing style.

Processors

- Chilling centers should be established in such a way that it can cater all the groups equally (radius method). Maximum 2 kilometers distance is advised otherwise dependency on the middlemen will not reduce.
- Processors must ensure better prices to farmers and ensure year around purchase. Unless this occurs, farmers will keep being exploited by the middlemen.
- Skill development of staff and employees of milk processor in the line of standard milk handling techniques, GMP, GAP, and HACCP.
- Processors make enhanced provision for the supply of advisory and extension services, as above
- Making linkages with financial institutions to access the finance beneficial to sector development.

Access to Finance

Most dairy farmers take loans from middlemen, but also from micro-credit providers (NGOs).

Gender Issues

Women are actively involved in dairy production. Their knowledge and participation in dairy farm management is no less than men. In most cases (more than 50%) women have equal decision making power regarding economic activities. They are highly interested to develop their knowledge on dairy farming and make a difference to their livelihood.

Given the situation to develop business in the sector the project and/or government should plan to take some strategies. Based on our findings, we have following recommendations for BDEP implementers to maximize the effectiveness and impact of the project:

- To counter the issue of low productivity, farmers should be trained on:
 - **Farm management:** The farmers, the key participant of the program needs to be trained to understand dairy farming as a business better. They need to know that dairy is business and only dairy cows are the members of herd. Farmers need to plan for dairy production improvements, including utilizing cost efficient feed formulations from local feed ingredients.
 - **Feed management:** Farmers were found to mix food with water, which is not a good practice as it reduces the nutrition of food. They were also found to be unaware of quality feed and other supplements. Therefore, the farmers need to be trained on appropriate selection of ingredients and optimal feed mixing. Also, they should be linked with quality feed suppliers or advised which forage/fodder to purchase
- **Animal Health Management.** For cattle, preventive health measure are preferred rather than treatment for disease. Experience suggests that enhanced nutrition and better farm management can reduce the incidence of disease. Nevertheless, farmers need access to veterinary care. Most dairy processors are providing veterinary services to their suppliers.

Artificial Insemination. Most AI services are being provided by DLS or dairy processors, at either subsidized rates or at cost.

- **Water management:** It was revealed in FGD that farmers provided water to cows either with roughage and/or with any feed. Therefore, the frequency of serving water to cows is approximately 2-3 times a day. The average amount of water served to cows is 36 liters per day, which is much lower than the need. It is vital for a cow to consume water in an amount equal to half of its body weight (if not 100 liters for local cows and 200 liters for cross breeds) to produce optimum quantity of milk. So the project should influence the farmers to increase the frequency of serving water so that the cow gets water round the clock.
- **Shed construction and management:** In general, shed floors are made of brick-cement in 70% cases and the rest are earthen made. Brick cement floors are not comfortable for cattle if rubber cushions are not used. The project should train farmers on this concept.

Milk Sales and Marketing (Farmer/Farmer Group Level)

- Farmers should be trained about maintaining the freshness, quality and hygiene of milk for storage at the farm and during transportation to collection points.
- Market demand for milk and dairy products is met largely by imported product. In addition, processors report that they cannot meet existing demand for their products. Accordingly, it is recommended that the funding of branding and marketing as per the present project design is redirected to meeting the challenge represented by poor on-farm productivity.

Milk Processing and Marketing (Value-added products)

- Formal processors must offer competitive prices to farmers and ensure year-round purchases to keep farmers motivated to sell their milk to them.

Access to Finance

- Better access to finance may allow farmers to grow their dairy businesses, through cow purchase or for slightly larger farmers some mechanization, for example.
- Small business may be financed in order to increase the inputs available to dairy farmers.

Gender Issues

- Female should be trained on the same issues as male, as more than 50% women take joint decision on farm management. So both must know the technicalities before agreeing on something.
- Training on farm management, access to finance and financial management should be given emphasis.
- Female in FGDs suggested that their groups should be trained separately to ensure active and lively participation
- Training center should be nearby as around 38% female reported that they could not attend training in past because of distant training center.

Sustainability

- This project wishes to achieve sustainability, and rightly so. In this question, we note the concerns over the sustainability of farmer owned MCCs as expressed to Innovision by another dairy focused project in northern Bangladesh).
- BDEP needs to boost the capacity of implementing partners if it is to achieve its goal. Ideally, this enhanced capacity should remain focused on the dairy sector after the completion of the project. In this regard, Innovision recommends that the nature of implementing partners be very carefully considered, and in particular whether the extension departments of processor partners might provide a sustainable “home” for advisory services.

1.0 Introduction

1.1 Background

The survey has been designed for setting targets against the project indicators to measure impacts at project completion. The two regions selected for survey showed more or less similar pictures with exception of some areas and items. Rajshahi region has been found developed in dairy compared to Khulna. However, the trend is developing in Khulna region for the past two decades. Rajshahi is superior in dairying to Khulna because industrial milk processors are present here for over 30 years. Therefore, apart from the government, private sector service providers are more developed in service provisions and input supply in Rajshahi than Khulna. Numbers of crossbred cows, increased milk production and access to milk marketing facilities are more available in Rajshahi than in Khulna. Apart from these comparisons survey has revealed some common features of constraints and possibilities in both regions.

Dairy farm management

Many farmers keep bulls and oxen with cows for fattening purpose. They generally keep them round the year till they grow large enough for consumption as meat. The sale prices of the bull seldom make up for the cost involved to raise these stocks. Even the crossbred cows sometimes doesn't produce above 6 liter of milk which as a rule of thumb is required to offset the cow's own feeding cost. Farmers' awareness on dairying is absent; they rather concentrate on keeping cattle herd not the cows for business. These issues call for raising awareness of farmers on dairy accounting and record keeping for profitable dairy business.

Water, feeds and feeding techniques: Farmers have no idea about feed formulation with the ingredients locally available around the premises or at homes. Almost all of the farmers reported that they procure feed and fodder and ingredients from their own sources and/or from the market. While serving feed to cows the ration is not maintained to fulfill the requirements of the body maintenance and production of cows. A combination of roughages and concentrated feed ingredients can successfully serve the target of feeding. Feed serving and feeding techniques are also unknown to them. Farmers only serve water and feed 2/3 times a day which can, in no way, help cows produce better. Because of the compound nature of the stomach of ruminants they need longer time to fill the rumen, the first stomach. Then at night or at leisure time cows regurgitate or chew the cud for further processing the consumed feed stuff.

Housing and cleanliness: During FGD it was seen that cattle houses are smaller than required. In household survey, data says that for each adult cattle a space of 55 square feet has been provisioned within the shed. Farmers keeping cows at stall feeding system feeds them via the cut and carry method. Stall fed cows require minimum (10x30) 300 square-feet space for manger space and movement purpose. Housing system observed in both of the regions is congested; floors are brick built but uneven and slippery due to wetness from urine and residues from cow dung. Drainage system is poor due to waste water logging and carelessness.

Many of the cows that are observed in the sheds are traumatized on their back legs and injuries are chronic and prominent. Some injuries are infected and abscesses have been formed. Performance of these cows will not be the same as from a healthy cow. Moreover, this situation of the cows increase the cost involved in treatments and extra time from farmers. These are simply due to lack of

awareness of farmers on cow comfort issues and cow health consciousness. These areas of awareness of farmers can be corrected by training and through business motivation approach.

Service providers

Veterinary and AI services: There are serious lacks of services from the formal sector of DLS. Shortage of human resources from DLS are the main cause of lacking of rendering services. “Paravet”¹ has been developed by DLS and NGOs under projects to fill the gap of DLS. Some paravets receive training on AI in advanced stage of experience. They serve as private service providers in veterinary sector for treatment and AI activities. Paravets are not as available in Khulna as in Rajshahi.

Service providers in Khulna and Rajshahi are poor in advising services on husbandry issues. Their principal target is to provide treatments to sick animals and vaccinate them, for prevention of few fatal, infectious diseases. Even the treatments they provide many times needs to be repeated, which increases the cost. Vaccines they collect from DLS sources often have not been maintained in a cool chain and hence are not as potent as they should be. Nutrition related suggestions are absurd from them; even though farmers do not pay for the advice. Refresher training or advanced training to these paravet would be a solution to serve farmers better.

Input suppliers: Feed companies that manufacture cattle feed too often adulterate their products. Ready feed stored in the market are often of deteriorated quality; especially the microelements added to feed are degraded. Feed ingredients suppliers also adulterate ingredients with saw dust, brick dust and sand. Seed retailers supply seed in the names of hybrid fodder but productions often do not show the results. Medicine shops often sell lower quality drugs at cheaper price. These medicines increases cost of treatment and often the cow suffers longer and hence it is needed to be disposed in the market. Very often AI workers inseminate cows with semen of unknown character or that has not been kept in liquid nitrogen. Even then daughter performance is often lower than that of the mother. Farmers have no idea of choosing semen to inseminate their cows. Repeated AI failure often leads farmer to use natural insemination from bulls.

All these irregularities in this sector are due to the segmentation of the industry and inadequate government service which crowds out more effective providers. Workshops and linkages with each other may improve the performance of the service segment.

Milk marketing: Due to absence of formal milk processor in the areas surveyed, middlemen are exploiting farmers by buying milk at lower price and putting farmers at risk of loss. Few farmers in Khulna know milking techniques, leading to even greater reliance on middlemen. The practice of a middleman moving from farm to farm and undertaking the milking is likely to be an effective medium for disease transmission including mastitis. These middlemen supply milk to private chilling centers established under contract a processor. In Rajshahi region there are farmers still untapped by milk companies. These farmers try to get access to vet services and feed ingredient from their locality on the basis of availability. Their herd health checks and milk sales are not as assured as in the case of herds of the suppliers to three of the target processors

¹ A trained individual on primary knowledge of animal health and common diseases of livestock. Allowed to provide simple and basic service to the cattle farmers.

These members are eager to be a part of the formal dairy sector, no matter which company arrange it in those areas. Milk processor companies may take the opportunity due to the first come first serve basis by establishing communications with farmers, formation of society, provisioning services and setting MCCs at those areas by bringing milk market in the village.

1.2 Organization of the Report

This section outlines a brief report of the livestock production in Bangladesh, the objectives of the project and the objectives of the baseline survey. Section two contains the findings of the baseline survey where both qualitative and quantitative information are presented. The findings are presented for both treatment and control groups in two project divisions (Khulna and Rajshahi) and also for all the respondents of these two groups. The findings are presented based on the project's strategic objectives and results indicators. Each result section ends by highlighting the key performance indicators (as per the PMP and project strategic objectives and results indicators), their baseline value, a suggested revision on the targets (if necessary) and future monitoring of the indicators. Additional performance indicators are also proposed for consideration based on the results from the survey and other studies. The last section of the report presents the conclusions and recommendations for the project. Annex 1 includes an overview of the dairy sector of Bangladesh and project background. Annex 2 describes the methodology applied in the survey, where we cover the survey approach and the team description, selection method of treatment and control area, determination of the sample size, sampling technique, sampling distribution and the tools employed in the study. Annex 3 is comprised of the Evaluation strategy of the project. Annexes 4, 5 and 6 include Data tables, Terms of References, and Study tools respectively. Finally, Annexes 7, 8 and 9 include a map of the survey area, a respondents list and the project results framework, respectively.

1.3 Scope and Limitation of Baseline Data

For the proposed dairy enhancement project, dairy farmers and milk processors are the most important sources of information on production and marketing respectively. Interviews of the key informants supplemented this data in order to provide a more robust illustration of the dairy sector in Bangladesh.

For the purpose of gathering data from the treatment groups, villages were pre-selected by implementers in coordination with commercial milk processors and the evaluation team was challenged to find the control sites with matching characteristics. This may have caused some notable differences between control and treatment groups. The findings show, as explained with detailed data in relevant sections below, a considerable similarity in the two groups while processing the data for Propensity Score Matching.

Other constraints included poor record keeping at both the farm and household levels. Farmers rarely keep records of their production, herd management or investments in farming or household expenses. Moreover, the survey was conducted during the rice harvesting season and the majority of farmers were quite busy during the data collection time. As a result, the enumerators had to wait for long lengths of time to get appointments with farmers, thus incurring more time than expected. Lack of availability and inconsistency in secondary literature was another issue that the study team dealt with. Though upazila-level livestock data of the study area was gathered from the respective upazila livestock offices, major market data is missing.

2.0 The Results and Findings of the Baseline Study

According to the program's Results Framework (Annex 9), the two main strategic objectives (SO) of the program are: Increased Agricultural Productivity, and Expanded Trade of Agricultural Products. Various activities (given codes from A to I) have been planned under multiple Intermediate Results. In this section, relevant data and findings from the baseline study will be presented for every SO and Intermediate Results component. The performance indicators related to results and associated activities will also be discussed in the subsequent relevant sections. Above the strategic objective, some performance indicators have been added to report on Feed the Future initiative indicators. Those overarching indicators are discussed in first part of this section.

2.1 Household Demographic and Socio-Economic Information

Respondents from the village were selected from those who have milking cows. The female representation among the respondents was 46% in the survey, which ensures almost equal gender participation in the study. The average household size of the study area was found to be five members, where four people depend on the earnings of one member on average.

2.1.1 Education and occupation of family members

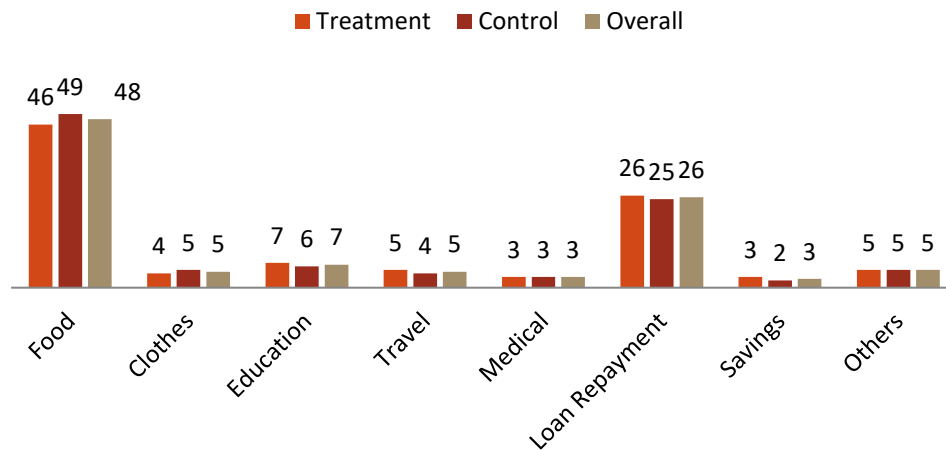
Of the family members in Khulna, 68% of females and 77% of males respectively are literate. Those of Rajshahi are 41% and 59% respectively, which indicates that the literacy rate of the household members of Rajshahi is lower than Khulna division (Tables 24 and 25). Crop farming was found as the main occupation of 52% of the heads of households in study area (Table 26).

2.1.2 Household Land Holding and Monthly Income

The average land holding for both regions is 1.13 acres and 1.41 acres for treatment and control groups, respectively. The average cultivated and fallow land sizes were found to be 1.46 acres and 3.25 acres respectively, and .46 acres.25 acres, respectively.

We have derived household income through the expense recording method where all household expenses, including loans and savings, were considered. The average monthly incomes in both the regions are BDT 12,064 and BDT 11,847 for treatment and control group respectively (Table 30). About 48% of the income was spent in food for the household and about 26% of income spent in loan repayment. A reasonable proportion of loans are taken from middle men or micro-credit organizations for the purpose of expanding herd size.

Chart 2: Percentage of expenses on different sectors²



2.1.3 Key program performance indicators for Results Area

Table 1: Key program performance indicators contribution to the 'Feed the Future' program

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
Feed the Future	Number of farmers and others who have applied new techniques or technologies as a result of USDA assistance. This indicator will count the number of farmers who applied new technologies to increase their milk yield	0	4000	7200	13,600	13,600	Should be adjusted as not all the farmers receiving trainings etc. may adopt the improved techniques/technologies. 80% adoption rate is suggested as target.
Feed the Future	Number of Individuals who have received USG supported short-term agricultural sector productivity or food security training. Individuals included here include farmers and others who receive training in best practices in productivity, agricultural techniques and technologies to therefore improve	0	5000	9000	17000	17000	No change

² Given the PSM methodology that has been approved in the evaluation plan, BDEP will conduct additional mini-baselines once treatment groups have been identified and selected by the processors.

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
	farm management, post-harvest management and market linkages						
Feed the Future	Number of farmers and others who have received training on improved agricultural techniques and technologies as a result of USDA assistance	0	500	8250	8250	17000	No change
Feed the Future	Number of Jobs attributed to USDA assistance	0	TBD	TBD	TBD	450	Jobs will mainly be created through Milk Collection Centers and the small business supported for inputs/service etc. Even with an increased in the number of MCCs, and with financial assistance for small businesses, this number may come out to be too high. A downward revision of 450 is suggested.
Feed the Future	Total increase in installed storage capacity of cold storage as a result of USDA Assistance	0	0	20	240	260	Based on the milk output at the 50% increase, we project at the end of the program to have 260 metric tons of milk storage capacity for the processors.
Feed the Future	Value of Agriculture and Rural loans provided to farmer groups as a result of USDA assistance	0	0	160,000	140,000	600,000	The indicator has been modified by reducing the total target from USD 2,000,000 to USD 600,000. Based on stakeholder input, this to be the responsible way to support farmers and agribusinesses, rather than forcing financing in a very short window.
Feed the Future	Value of incremental sales attributed to USDA assistance	0 ³	TBD	TBD	\$10,000,000	TBD	Added per USDA's request after revision of the BDEP evaluation plan.

2.2 Strategic Objective-01: Increased Agricultural Productivity

2.2.1 Current milk production scenario

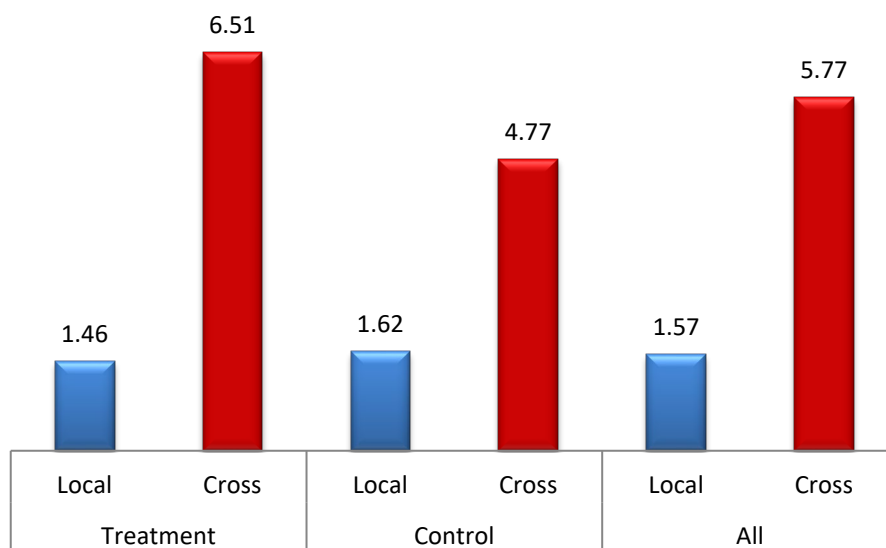
In the study area, the average number of milking cows per herd was 1.55 and 1.15 for treatment and control groups, respectively. The average milk production per cow per day in the study area was 2.9 liters. More specifically, the average milk production per cow per day was 3.77 liters for treatment groups in the study area whereas it was 2.03 liters for the control groups (Table 77). The average milk production from a local cow was 1.32 liters per day whereas a cross-bred cow produced 7.13 liters milk per day on an average in the treatment sites. Though the percentage of households having only local cows was almost 53% in the treatment sites, in control sites it was 70%. The majority (75%) treatment households of the Rajshahi division had crossed breed cows whereas the majority (73%)

³ Data to be collected at the end of the year.

of the treatment households of Khulna had local breeds (table 35). The popular crossed breeds among the treatment households were Holstein-Friesian (31%) and Jersey crossed (table 36).

The average annual milk production per herd of the treatment sites was found to be 1578 liters whereas it was 630 liters for the control groups (table 55).

Chart 3: Average of production of milk



Key program performance indicators for Results Area

Table 2: Key program performance indicators for Increased agricultural productivity

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr SO1	Number of individuals benefiting directly from USDA-funded interventions	0	500	8250	8700	17450	Increased number to accommodate on-farm jobs to be created.
FFPr SO1	Percent increase in volume of annual milk output per cow per day in two targeted regions (local)	1.89L	16%	16%	50%	50%	Research suggests that a cow grown under subsistent level may produce up to 25% more when standard nutrition and management applied on it. Therefore, target of increasing milk yield by 50% seems to be too ambitious for the project.
	Percent increase in volume of annual milk output per cow per day in two targeted regions (cross-bred)	5.5L	7.5%	12.5%	25%	25%	This target of 50% increase should be per farmer or per cow per day measure. Rather than region. Otherwise the project need to work all farmers all over the region. Further, it is recommended that in the light of the difference in the yields between local cows and crossbreds, targets for production increases are disaggregated, perhaps retaining the 50% increase target for local cows, and 25% of crossbreds.

2.2.2 FFPr1.2 Increased use of improved agricultural techniques and technologies

2.2.2.1 Existing dairy herding systems and techniques

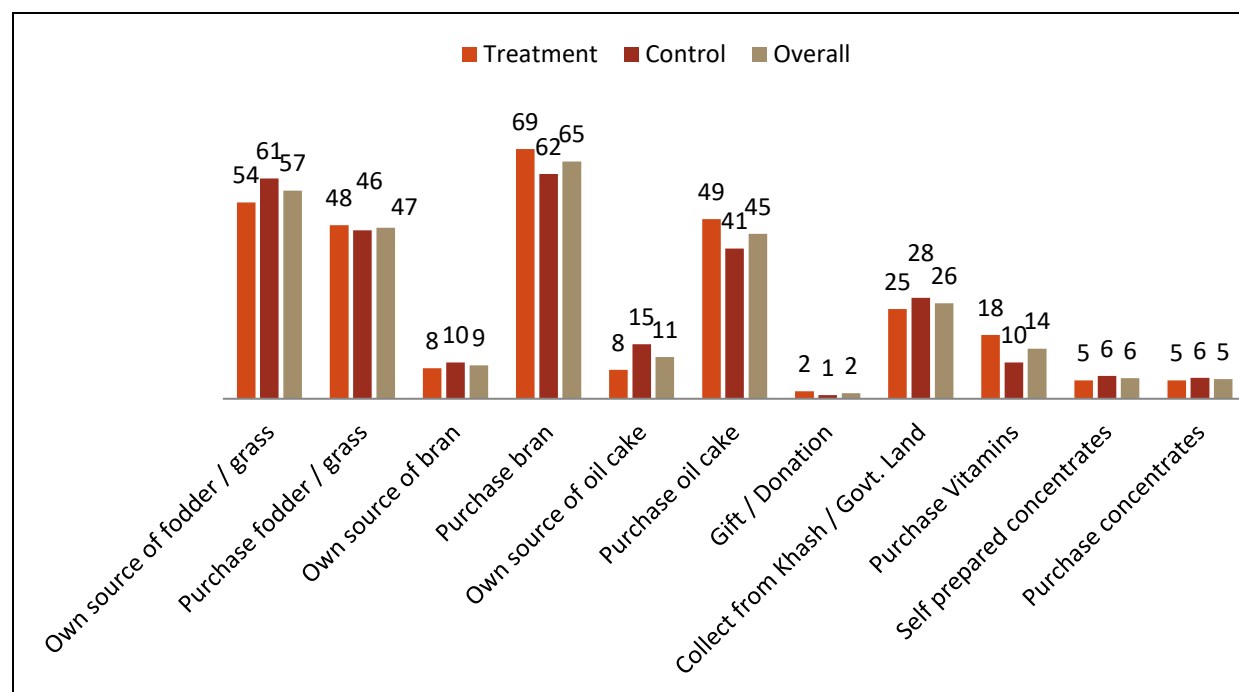
Feeds and Feeding: Planned feeding to dairy cows with quality feed ingredients are important. Balanced feeding helps dairy cows to produce more milk and maintain healthy productive life. In the study region it was found that majority of farmers (89%) fed the cows inside their sheds.

In household survey it has been seen that majority of the farmers feed cows with grasses (91%) and straw (92%). They also used rice bran (58%), wheat bran (72%), and salt (57%) in making mixed feed as concentrate, mustard oil cake (48%) and soybean oil cake (21%) (table 59). A very few farmers also provided other non-traditional items like maize powder, rice gruel, sugar syrup, urea-treated straw to cows. It was revealed in the FGDs that none of the farmers of the study region use fodder, forage, supplementary feed or any feed concentrates. Only 35% of the interviewed farmers claimed that they always fed by chopping straw or grass. The frequency of serving feed also was found to be insufficient; the majority (92%) of the farmers fed their animals at most three times a day. Almost 58% farmers fed only twice or less a day in the study region (table 41). About 75-80% farmers claimed that they usually “process” before feeding the animals (table 64), typical “processing techniques” being chopping of roughage or grass (70%), mixing water with feed (81%), mixing salt in the feed (55%), mixing vitamins (27%) (table 65). It was revealed in the FGDs that none of them know how to make balanced feed for

cows' nutrition. About 55% farmers sourced fodder from their own sources and other farmers purchase from the local bazar. Only 5% of the farmers were found to procure concentrate ingredients. Around 5% (Table 58) of herds have the opportunity to graze in fields.

The total package of feed management needs to be developed. A strong message needs to be given to the farmers regarding this issue. There are ample scopes to improve in feed formulation using local ingredients of own and local sources, form of feed presentation, calculation of feed requirement, and adaption of increasing frequency of feeding practices at farmers' level.

Chart 4: Sources of feed (%)



Water and its supply: Clean water is a prime requirement for a cow to produce milk at its peak. Our experiences and FGD findings reveals that almost all the farmers offered water to cows either with roughage and/or with feed. Therefore, frequency of offering water is directly proportional to that of feed and is around 2-3 times a day (table 69). According to HH survey, it says that on average 36 liters of water is offered by most of the farmers over the whole day (table 68). In general, if available, within 24 hours cows drink the quantity of water that equals to roughly half of its body weight, or 100-200 litres. This amount of water cannot be consumed in two to three “drinking sessions”, rather the frequency must increase. Apart from those facts the quality of water supplied by major farmers (95%) are acceptable as it is from tube-well sources (table 70).

Given the scenario of water supply the cattle herd will never be able to perform at its peak even if it has the history of good performance. Therefore, there are opportunities to intervene at this point to bring improvements in water management in cows.

Herd Health and disease management: Good herd health is a precondition for good output from the herd. Apart from feed and nutrition cattle, need to be free from disease to perform at their peak. For cattle, health management preventive measures are the first priority as opposed to treatment of

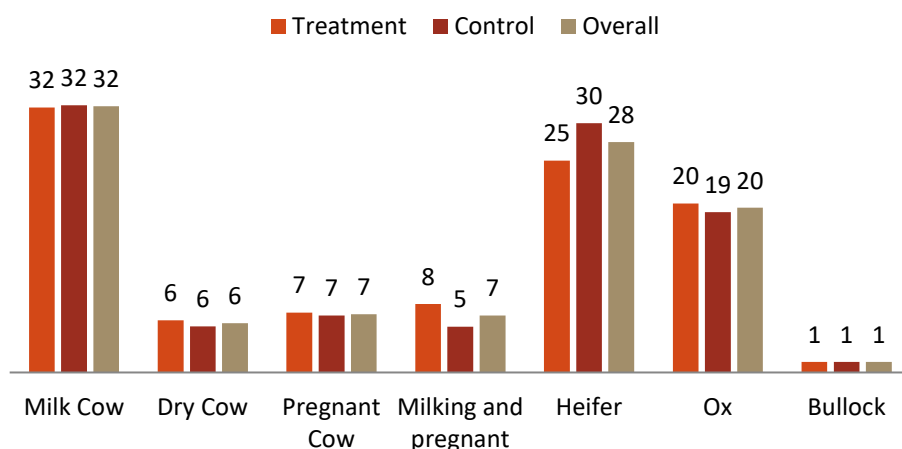
disease. By using vaccines regularly, fatal infectious diseases can be prevented. Surveys reveal that to keep cattle healthy, 68% of farmers administer vaccines to cattle (table 72). Though in the FGDs the majority of the farmers showed dissatisfaction with the quality and availability of vaccine, most of them complained that they were not getting timely vaccination for their animals. Among the other options, 50% of farmers use anthelmintic against worms, and 44% of farmers maintain clean cow sheds. Isolation of sick animals is practiced by 17% farmers and 26% believe that adequate water supply can prevent diseases. Most of the preventive measures to avoid animal disease were not practiced by the majority of farmers in the study region. Paravets are the main service providers or “doctors” for the herds in villages, followed by registered veterinary practitioners from DLS, which are 83% and 29% respectively.

FGDs also revealed that registered veterinary doctors are not always available to respond to calls from farmers as they are often busy in the offices of the upazila complex. The Paravets are the main service providers to cattle farmers in the remote areas. Registered veterinarians are not always available in the private service sector and government officers are busy with file works. Dairy companies provide veterinary services to their supplies, and it is recommended that BDEP pursue this option for their farmer beneficiaries.

Cattle housing and comfort: Comfortable housing and shed management for cattle are big challenges for cattle farmers. In general, comfortable housing facilitates cattle to perform better. A stressed cow will not perform at its potential. Protection from heat, cold, mosquitos, ticks etc., comfortable flooring arrangements, and sufficient ventilation are required for cows to stay out of stress. Under stall feeding systems, cows are compelled to stay within sheds almost 24/7 days (table 51). Survey findings show that on average, 71% farmers have tin houses for cattle (table 30). In general, floors are made of brick-cement (table 52) in 70% cases and the remainder is earthen made. Brick cement floors are uncomfortable if rubber cushions are not used. Farmers clean cow sheds around three times a day (table 54) and they keep 4 cows (Table 55) in 222 square feet sized shed (table 54) space for whole day which is hardly sufficient for one cow. Including paddock an adult cow needs at least 300 square feet area under stall feeding for barn and moving for little exercise. During FGD it was observed that no cow shed has a paddock area for movement of cows. Moreover, the floors are wet and not fully cleaned. Lesions of trauma on the hip joint and buttocks were observed.

Culling unproductive cattle from herd: During FGD it was observed that farmers have some cattle in the herd that are not productive due to various reasons. Also, some cows are not getting pregnant over years due to diseases or nutritional problems. Oxen and bulls are kept for fattening purposes and consume feed, increasing the cost of herds. Table 14 shows that among cattle in the herd, 20% are oxen, 6.25% are dry cows and 1.25% are bullock. In dairy herds, these types of cattle are unwanted because they increase the cost of milk production

Chart 5: Types of livestock (%) owned by farmers



2.2.2.2 Key program performance indicators for Results Area

Table 3: Key program performance indicators for Increased use of improved agricultural techniques and technologies

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 1.2	Number of farmers and others who have applied new techniques or technologies as a results of USDA assistance	0	500	8250	13,600	13,600	Propose to change to reflect 80% adoption rate.
FFPr 1.2	Percent of farms in target areas using sustainable agricultural practices	0	80%	80%	80%	80%	No change.

2.2.3 SubIR1.2.1 Increased availability of improved inputs

2.2.3.1 Status of inputs availability

Supply of concentrated feed and feed ingredient: Ingredients of concentrated feed are locally available at larger markets or upazila markets. The feed ingredients for concentrated feed available are mainly the byproducts of home-grown agricultural crops e.g. rice polish, wheat bran, sesame cake, mustered cake, soya cake, pulse bran, maize, and micronutrients. During FGD, farmers opined that these items are produced at their houses during the processing of their own food. There are also supplies of these ingredients in market and it largely depends on presence of dairy cows in the area and demand from dairy farmers to feed cows. Quality of ingredients in the market varies due to types of storage facilities and duration of storage by the sellers, and when harvested. There are processors

of feed or feed companies that manufacture mixed feed in the form of mesh, pellet and others in the market. None of their feed assures the quality and presence of exact nutritional value. Often companies adulterate feed ingredients to reduce cost of production and increase profit at the cost of farmer. Often farmers use rice bran from own sources instead of rice polish. Bran from pulses and wheat are collected from the market.

Case form Paikgacha, Khulna

There is a Woman from the Paikgacha upazilla of the Khulna district. She owns a native cow. Her dream is to be able to contribute to the earnings of her family by selling the milk that is produced by her cow.

The Woman only cow gives half liter of milk every day. She heard that she has to provide proper food, nutrition and water to increase milk production. But this is not possible in her locality since the people there mostly depend on shrimps and other aquaculture as their main source of earnings. As a consequence entire area suffers from lack of grass. As a result of this, the water present in the area is mostly salt water. There is barely enough freshwater available in the area to quench the thirst of the people in the locality let alone the animal. As a result there is not enough freshwater to give to the cow. Moreover, as the salt water is also found on land, it is not suitable for agriculture, or the production of crops. The people from this upazilla have to buy the rice they eat from other areas. This means that there is not enough straw or grass which is the main food for cows. Hence, if the food supplement for the cow is less, it means that the milk production is also less. The Woman cannot improve her livelihood unless something is done so that the cow can get enough food and water for an increased production of milk.

Availability of roughages or fibrous food: Fibers are required by cows to digest feed. Due to the compound nature of the stomach of cattle it is capable to digest all fibrous food originated from non-toxic plants. Farmers said during FGD in both regions that they collect weeds and grasses grown in crop fields and serve to cows in crop growing seasons. Farmers use home-grown paddy-straw for cows round the year. Those who do not have straw procure from markets or from neighbors at cost. Oftentimes, farmers use straw as the principle food for cattle. Feeding cows only with straw reduces the body weight of cows by 7% (BLRI findings). Grass cultivation is not widely practiced except in a few areas of riverine belts in Sirajganj and Pabna district of Rajshahi region. In Pabna and Sirajganj varieties of grass seed are available in market. Jumbo, Napier, maize, sorghum and other local types are sold regularly. Some seeds are coming from India through informal trade. Fallow lands are used by farmers to grow grasses in these areas.

In comparison with human food, grass cultivation is not preferable to the dairy farmers unless it is profitable. With the Khulna region being a saline area, crops are not grown well, and farmers are reluctant to grow grasses instead of growing food for human consumption. Only homestead lands are sometimes used to grow grasses for cows.

Some areas suffer from extreme shortages of animal feed, such as Paikgachha Upazila under Khulna District. Water and soil in this area is unsuitable for growing grass and straw. Thus, the project should think differently for those areas. We recommend one group member buy fodder in bulk from nearby fodder producing areas and distribute them among the group members. In this case, the project should influence farmers (who have suitable land) to produce fodder, as it will create a win-win situation for the farmers of both the areas.

Veterinary and husbandry service provisions:

Veterinary and husbandry services are mainly in the hands of DLS. Due to the shortage of human resources in the government, service is limited to small areas relative to demand. Therefore, government projects and NGOs developed a category of service providers called “paravet” or “LSP” to serve people at lower cost. Paravets attend a month-long theoretical training with field days at veterinary clinics. Dairy farmers by and large depend on these types of service providers. The prime services that farmers receive from these groups are vaccination to their cows, treating cows while sick and providing AI in cows when required. The paravet is not capable of suggesting dairy husbandry practices. They are trained to provide only primary treatment of some intestinal disorders, and anthelmintic to cows.

Artificial Insemination services:

AI is an important component in the dairy development of a country such as Bangladesh (and indeed it is vital in developed dairy economies). Survey results which show local cows producing on average less than 2 liters per day while crossbreds produce around 5 liters per day illustrate very well the state of the dairy sector in Bangladesh: crossbreeding is delivering higher productivity, while poor farm management practices result in the failure by a significant margin to produce milk to the genetic capability of these crossbreds. The foundation of enhanced farm management must be in place before AI can deliver to its potential. Survey results show that farmers are insufficiently knowledgeable of the quality and types of semen. Record keeping is absent; planned AI is absent. Generally, AI is done with semen from bulls developed locally by crossing local cows with imported bulls. There is a risk of breeding backwards, i.e. losing genetic potential over time, with this strategy.

DLS and the major dairy companies are the main sources of AI.

2.2.3.2 Key program performance indicators for Results Area

Table 4: Key program performance indicators for increased availability of improved inputs

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 1.2.1	Number of agricultural input suppliers in the target regions that supply/ sell improved inputs (feed, AI, minerals etc)	0	40	60	100	100	Since the survey was conducted in sample villages, the number of total suppliers in target regions cannot be determined. This number will be calculated as we roll out the operations in all geographies.
FFPr 1.2.1	Number of specific improved inputs available to farmers in target regions (feed concentrates, supplements, AI. etc.)	0	1	3	1	5	No change

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
Activity A	Number of new feed formulations	0	2	3	0	5	No change
Activity A	Number of one (1) day on-farm training on optimal feed mixing and utilization	0	20	115	115	250	The indicator needs to be modified to expand focus from feed mixing to animal nutrition and water.
Activity A	Number of Community Based AI technicians trained and provided with AI kits	0	0	0	0	0	The indicator has been deleted. Instead of training community based farmers to be AI technicians, we recommend that this service will be provided through processor partners already providing this service. Land O'Lakes also suggests providing resources to processor partners to expand and enhance the capability of their advisory services including AI.
Activity A	Number of farmers participating in feed formulation trials and testing	0	20	20	20	60	Targets have been revised considering that a smaller number of farmers will be required to participate in feed formulation trials
Activity A	Number of family members indirectly benefiting from new feed formulations, trainings on feed formulations and artificial insemination	0	2,400	39,600	41,760	83,760	The average household size found in the course of this survey is five, hence we suggest this number should be reduced to 83,760 to avoid double-counting.
Activity A	Number of farmers trained in optimal feed mixing and utilization	0	500	8250	8250	17000	No change

2.2.4 SubIR1.2.4 Increased knowledge by farmers of improved agricultural techniques and technologies

2.2.4.1 Present status of knowledge of farmers on agricultural techniques

Knowledge on feed management and farm management: Farmers are not aware of cow nutrition and feed formulation. In FGD, farmers opined that they use mix of concentrates without any estimation of nutritional aspects. Farmers serve feed and water 2-3 times a day. Cow needs continuous feed and water to fill the belly and convert complex feed ingredients into simple form by its compound stomach.

Only 7% of respondents received training on livestock management in the study area mostly from Department of Livestock Services (DLS). In the training the participants mostly got knowledge on dairy farm management (55%), feed preparation (76%) and disease identification (70%). Almost 73% of

them claimed that they adopted training's knowledge in livestock rearing. However, almost all (96%) the respondents showed their interest to receive training on livestock rearing. It is clear from the survey results that neither the reach nor the effectiveness of DLS training is satisfactory.

Knowledge on water management for cow: During the FGDs, farmers showed their unawareness about the importance of water management for cows. They did not know about the minimum amount of water that should be served to a cow per day. The household survey also suffices this finding. As already discussed earlier, majority of the farmers offered only 36 liters water to a cow per day, experts says that a cow should offered the amount water that equals to half of its body weight. It means if a cow's weight is 200 kg, it should get 100 liters water per day.

Knowledge on feed processing and preservation: Hardly few farmers know about fodder processing into silage, urea-molasses-straw and UMB preparation (table 64). These will increase nutritional value of feeds and appetite of cows to eat more feed. As discussed earlier in the feeds and feeding section, none of them use supplementary feed, fodder, mixing nutritious ingredients in feed etc. During the FGDs, the farmers informed that they do not have knowledge on feed processing and preservation. Though in the household survey, the respondents (77%) claimed that they do the feed processing: by feed processing they meant chopping grass, mixing water and salt on it (table 64) but not nutritionally balancing of feed. A very few of the households mixed vitamins but none of them keep silage, treat straw with urea and molasses etc. which clearly indicates their lack of knowledge on feed processing and preservation.

Knowledge on disease identification and preventive measures: It is revealed in the household survey that the majority (83%) of farmers depend on local paravets for animal disease management. During the FGD, most of the farmers complained disease as one of the major problem they faced in livestock rearing. About 68% farmers claimed that they did vaccination to their animal but not on time. While we asked the farmers what they do as preventive measure for their animals, they only mentioned vaccination (68%), maintain safe cow shed (44%) and de-worming as preventive measures. Only 17% farmers kept infected animals separated from the herd.

Knowledge on breeding: About 68% farmers complained of failures in conception in the animals as their major problem in breeding. Another 29% farmers reported that they had failed to detect when animals were in heat.

Knowledge of Whole Farm Management: Very few farmers understand the need to look at their farms and their dairy business in a holistic manner.

2.2.4.2 Key program performance indicators for Results Area

Table 5: Key indicators for increased knowledge by farmers of improved agricultural techniques and technologies

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 1.2.4	Number of Individuals who have received USG supported short-term agricultural sector productivity or food security training	0	500	8250	8250	17000	No change
FFPr 1.2.4	Number of farmers and others who have received training on improved agricultural techniques and technologies as a result of USDA assistance	0	500	8250	8250	17000	No change
FFPr 1.2.4	Percent of farmers who demonstrate proficiency in animal nutrition techniques	0	80%	80%	80%	80%	No change
Activity B	Number of grants to small input suppliers	0	0	70	30	100	Suggest increasing the number of grants to support the increased number of agribusinesses supported by processors.
Activity B	Value of grants to small input suppliers	0	0	\$175,000	\$75,00	\$250,000	Suggest adding this indicator to track the value of grants issued.
Activity B	Number of training sessions in feed mixing and silage	0	20	150	150	250	Suggest rephrasing this indicator to, "Number of trainings on whole-farm management."
Activity B	Number of farmers trained in feed mixing and silage units in community	0	8500	8500	0	17000	Suggest rephrasing this indicator to, "Number of farmers trained on whole-farm management."
Activity B	Number of family members indirectly benefitting from new small feed mixing units and trainings in feed mixing/silage techniques	0	51000	51000	0	102000	Suggest deleting this indicator.

2.3 Strategic Objective2: Expanded Trade of Agricultural Products

2.3.1 Present status of milk trade in formal and informal sector

Milk trade avenues: At present, milk trade in the formal sector is about 600,000 liter per day by industrial processors. The rest of milk is traded informally to consumers and a portion goes to sweet shops and tea stalls. More than 85% of milk is traded in the informal sector. Both dairy farming and the dairy market are fragmented Milk prices vary with geographical location, condition of road communication, festivals, rituals and presence of milk processor companies. There is a great need for milk processing companies to lead the handling, collection, processing and marketing of milk and milk products. Approximately 9 million liters of milk are produced in the country every day by the cows all over the country only little above than 10% milk is coming to formal channel for processing. Collection by the formal sector of the rest of the milk is challenging owing to unorganized farmers, poor transport infrastructure, farming supports and markets.

2.3.1.1 Key program performance indicators for Results Area

Table 6: Indicators for Expanded Trade of Agricultural Products

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr SO2	Percent change in volume of locally produced milk and milk products	0	0%	5%	10.5%	10.5%	A significant increase in the milk volume procured by the formal sector from 600,000 (100%) liter to 1,200,000 liter per day seems to be unrealistic. In 2001 the total milk processed by formal sector was approximately 131,000 liter (3%) per day. Today's rise in 600,000 liters took more than 13 years. Therefore, this target would be very ambitious and to achieve within three years in certain specific area. Suggest target be reduced to be more practical at 10.5%.

2.3.2 IR2.1 Increased value-added to post-production agricultural products

Status of present post-production value addition

At present more than seven companies are in adding value to milk in to different products. Other than them different milk products are also imported for local consumption and for the foreign nationals in the country. More companies are showing interest in milk processing business, some are already on the way of setting milk processing business by piloting chilling points. There is a big market for processed milk in the country. In this survey Innovision was advised to concentrate its work in collecting information from farmers end in the villages. Information on value added products, its market size and types of products may be obtained by an extended survey in the market. However, daily approximately 600,000 liter of milk are processed to value addition in to different products. Currently the companies are producing 10-12 different value added or processed milk products such as flavored milk, UHT milk, cheese, Ghee, powdered milk etc.

2.3.2.1 Key program performance indicators for Results Area

Table 7: Indicators for Increased value-added to post-production agricultural products

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 2.1	Number of Jobs attributed to USDA assistance	0	TBD	TBD	TBD	450	Even with the higher number of MCCs identified as being necessary to link the target 17,000 farmers to the formal market, the original target of 1,000 jobs seems to be too high – we propose a number closer to 450.
FFPr 2.1	Average margin between farm-gate price and end product price for milk and milk products through the formal domestic and international chains	Informal 30%, Packaged 56%	10%	25%	50%	50%	No change. However, processors have indicated to Innovision their reluctance to provide the detailed operating costs and margin information needed to measure this indicator.
FFPr 2.1	Number of downstream milk products produced	10	0	2	3	5	No change, however, processors should decide the best use for any additional milk volume obtained through this project.

2.3.3 SubIR2.1.1 Improved quality of post-production agricultural products

Present status of quality of post-production agricultural products

Milk supplied to the chilling centers is not always good quality. Milk hygiene and cleanliness is a must for the farmers as well as for processors' collection centers. Milk often arrives at the chilling center in a spoiled or adulterated condition. Farmers sometimes adulterate milk to increase the quantity for sale, but it is generally held that most adulteration is conducted by middlemen. Farmers in our FGDs reported that middlemen adulterate milk while supplying to MCCs, the sweet shop and tea stalls and eventually give them lower price. Mixing water with milk reduce fat contents leading to lowering price.

Quality of milk collected from farmers also contributes to the quality of products. Shelf life of processed milk varies due to quality of the raw milk procured from fields or chilling points at the villages. Training to farmers on milk hygiene and practices on sanitation is essential for improving quality of products in the processing plants. The staff of the company collecting milk needs to be trained to handling milk appropriately.

2.3.3.1 Key program performance indicators for Results Area

Table 8: Indicators for Improved quality of post-production agricultural products

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 2.1.1	Percent of milk and milk products certified as meeting international standards	0	5%	10%	15%	15%	No change in value, however, we suggest changing the wording to reflect Bangladesh guidelines and standards, as opposed to international standards.

2.3.4 SubIR 2.1.1.1 Increased adoption of established standards by industry

Status of present standards in dairy industries

Very few farmers (approximately 8%) have had formal education or have received training on dairy farm management. Yet these farmers are interested and eager to adopt new techniques and technologies if training is provided. From the FGDs we know that most of the farmers want training on farm management, record keeping, breeding of cows and disease management etc.

Bangladesh is not exporting any meaningful volume of dairy products. Hence, there is no particular need for Bangladesh to meet international standards, and in any case this would not be possible given the fragmented nature of the dairy farming sector; the adoption of international standards might only be possible if a very significant reduction in milk procurement by the processors was forced upon them. Dairy processors have their own standards for milk procurement, and it is felt more relevant for BDEP to focus on implementation of these standards. Processors desire that BDEP works with farmers to both increase milk production and enhance quality at the point of delivery to MCCs.

2.3.4.1 Key program performance indicators for Results Area

Table 9: Increased adoption of established standards by industry

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 2.1.1.1	Percent of registered dairy firms that obtain certification with international/BTSI standards related to milk quality	0	5%	10%	20%	20%	No change, however, we also suggest changing the wording to reflect Bangladesh guidelines and standards, as opposed to international standards.
Activity F	Number of training sessions for MCCs staff in milk quality and record keeping	0	0	5	1	6	Total number increased to meet the needs of the target beneficiaries.
Activity F	Number of farmers directly benefiting from standards and record keeping trainings	0	0	14,450	2,550	17000	No change.
Activity F	Number of family members indirectly benefitting from standards and record keeping trainings	0	0	0	0	0	Suggest deleting this indicator.
Activity F	Number of MCC procurement staff trained in milk quality and record keeping systems	0	0	85	15	100	Target revised from 42 to 100. If it is agreed to increase the number of MCCs established with the assistance of this project, this target should also increase.

2.3.5 SubIR 2.1.2 Increased efficiency of post-production processes

Formal milk processing companies in Bangladesh are sufficiently capable of processing milk into different products as required by market demand. Additional raw milk supply is required to fulfill the capacity of companies' milk processing plant. Higher volume of milk entering into the formal chain will enable processors to reduce production costs and increase product diversification. According to company information milk chilling centers, transport and processing is not any problem for the industries. Problem lies at farmers end and milk collectors end. Milk delivered to MCCs must be qualitative in terms of purity (un-adulterated) and hygiene.

2.3.5.1 Key program performance indicators for Results Area

Table 10: Indicators for Increased efficiency of post-production processes

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 2.1.2	Percent decrease in average production cost per unit of dairy products	BDT 24	TBD	TBD	TBD	TBD (Reduce by 5%)	No change

2.3.6 SubIR 2.1.2.1 Increased use of improved post-production processing and handling practices

In the dairy sector, skills in post-production handling and post processing handling are essential. Companies are practicing those rules and guidelines. For the new MCCs established there must be training programs to development of skills of farmers and employees of the MCCs.

2.3.6.1 Key program performance indicators for Results Area

Table 11: Increased use of improved post-production processing and handling practices

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 2.1.2.1	Number of firms in target regions using modern equipment to process milk and milk products	0	1	2	3	3	Suggest reducing this number to the number of processors BDEP will work with. Since there are only about a dozen milk processors spread all over Bangladesh, the original number of 42 is difficult to achieve. It should be revised down to the number of firms actually operating in Khulna and Rajshahi and who will partner with BDEP.
Activity G	Number of farmers trained in milking hygiene, and handling	0	0	10000	7000	17000	Suggest increasing to 17000 to reflect all farmers who will be trained under BDEP.
Activity G	Number of training sessions for farmers in milk hygiene, and handling	0	0	350	850	850	Suggest increasing number of sessions to accommodate the number of farmers to be trained.
Activity G	Number of training sessions for MCC procurement staff in milk hygiene, handling and packaging	0	0	25	5	30	Increase to reflect increased numbers of MCCs.
Activity G	Number of family members indirectly benefitting from training on sanitation, cold chain management, and packaging/handling products	0	0	0	0	0	Suggest deleting this indicator.
Activity G	Number of milk collection and processing staff members trained in milk hygiene, handling and packaging	0	0	85	15	100	Suggest increasing to reflect the higher number of MCCs if these are approved. Also suggest deleting "packaging" out of this component.

2.3.7 SubIR2.1.2.2 Improved post-harvest infrastructure

Around 75% of the households in our survey population sell their milk in whole or in part; others consume their total production. Our FGD findings reveal that in most cases middlemen perform the milking activity. On an average every farm sells 4.1 liter milk every day at an average price of BDT 35.5. Predominant buyers in our survey area are middlemen/goalas (on an average 55%).

From the FGDs we know that farmers are not responsible for spoilage of their produce but processors reported that they often find adulterated milk when they receive it. It happens due to the middlemen who mix water to increase the volume, or other adulterants to prevent bacterial spoilage or to increase fat content. Mixing with water reduces fat content which leads to lower price for the farmers and processing problems for the dairy companies; other adulterants may cause either human health concerns or at the very least issues with respect to honest labeling (e.g in the case of vegetable oil addition). This problem can be mitigated by establishing milk collection centers closer in proximity to more the farmers, so that they can directly sell their produce to the processors. Increasing number of milk collection centers will ensure accessibility of more farmers and less value loss of milk.

Also milk is perishable and requires chilling systems in order to cool to a temperature of less or equal to 4 degree Celsius. A system needs to be in place so that milk collected is transported and cooled quickly. An increase in farmers supplying milk to the formal sector will obviously require an expansion in the numbers of MCCs to receive that milk.

2.3.7.1 Key program performance indicators for Results Area

Table 12: Indicators for Improved post-harvest infrastructure

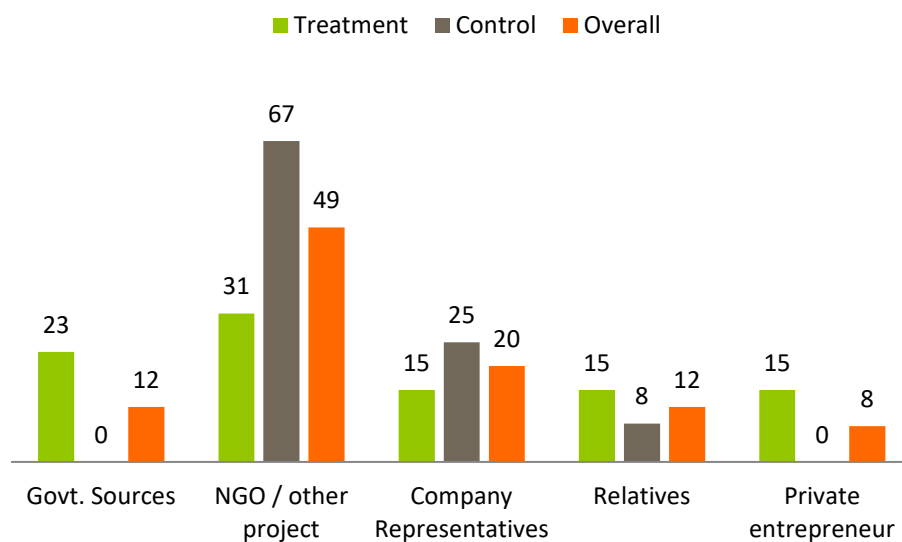
Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 2.1.2.2	Total increase in installed storage capacity of cold storage as a result of USDA Assistance	0	0	20	240	260	Suggest increasing this value due to the increase in the number of farmers supplying milk to processors.
FFPr 2.1.2.2	Number of farmers in target regions that have access to quality and effective off-farm storage for milk and milk products	0	500	8250	17000	17000	Target value increased from 10,000 to 17,000. Suggest including all farmers who will have access to increased number of MCCs.
Activity C	Number of milk collection hubs installed	0	0	2	0	2	No change
Activity C	Number of MCC farmer groups formed	0	0	85	15	100	To achieve sustainable formal market linkage, this project recommends that MCCs should be operated by processors. In addition to sustainability, this supports specialization within the sector. Accordingly, it is recommended to increase this number from 42 to 100.
Activity C	Number of farmers trained in cooperative development and management	0	500	8250	8250	17000	Suggest rephrasing this indicator to, "Number of farmers trained in good farming practices." Suggest increasing value to reflect all farmers trained.
Activity C	Number of family members indirectly benefitting from the training in cooperative development and management and MCC/milk hub.	0	0	0	0	0	Suggest deleting this indicator.
Activity C	Number of processors buying milk from milk collection centers	0	3	0	0	3	Suggest reducing this from 4 to 3 to reflect on the ground realities of very few processors operating in Bangladesh.
Activity C	Number of model farms established	0	0	1	0	1	Suggest to add this indicator. Critical for farmer demonstrations and adaptations of new techniques and technologies for good farming practices.
Activity D	Number of farmers delivering milk to milk collection centers/hubs	0	0	14450	17000	17000	No change
Activity D	Number of small scale milk collection and chilling centers	0	0	85	15	100	Based on stakeholder input, this indicator will slightly be modified to accommodate realities on the ground, as the approach of setting up the MCCs has changed from farmer groups owned MCC to processors owned MCCs. Land O' Lakes has increased the target to meet program needs. – Land O' Lakes will direct resources to establish 100 milk collection centers in conjunction with processor partners.
Activity D	Number of family members indirectly benefitting from insulated tanker deliveries	0	0	0	0	0	Suggest deleting this indicator.
Activity D	Number of insulated tankers for milk deliveries	0	6	0	0	6	No change

2.3.8 FFPr2.2.3.1 Increased use of financial services

Credits in agriculture sector are often refused by banks, especially for small dairy farms. When in need, dairy farmers often seek loans from middlemen; repayment may be via a verbal agreement to sell milk at a fixed price lower than market rate. Farmers need cash for feeding cows and increasing the herd size.

It has been found in our primary surveys that most prevailing sources of formal loans are NGOs and development projects (see chart below). These NGOs are usually microcredit providers and impose high interest rate (around 14%) on the farmers. Though farmers show their unwillingness to those organizations still they choose them because of unavailability of alternative sources. In this situation project should come forward for better financial linkages with lower interest rate and favorable terms and conditions.

Chart 6: Sources of loan for developing dairy businesses



Processing plants and facilities may have credit from banks at ease. To increase business facilities and expand collection and processing facilities they will need credit. Feed processing plants, medicine companies, service providers will enjoy the facility of accessing to credit for expansion of business.

2.3.8.1 Key program performance indicators for Results Area

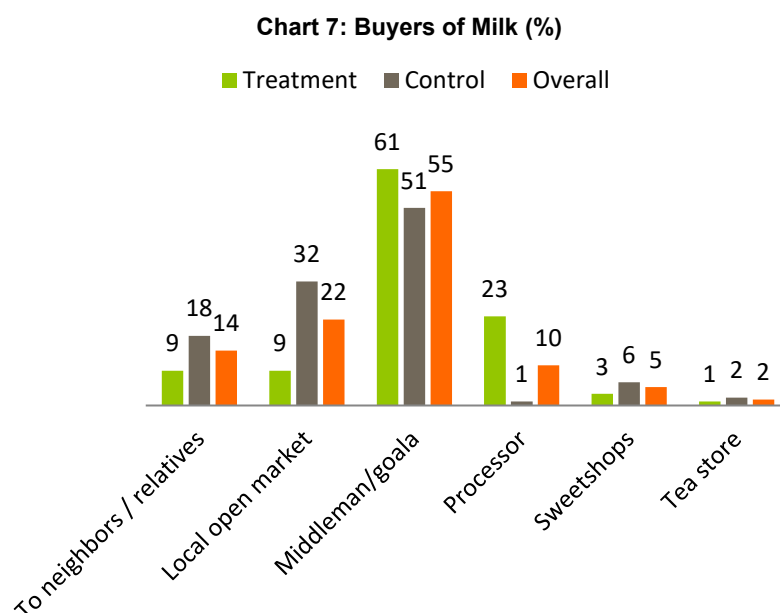
Table 13: Indicators for Increased use of financial services

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 2.2.3.1	Value of agricultural and rural loans provided to farmer groups as a result of USDA assistance	0	0	300,000	300,000	600,000	The baseline survey suggests that it will be difficult to extend loans to the value as per this indicator, within the time frame of the project. We consider a significant reduction is necessary.
FFPr 2.2.3.1	Number of firms in target regions who are accessing credit through any type of "formal" financial product (e.g. loans)	0	1	4	5	10	No change
Activity I	Value of loans provided to farmers and AI (input) providers under Activity - Training: Improved agriculture production techniques	0	0	160,000	140,000	300,000	As per the findings of the Inception Report, AI businesses are unlikely to be sustainably profitable, thus we suggest decreasing this value.
Activity I	Value of loans provided to establish small milk collection centers under Activity - Infrastructure: Post harvest handling and storage	0	0	0	0	0	Owing to the change to processor owned MCCs, we suggest deleting this indicator based on the findings.
Activity I	Value of loans provided to input providers and processors under Activity -Capacity Building: Providing business development services in agricultural production to expand trade	0	0	160,000	140,000	300,000	We suggest significantly reducing this value based on the findings.
Activity I	Value of loans provided to support marketing campaigns under Activity - Training: improved marketing and branding	0	0	0	0	0	This survey has found that there is little need to create demand when processors already cannot meet demand. Accordingly, this indicator should be deleted.
Activity I	Number of loans issued under Activity - Training: improved agriculture	0	0	40	35	75	This should be modified in the light of better understanding the needs of the sector, as identified in this baseline survey. The

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
	production techniques						number of loans has been reduced to align with expectations of the average loan size issued in country.
Activity I	Number of loans issued under Activity - Infrastructure: Post harvest handling and storage	0	0	0	0	0	Suggest deleting this indicator based on the findings.
Activity I	Number of loans issues under Activity - Capacity Building: Providing business development services in agricultural production to expand trade	0	0	40	35	75	This should be modified in the light of better understanding the needs of the sector, as identified in this baseline survey. The number of loans has been reduced to align with expectations of the average loan size issued in country.
Activity I	Number of loans issued under Activity - Training: Improved marketing and branding	0	0	0	0	0	This survey has found that there is little need to create demand when processors already cannot meet demand. Accordingly, this indicator should be deleted
Activity I	Number of family members indirectly benefitting from the loan guarantees	0	0	0	0	0	Suggest deleting this indicator based on the findings.

2.3.9 IR2.2 Increased access to markets to sell agricultural products

As milk is a perishable product market access is vital for the farmers. It is always preferred that farmers put their attention only in farm management and the produce when buyer should think about the market so that smooth demand and supply can be ensured. From the primary survey we know that around 61% of our targeted farmers sell their produce to middlemen or govt. This has been found as the strongest channel in the survey area. Over dependency on middlemen can lead to exploitation of farmers and adulteration.



Note that middlemen may sell to sweet shops and tea stores. However processor companies have been found to provide slightly better price (table 14) than middlemen that can be a motivational factor for the farmers for selling their produce to the processors directly.

Table 14: Average Price of Milk BDT/litre by Buyer

	Khulna	Rajshahi	All
To neighbors / Relatives	35.78	40.11	37.05
Local open market	33.69	39.82	38.93
Middleman/goala	31.14	35.52	32.20
Processor	35.00	37.00	36.95
Sweetshops	33.88	41.00	37.65
Tea store	32.50		32.50

2.3.9.1 Key program performance indicators for Results Area

Table 15: Indicators for Increased access to markets to sell agricultural products

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 2.2	Percent change of raw milk entering formal value chain	10%	33%	33%	33%	100%	The indicator definition should specify the source of milk to be herds of program beneficiaries only.

2.3.10 IR2.1.3/2.2.1 Improved marketing of agricultural products

One processor reported that a company can make more profit from milk when diversified products are made. The processor does not have enough milk for its processing plant and for consumers; therefore, we cannot think now about many new products. We need to increase production at farmers end. Therefore, BDEP needs to emphasize more on farmers end for production than anything else. They also said that processors in Bangladesh are experiencing shortage of raw milk supply on the face of more demand. Therefore, marketing support is not needed. Rather, project funding should be directed towards farmer development.

Companies do not seem to require any support for marketing their products at this stage.

2.3.10.1 Key program performance indicators for Results Area

Table 16: Indicators for Improved marketing of agricultural products

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 2.2.1/2.1.3	Number of dairy firms that use at least two forms of media to advertise their products (print, radio, TV, web, direct mail, etc.)	0	0	1	1	2	It was noted above that one targeted processor has not been responsive to BDEP partnership approaches. This suggests a reduction in this indicator is warranted from 4 to 2.
FFPr 2.2.1/2.1.3	Number of consumer-ready dairy products using specialty labeling	0	0	3	2	5	Suggest reducing this from 20 to 5. BDEP should work with processors to determine how best to utilize the additional milk volume generated through this project.
Activity H	Value of resources provided to processors for marketing	0	0	\$171000	0	\$171000	Suggest adding this indicator to meet the needs on the ground.
Activity H	Number processors carrying out dairy marketing campaigns	0	0	3	0	3	Suggest adding this indicator to meet the needs on the ground.
Activity H	Number of processors trained to develop new products and industry promotional campaigns of OBM	0	0	0	0	0	During stakeholder interviews, processors showed no interest in such a generic campaign. Accordingly, it is recommended that this indicator be deleted.

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
Activity H	Number of family members indirectly benefitting from messages from the OBM campaign and the new dairy products from locally produced milk	0	0	0	0	0	Suggest deleting this indicator.
Activity H	Number of marketing campaigns developed	0	0	0	0	0	During stakeholder interviews, processors showed no interest in such a generic campaign. Accordingly, it is recommended that this indicator be deleted.
Activity H	Technical assistance in developing industry promotional campaigns of OBM	0	0	0	0	0	During stakeholder interviews, processors showed no interest in such a generic campaign. Accordingly, it is recommended that this indicator be deleted.
Activity H	Number of processors using the OBM logo	0	0	0	0	0	During stakeholder interviews, processors showed no interest in such a generic campaign. Accordingly, it is recommended that this indicator be deleted.
Activity H	Number of new dairy products that processors are trained to develop from local milk	0	0	0	0	0	During stakeholder interviews, processors showed no interest in such a generic campaign. Accordingly, it is recommended that this indicator be deleted.

2.3.11 SubIR 2.2.2 Improved linkages between buyers and sellers

Long term, collaborative relationships between buyers and sellers are essential for sustainable business and sector development.

A key goal of the present project is to increase the supply of milk to the formal market, by strengthening links between farmers and processors. In this manner, a package of benefits can be achieved:

- For the consumer: more milk and milk products, better quality, ultimately perhaps more competition.
- For the processor, more milk, better quality milk and the opportunity to increase profitability, lower costs and produce more added value items.
- For the farmer, a stable and consistent market, competitive prices and the prospect ultimately of greater competition for their milk, plus services such as AI, veterinary care and advisory services.

- For organizations interested in dairy development, the linkage of farmers to the formal market generates revenue streams, part of which can be used to build capacity in advisory services.

Such farmer-to-market linkages are insufficiently common in Bangladesh today. There is a great need to develop such linkages, and a key requirement is additional investment in MCCs and associated infrastructure. Establishment of greater numbers of MCCs will allow for more farmer-to-formal market linkages.

Information from one processor suggests that the collaborative nature of these linkages is best achieved by the mutual advantage that the relationship brings. Sustainable procurement is achieved only by treating the farmer with respect. Greater milk volumes will come about via fair pricing and support in the way of training and extension services. According to the processor, little additional benefit is achieved by entering into more formal arrangements. Integrity and a long term commitment, The processor considers, are of greater value to both parties than some form of contract. Competition also means that dairy companies need to treat farmers fairly. Investment by the processor in its farmers is large: it cannot afford to give them reason to walk away in order to supply another processor.

2.3.11.1 Key program performance indicators for Results Area

Table 17: Key indicators for improved linkages between buyers and sellers

Results Frame work Level	Performance Indicator	Baseline	Targets			Proposed End of Project	Suggestion for revision of PMP and future monitoring
			Year 1	Year 2	Year 3		
FFPr 2.2.2	Number of agreements between buyers/sellers for buying guaranteed volume of milk	0	0	10	5	15	Suggest reducing this from 40 to 15 due to on the ground realities.

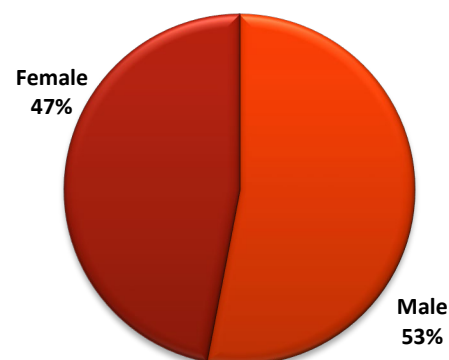
2.4 Gender Analysis

Traditionally women play a significant role in livestock nurturing. Thus a focus in women involvement is vital before starting a project like BDEP.

Women are mostly engaged in the production tier of the dairy value chain. A detailed discussion of their roles, contribution and hurdles has been provided in this section.

The base of the findings are household survey with female, Focus group discussions with female, and key Informant interview in particular with government officials from the Department of livestock.

Chart 8: Ratio of Male and Female in Household Survey



2.4.1 Roles and contributions to livelihood

Women in rural areas are usually housewives in Bangladesh. They are responsible for doing household chores and taking care of their children and other family members. However, they are to some extent also engaged in economic activities. Women in our targeted areas are also engaged in dairy management. They carry out some essential tasks on dairy management which make differences to their livelihood.

2.4.2 Assets Ownership

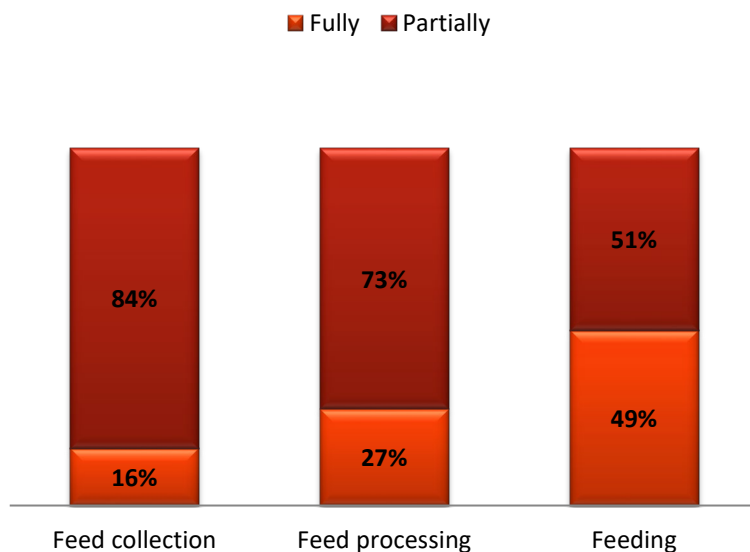
Around 20% women from the household survey reported to have land registered in their names and around 32% said they have their own cattle. On an average they have 2-3 cattle. Control over these assets has been discussed below.

2.4.3 Roles in livestock management and Control over Benefits

Farm Management

Women are mostly engaged in farm management. Our primary survey reveals that 42% women are fully and the rest of the 58% are partially responsible for cowshed maintenance (mostly cleaning). Whereas only 9% women are engaged fully in shelter construction as industrious works are mostly performed by the male of the household. These findings suggest that project should target women if it aims to train its beneficiaries on cowshed management.

Chart 9: Contribution in Feeding Activities



Women are actively involved in feeding activities than feed collection and processing. Around 49% women are fully and 51% are partially involved in feeding. Whereas 84% and 73% are partially engaged in feed collection and feed processing respectively while few are (16% and 27%) fully engaged in feed collection and processing. In our social structure men are responsible for buying and collecting inputs (feed) from outside, thus feed collection

is mostly done by men. While, as women stay at home, it is more convenient for them to take care of serving feed than men. However, FGD findings reveal that they do not have clear idea about proper food and nutrition. They mostly practice whatever their men suggest to do. So it is recommended that project should provide training to particularly women on feeding techniques and processing.

Our targeted women have been found with limited knowledge over health care of their livestock. Only about 13% and 12% women are fully engaged in reproduction activities and other disease treatments of cows. Rest of the women relies on their husbands, local paravets and veterinarians. However, our FGDs reveal that, most women consult with their husbands in case of any physical hazards of their cows, if they cannot resolve it jointly male member of the household contact the paravets or veterinarians.

Chart 10: Contribution in Health Care

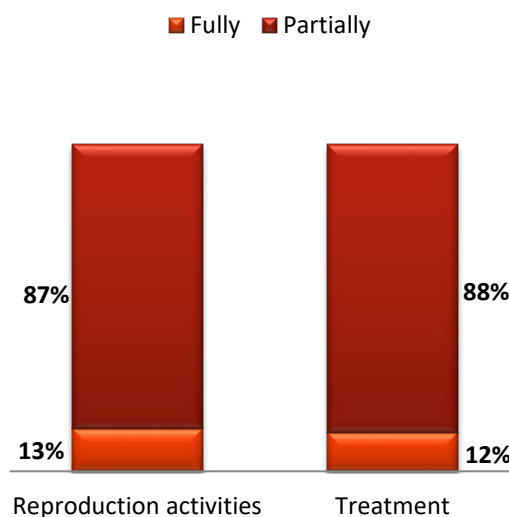
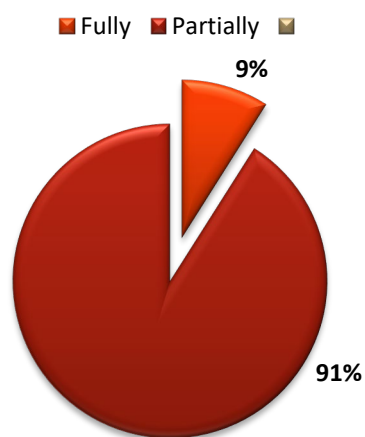
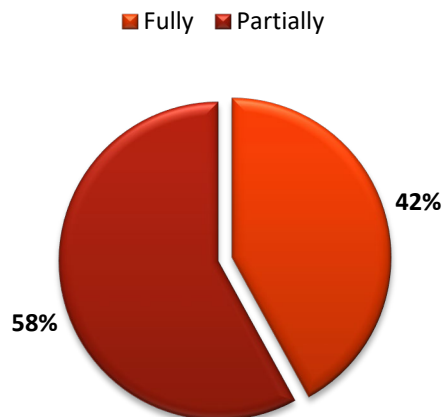


Chart 11: Contribution in Shelter Management

Contribution in Shelter construction



Shelter maintenance



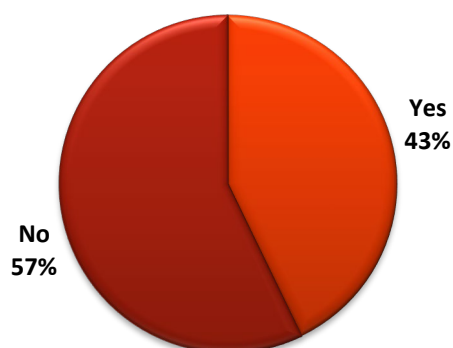
Post Harvesting Activities

Though most women are involved in farm management, some of them are involved in post harvesting activities as well. From the FGDs we know that women in Khulna region are not trained in milking, whereas most women in Rajshahi region perform milking activities.

30% women of our total respondents reported that they are fully responsible for selling milk while other 70% are just partially involved. They sell their produce mostly from home. Usually Goalas (middlemen) come to their home and collect the milk from the cows. Some women also sell their products to their neighbor.

However women in Tala, Satkhira reported in our FGD that the middle man (goala) gives them lower price as he does the milking activity. They said if they knew how to collect milk from the cow then they would not have to depend on the middlemen. Eventually they would get the high price and also the cow would have been freed from virus infections (as milking many cows by the same person causes infection).

Chart 12: Contribution in Selling Milk



A 36 year old mother of two, used her years of saving to acquire a calf. With care, it was grown for nearly 2 years with feed she personally collected from neighborhood at the break of dawn before her children woke up. She looked forward to the day when it would start to give milk, and consequently have a source of nutrition for her children and some additional income for her children's education, which seems to get more expensive every year.

She spent BDT 150 for artificial insemination done by the local vets. However, when the cow finally started giving milk, her hopes were shattered. The production was only 1 litre maximum per day, making barely enough left for selling. The time and money cost of feed was unfeasible considering the output that is sold for BDT 34/litres at max. In addition, the short life span of milk means that on most days, she sells what she can to the collector while feeding the excess to her children.

Her days are now spent in despair as the effort she already put in makes her stubborn about selling off the cow. She has heard of cows in other areas which give double or triple the amount and she would like to know how it was done. However, these informations seems more like a myth to her as she has never seen that and cannot guess what she is doing wrong. Currently, the cow is maintained as a safety fund in case of financial emergencies, and whatever milk given by the cow is for self-consumption only. Her hopes of having her own income are now but a distant dream.

Control over Benefits

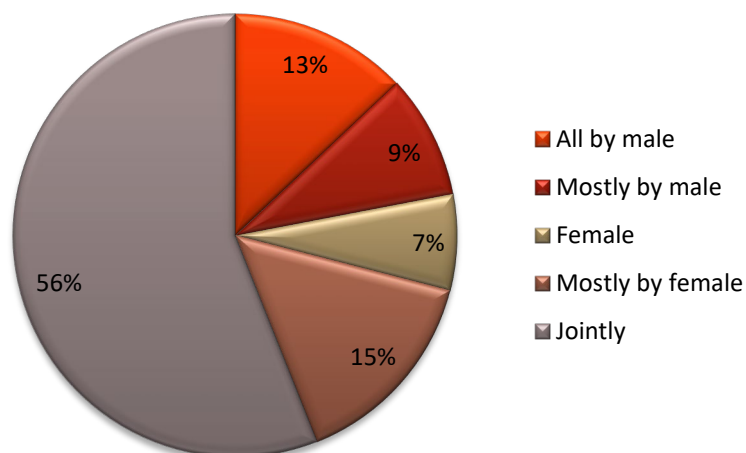
Our findings depict that only 7% women have the authority to use their income earned from dairy. On the brighter side, around 56% decide jointly (with husband) about how to best use her income. Women, who have control over their income, spend their earnings on their children's education mostly. Some earning is used up for better nutrition and health care for their children. Women rarely spend their earning for themselves; they feel self contained when it is used for family members.

2.4.4 Decision Making

We have discussed earlier that some women have their own assets. However around 43% of the women were reported to have authority to control over it.

When we asked them what prevents them from having full control of their own assets, they answered (75%) that they need their husband's permission to do anything with that asset. While others said according to social structure they need to consult with other family members to take any decision regarding their assets.

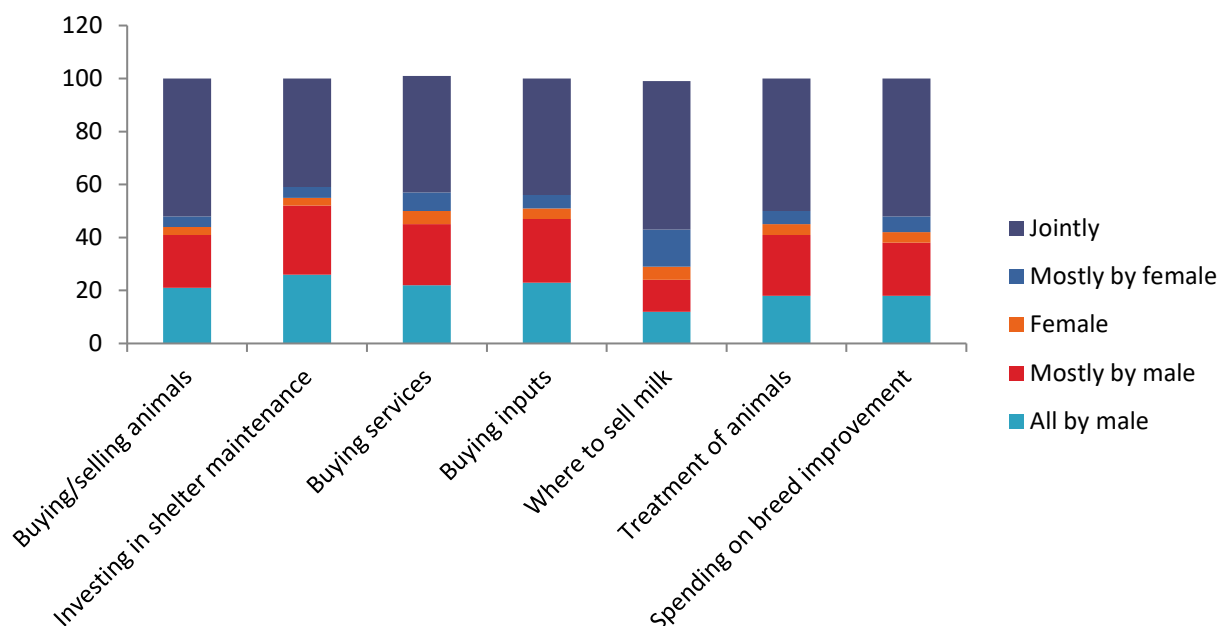
Chart 13: Women having authority to sell assets without anyone's permission



Also around 44% women reported that they need permission (from husband or other family members) to sell milk too.

Our primary survey also reveals that most dairy management decisions are taken jointly by husband and wife by the household. Around 50% women reported that they take joint decision whenever there is an issue concerning buying or selling animals, buying inputs or services, investing in livestock and milk selling. For the rest of the cases these decisions are taken by male only or by maximum influence of male. Only 5-7% women have full influence on decision making regarding dairy farm management.

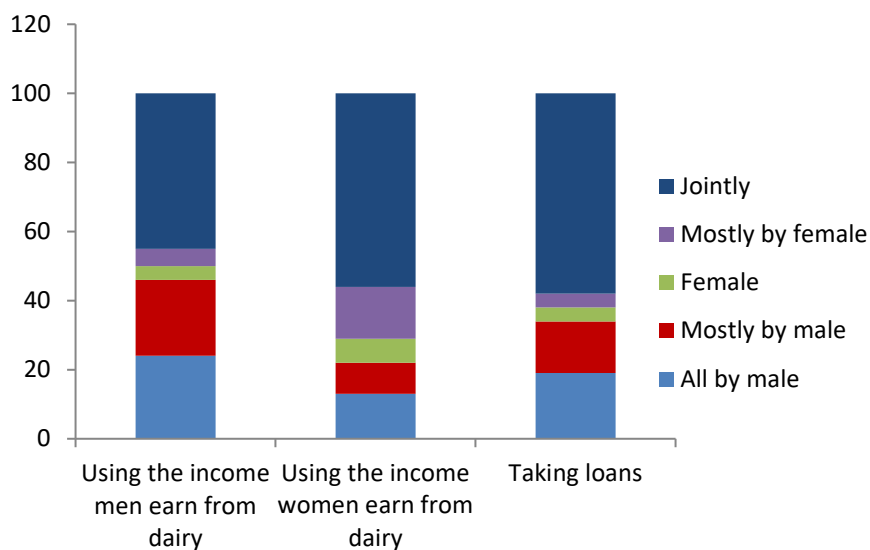
Chart 14: Decision Making Regarding Farm Management



Financial decisions are also taken jointly in around 50% cases. However 22% male take decisions all by himself if he is the earner. Women's earning is used jointly in most cases. In case of taking loans male and female take joint decision (in around 50% cases).

Women are found to have very little influence on decision making in any point of their livelihood. However empowering women through skill development and awareness build up can help them be vocal in decision making too.

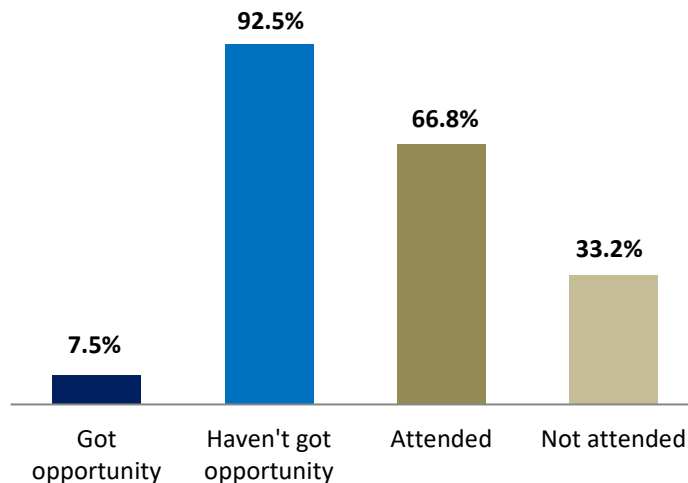
Chart 15: Decision Making Regarding Financial Matters



2.4.5 Extension Services

Chart 16: Training services between women

From the primary survey only 7.5% women have reported to get training opportunity of them 66.8% found to avail the training. 33.2 % women could not attend the training due to the social barriers from in-laws, short of time or due to the distance of training centre from home. Most of the trainings were provided by the local NGO or projects. Typically the trainings topics were for improvement in crop cultivation, livestock rearing, aquaculture, improved food and nutrition etc. This suggests that BDEP needs to consider moving its training from off-farm to on-farm to the greatest extent possible, if women are to benefit to the maximum degree.



Most of them found these training useful because they could apply the knowledge at home for the improvement of their economic activities.

However, some of them found them to be not so useful because of the short duration of training or lack of logistics facilities to implement the training knowledge.

Figure 1: Recommended Trainings for Women



3.0 CONCLUSION

The survey has been designed for setting targets against the project indicators to measure impacts at project completion. The two regions selected for survey showed more or less similar pictures with exception of some areas and items. Rajshahi region has been found developed in dairy compared to Khulna. However, the trend is developing in Khulna region for the past two decades. Rajshahi is superior in dairying to Khulna because industrial milk processors are present here for over 30 years. Therefore, apart from the government, private sector service providers are more developed in service provisions and input supply in Rajshahi than Khulna. Numbers of crossed bred cows, increased milk production and access to milk marketing facilities are more available in Rajshahi than in Khulna. Apart from these comparisons survey has revealed some common features of constraints and possibilities in both regions.

Dairy farm management

Many farmers keep bulls and oxen with cows for fattening purpose. They generally keep them round the year till they grow large enough for consumption as meat. The sale prices of the bull seldom make up for the cost involved to raise these stocks. Even the cross bred cows sometimes doesn't produce above 6 liter of milk which is as a thumb rule required to offset the cow's own feeding cost. Farmers' awareness on dairying is absent; they rather concentrate on keeping cattle herd not the cows for business. These issues call for raising awareness of farmers on dairy accounting and record keeping for profitable dairy business.

Water, feeds and feeding techniques: Farmers have no idea about feed formulation with the ingredients locally available around the premises or at homes. Almost all of the farmers reported that they procure feed and fodder and ingredients from their own sources and/or from the market. While serving feed to cows the ration is not maintained to fulfill the requirements of the body maintenance and production of cows. A combination of roughages and concentrated feed ingredients can successfully serve the target of feeding. Feed serving and feeding techniques are also unknown to them. Farmers only serve water and feed 2/3 times a day which can, in no way, help cows produce better. Because of the compound nature of the stomach of ruminants they need longer time to fill the rumen, the first stomach. Then at night or at leisure time cows regurgitate or chew the cud for further processing the consumed feed stuff.

Housing and cleanliness: During FGD it was seen that cattle houses are smaller than required. In household survey, data says that for each adult cattle a space of 55 square feet has been provisioned within the shed. Farmers keeping cows at stall feeding system feeds them via the cut and carry method. Stall fed cows require minimum (10x30) 300 square-feet space for manger space and movement purpose. Housing system observed in both of the regions is congested; floors are brick built but uneven and slippery due to wetness from urine and residues from cow dung. Drainage system is poor due to waste water logging and carelessness.

Many of the cows that are observed in the sheds are traumatized on their back legs and injuries are chronic and prominent. Some injuries are infected and abscesses have been formed. Performance of these cows will not be the same as from a healthy cow. Moreover, this situation of the cows increase the cost involved in treatments and extra time from farmers. These are simply due to lack of awareness of farmers on cow comfort issues and cow health consciousness. These areas of awareness of farmers can be corrected by training and through business motivation approach.

Service providers

Veterinary and AI services: There are serious lacks of services from formal sector of DLS. Shortage human resources from DLS are the main cause of lacking of rendering services. "Paravet"⁴ has been developed by DLS and NGOs under projects to fill the gap of DLS. Some paravet receive training on AI in advanced stage of experience. They serve as private service providers in veterinary sector for treatment and AI activities. Paravet are not as available in Khulna as in Rajshahi.

Service providers in Khulna and Rajshahi are poor in advising services on husbandry issues. Their principal target is to provide treatments to sick animals and vaccinate them, for prevention of few fatal, infectious diseases. Even the treatments they provide many a times needs to repeat and increases the cost. Vaccines they collect from DLS sources often have not been maintained in a cool chain and hence are not as potent as they should be. Nutrition related suggestions are absurd from them; even though farmers do not pay for the advice. Refresher training or advanced training to these paravet would be a solution to serve farmers better.

Input suppliers: Feed companies that manufacture cattle feed too often adulterate their products. Ready feed stored in the market are often of deteriorated quality; especially the microelements added to feed are degraded. Feed ingredients suppliers also adulterate ingredients with saw dust, brick dust and sand. Seed retailers supply seed in the names of hybrid fodder but productions often do not show the results. Medicine shops often sell lower quality drugs at cheaper price. These medicines increases cost of treatment and often the cow suffers longer and hence it is needed to be disposed in the market. Very often AI workers inseminate cows with semen of unknown character or that has not been kept in liquid nitrogen. Even then daughter performance is often lower than that of the mother. Farmers have no idea of choosing semen to inseminate their cows. Repeated AI failure often leads farmer to use natural insemination from bulls.

All these irregularities in this sector are due to the segmentation of the industry and inadequate government service which crowds out more effective providers. Workshops and linkages with each other may improve the performance of the service segment.

Milk marketing: Due to absence of formal milk processor in the areas surveyed, middlemen are exploiting farmers by buying milk at lower price and putting farmers at risk of loss. Few farmers in Khulna know milking techniques, leading to even greater reliance on middlemen. The practice of a middleman moving from farm to farm and undertaking the milking is likely to be an effective medium for disease transmission including mastitis. These middlemen supply milk to private chilling centers established under contract by a processor. In Rajshahi region there are farmers still untapped by milk companies. These farmers try to get access to vet services and feed ingredient from their locality on the basis of availability. Their herd health checks and milk sales are not as assured as in the case of herds of the suppliers to three other processors.

These members are eager to be a part of the formal dairy sector, no matter which company arrange it in those areas. Milk processor companies take the opportunity due to the first come first serve basis by establishing communications with farmers, formation of society, provisioning services and setting MCCs at those areas by bringing milk market in the village.

⁴ A trained individual on primary knowledge of animal health and common diseases of livestock. Allowed to provide simple and basic service to the cattle farmers.

4.0 Recommendations

The survey has identified a number of opportunities for enhancing productivity and competitiveness of the milk value chain. The processor and the project jointly can address those areas to enhance dairy performance.

Dairy farmers' level

- A comprehensive training program for dairy farmer will help developing skill and knowledge on dairy management, feeding and nutrition, and overall dairy business.
- Promote fodder cultivation (high value grass) in areas where suitable and creating linkage with the farmers of the area where the supply is lower. Such as; Paikgachha, Khulna suffers from lack of fresh feed (fodder, grass or straw) and it does not have suitable environment for producing fibrous feed; So fodder can be cultivated in other nearby areas and exported to Paikgachha.
- The training program should essentially cover the aspects of fodder cultivation, fodder preservation, urea-molasses-straw preparation and fodder production and preservation, feed formulation from the local ingredients, herd management, milking and post harvest hygiene and etc.
- Both women and men need to be trained on the same issues in order to put them on the same level of knowledge. Therefore they can decide jointly on action without any confusion
- Mechanisms to enhance farmers' access to credit through alternative collateral arrangements can boost sector development over time, Care needs to be taken to ensure that finance being provided by middlemen does not inhibit farmers from supply to the formal market.

Service provider level

- Service providers in the targeted region have been found incompetent. However they are catering a big chunk of farmers. They should be trained by the quality input suppliers for better linkage and sustainability of the intervention.
- Train Paravets to provide counseling or consultation services (on farm and herd management) to farmers besides technical services (treatment, AI etc). That will ensure more access to knowledge for the farmers regardless of beneficiary and non- beneficiary.
- Enhance linkages to financial service providers with service providers. It will increase the number of service providers in the region. More people will be inspired to open up their small business.
- An alternative and perhaps more effective and sustainable structure is to develop the advisory arms of the processors: this creates market alignment between farmer and processor needs, and the more effective the processor advisory arm becomes, the more milk its farmers should provide in a mutually reinforcing style.

Processor level

- Chilling centers should be established in such a way that it can cater all the groups equally (radius method). Maximum 2 kilometers distance is advised otherwise dependency on the middlemen will not reduce.
- Processors must ensure better prices to farmers and ensure year around purchase. Unless farmers will keep being exploited by the middlemen.

- Skill development of staff and employees of milk processor in the line of standard milk handling techniques, GMP, GAP, and HACCP
- Processors make enhanced provision for the supply of advisory and extension services, as above
- Making linkages with financial institutions to access the finance beneficial to sector development.

Gender

- Female should be trained on the same issues as male, as more than 50% women take joint decision on farm management. So both must know the technicalities before agreeing on something.
- Training on farm management, access to finance and financial management should be given emphasis.
- Female in FGDs suggested that their groups should be trained separately to ensure active and lively participation
- Training center should be nearby as around 38% female reported that they could not attend training in past because of distant training center.

Annex 1: Bangladesh Dairy Sector and Project Background

Annex 1.1: Livestock Production in Bangladesh

Bangladesh has traditionally been depended on agricultural activities such as; crop farming, aquaculture and livestock rearing for their livelihoods. Whereas livestock sector alone is contributing about 6.5% of the total GDP, 13% of the total foreign exchange earnings and generating employment for 20% of the population⁵ directly and indirectly. (BBS, 2004). The country encloses 10 million dairy cattle, including 4 million cross-breeds; produce 2.82 million tons of milk which is much lower than that in Pakistan, where only 5.5 million dairy cattle produce 25 million tons of milk (Raja, 2001; DLS, 2010; CLDDP, 2008; Hemme, 2010)⁶. The average milk yield per cow per day is 1.5 liters for indigenous and 2.5 liters for crossbreds. Dairy farming has always been part of a mixed farming system. Majority of the rural household keep 2-3 dairy cows on an average. Sometimes these cattle are used as dual purpose for milk and draft power.⁷

About 31.5% people are living under poverty line that is they are surviving on less than USD 1 per day (CIA World Factbook, 2010). Dairy sector can play an important role for shifting these people from the poverty line through prioritizing this sector for development. The small farm size and low productivity may be due to several sector constraints. Poor feeding and farm management, failure of disease identification, lack awareness on commercial viability of dairy farming, lack access to the market etc. are the major constraints faced by the dairy farmers of Bangladesh. This has been impeding the overall growth of the sector.

Based on the recognition of the above stated problems and constraints Bangladesh Dairy Enhancement Project has been introduced. This project is funded by United States Department of Agriculture (USDA) Food for Progress award, BDEP will work for increasing agricultural productivity by training farmers on improved animal husbandry techniques, raising awareness about animal nutrition and increasing the availability of water.

BDEP commissioned Innovision Consulting Private Limited to conduct a baseline survey to know the baseline situation against the indicators that were set to monitor the project activity and measure the impacts.

Annex 1.2: Project Background

In September 2013 BDEP was awarded a three-year long United States Department of Agriculture (USDA) sponsored 'Food for Progress' project in Khulna and Rajshahi divisions of Bangladesh. The project, titled Bangladesh Dairy Enhancement Program (BDEP), focuses mainly on 1) increase agricultural productivity in the dairy sector by optimizing feed formulations, breed improvement and training to improve farm management, and 2) expand trade of agricultural products in the dairy sector by organizing milk collection centers and milk hubs; adding value to the post-harvest products by adopting industry standards in processing, handling, and quality of the dairy products; and facilitating

⁵BBS 2004 Vol

⁶Outlook on Agriculture Vol 40, No 3, 2011, pp 263–271 doi: 10.5367/oa.2011.0056

⁷Adopted from J. Bangladesh Agril. Univ. 7(1): 69–72, 2009 ISSN 1810-3030 "Productive and reproductive performance of crossbred and indigenous dairy cows under smallholder farming system" by M. Rokonzaman, M. R. Hassan, S. Islam 1 and S. Sultana 2

agricultural lending to improving infrastructure, marketing techniques, and linkages between buyers and sellers.

Some 17000 dairy farmers will be addressed by the project and 42 chilling centers will be developed in two hubs e.g. Khulna and Rajshahi. Within three years, by the completion of the project, BDEP will improve the competitiveness of domestically-produced dairy products by ensuring 50 percent increase in milk yield and a 100 percent increase in volume of formally-traded locally-produced milk. This project wants to achieve their Strategic Objectives (SO) 1 Increased Agricultural Productivity and (SO) 2 Expanded Trade of Agricultural Products by facilitating animal productivity trainings including: animal nutrition, proper feeding methods through the application of improved techniques and inputs, capacity building of smallholders to make sound farm management decisions, increasing value added by processors through standards and quality processes, improving market access for smallholders, and lowering transaction costs all along the value chain through achievement of three intermediate results (IRs).

Annex 1.3: The Objective of BDEP Project

Bangladesh Dairy Enhancement Program (BDEP) focuses on achieving the following objectives:

- Increase agricultural productivity in the dairy sector by optimizing feed formulations, breed improvement and training to improve farm management.
- Expand trade of agricultural products in the dairy sector by organizing milk collection centers and milk hubs; adding value to the post-harvest products by adopting industry standards in processing, handling, and quality of the dairy products; and facilitating agricultural lending to improve infrastructure, marketing techniques, and linkages between buyers and sellers.

Annex 1.4: The Baseline Survey Objectives

The baseline study is being conducted to:

- Assess the prevailing conditions relating to dairy value chain where BDEP plans to conduct programmatic interventions
- Establish both qualitative and quantitative baseline information for the indicators for which the project will regularly measure performance
- Gather findings in light of which the annual targets for the indicators will be established or validated in the Performance Management Plan (PMP)
- Establish quantitative and qualitative methodologies for specific indicators according to which subsequent data will be collected and compared to track and evaluate the project's progress and impact over the lifespan of the project
- Gather necessary information regarding the situation and challenges on ground to make appropriate implementation decisions to maximize efficiency, effectiveness and impact of the project

- Explain and/or validate the relevance and potential impact of BDEP to key stakeholders
- Incorporate stakeholder views and ensure strong partnerships and generate accurate information that can be used by Government of Bangladesh (GoB), partners and stakeholders in developing the dairy sector.

Annex 2: The Study Methodology

The baseline study employed a quasi-experimental design where a combination of a propensity score matching (PSM) and Difference in Difference (DiD) utilized to create a foundation for an impact evaluation and thus enable attribution of the results to the interventions.

Annex 2.1: The Team Composition

The team comprised of four consultants with expertise of five areas namely: Livestock sector, Livelihood, PSM and Experimental design, Monitoring and Evaluation, Statistics, GIS and Mapping, Value chain analysis, Quantitative analysis and Operation and communication. Besides, there were two supervisors who have supervised the field team in data collection and assist the team to identify the right respondents for interviews. There were fourteen enumerators who have interviewed the target respondent across the five sample districts. A three days training with field pre-testing of the household questionnaire was conducted to ensure consistency in data collection. Besides, admin and finance department of Innovision provide all of kind of logistic support during the conduction of the study.

Annex 2.2: Survey Approach

The survey was conducted in two phases namely:

- Inception phase
- Implementation phase

Annex 2.2.1: Inception phase

Inception meeting

Three inception meetings were held in BDEP Dhaka office with BDEP staffs before start of the study. In these meetings, the objectives of the research, objectives of the project and ToR were briefed by the BDEP team. In the meetings, Innovision shared the approach and methodology of the survey and get feedback on them. Based on the feedback, Innovision finalized the methodology and shared to BDEP for final approval. After getting the final approval, the consultants commenced the study with the approved tools.

Literature review

Innovision reviewed all relevant secondary documents, project documents of project objectives and results, project performance measurement plan to get better understanding on the sector, different stakeholders, market dynamic, constraints and opportunities of the sector, project objectives, targeted results and indicators. Based on the literature review a plan and tools for rapid assessment was developed and shared to BDEP for the approval. After getting approval a rapid assessment was done.

Rapid assessment

A four days rapid assessment was conducted by the consultants with the predefined tools to have field on experience on the sector, value chain actors (input suppliers, producers, milk collectors, traders, end buyers, processors etc.), extension service providers, market constraints and opportunities, regional production clusters, availability of milk collection centers. In the rapid assessment the consultants conducted several in-depth interviews with the key informant and different stakeholders and FGD with the milk producers in six districts namely Jessore, Satkhira, Khulna of

Khulna division and Bogra, Shirajgonj, Pabna of Rajshahi division. The detail of sample covered in the rapid assessment is shown by the following table:

Tools	Respondents	Type of information	Number of respondents
In-depth interview & KII	Government livestock officers,	Qualitative information about the sector	06
	Sector expert (head of companies)		05
	Producer (In-depth)		02
	Traders,/Buyers		05
	Extension service providers		02
FGDs	Livestock producers		2 (30 milk producers)

Based on the rapid assessment and literature review, Innovision developed questionnaire for household survey for the milk producers, checklists for the different market actors and Key informants and FGD guidelines for milk producers and Female member of the households, detail sampling plan, sample size and activity plan and shared to BDEP for the approval. BDEP provided feedback on the tools and suggested Innovision to do the survey and FGDs for the milk producers and exclude the market actors interviews from the survey plan. Based on the feedback, activity plan and all research tools were finalized.

Annex 2.2.2: Implementation Phase

Selection of treatment sites and control sites

The primary approach of the study is to evaluate the effects of treatment /supports of BDEP by dividing all the respondents into two groups i.e., treatment and control group. In this case, the treatment is the 'support /training provided by BDEP to the livestock producers". BDEP will cover 8 districts in Rajshahi and Khulna Divisions.

Identification of the treatment and control sites is the most important stuff as the project is adopting quasi-experimental design method for measuring project's progress and impacts. The selection of the treatment and control groups were guided by several factors to ensure the two groups had similar characteristics except for the treatment or program interventions that will be received only by the treatment group.

Treatment group: Respondents or livestock producers from the regions covered by BDEP will be considered as elements of treatment group. It is pre assumed that all the livestock producers in BDEP covered regions would eventually be treated or trained about livestock development.

Control Group: The control group villages will be located in Rajshahi and Khulna division but will not be covered by BDEP program. Livestock producers from non-BDEP covered regions will be considered as control group. It is pre assumed that these livestock producers are not under similar treatments that will be provided by BDEP.

For the selection of the treatment sites following factors were considered:

- Program objectives: The project will provide support to improve feeding, water, farm management, market access, value addition etc. to milk producers. So the production cluster where these things are absent or the area where the demand for these support is relatively high were identified through the interviews with the officers of the Department of Livestock Services.
- Interest of the processor company: BDEP recommended considering the areas as treatment area where the processor companies are planning to establish milk collection center (MCC). It is also recommended by BDEP to consider the area as treatment group where a processor wants to establish MCC. So Innovision has done the sampling on the a processor proposed areas for treatment group.
- Livestock population and milk production: Innovision consider total livestock production and milk production while selection of the district for treatment group by consultation with DLS officers.

For selection of the control sites following factors were considered:

- Comparative analysis of Livestock population and milk production: It was suggested by the sector experts and Key informants that upazilas from same district are similar to each other in terms of cattle density, milk production and market access. So the control sites were selected from the same treatment districts but different upazilas. For the districts where there is no treatment group, the control sites were selected based on the cattle density and milk production data obtained from DLS.
- Phased program implementation: The control sites were identified from the envisaged expansion sites for the program under phased implementation approach. For example, a site serving as control site of the program for year 1 and year 2 may become a treatment site for the program at the end of year 2 of the program. This lessens the ethical issues in identification and use of control group.

Training of the enumerators and pretesting questionnaire

A three days training was organized, for the enumerators and two supervisors, where briefing on the project, it's objectives and research objectives were discussed. After that debriefing of the household questionnaire was given to the enumerators and organized several mock tests to measure the understanding of the enumerators on the questionnaire and provided feedback and recommendation accordingly. Finally, the enumerators have participated in the field pretesting of the questionnaire with close supervision of the respective supervisor. The consultants took feedback from the enumerators about the questionnaires and finalized it accordingly consultation with BDEP.

Determination of sample size

Sample Size Formula

$$SS = \frac{Z^2 * P * (1-P)}{C^2}$$

Where:

SS: Sample Size

Z: Z value (1.96)

P: p-value (0.5)

C: Confidence Interval (0.05)

Adjusted for Finite Population

$$\text{New SS} = \frac{SS}{(1 + ((SS-1)/Pop))}$$

The project aims to reach 17000 livestock producers in Khulna and Rajshahi division, which was considered as the population for sampling. Keeping a 95% confidence level with 5% confidence interval we determined a sample size of 570 according to Macorr's Sample Size calculator. Considering 12% Non-respondent sampling units, the sample size was 640 livestock producers. The division of treatment and control group was done based on prior research and empirical findings. *Source: <http://www.macorr.com/sample-size-methodology.htm>*

Methods and tools employed in the study

The study employed a number of quantitative and qualitative tools to achieve the study objectives. These are:

Household Survey: The main objective of the household survey was to acquire the quantitative information on socio-economic status of the households, income sources, herd size, type of cows, milk production, production practice, feeding, water management, disease management, market access, access to finance, access to extension service, gender etc. A total of 640 households were interviewed across five selected districts by the 14 enumerators with close supervision of two supervisors. A structured questionnaire was used in the household survey (please see annex...).

Focus Group Discussion: A total of 14 FGDs were conducted across the five districts where eight were conducted with the livestock producers and six were conducted with the female members of the households. Two separate FGD guidelines were used to conduct the FGDs. The FGDs were conducted by the consultants including the team leader (please see annex...).

The sample distribution of the household survey and qualitative assessment was given in the following tables:

Table 18: Sampling Distribution for Treatment Group

District	Upazila	Union	Household Survey		Total	FGD	
			No. of Village	No. of Respondent		Livestock producers	Female members
Shirajganj	Ullahpara	Lahirimohonpur	5	9	45	1	1
	Shahjapur	Porjona	5	9	45	1	-
Satkhira	Tala	Jatpur	5	9	45	1	1
	Debhata	Debhata	5	9	45	-	-
Khulna	Paikgacha	Paikgacha	5	9	45	1	1
Total			25		225	4	3

Table 19: Sampling Distribution for Control Group

District	Upazila	Union	Household Survey		Total	FGD	
			No. of Village	No. of Respondent		Livestock producers	Female members
Shirajanj	Tarash	Talom	9	9	81	1	1
Pabna	Sujanagar	Salbaria	9	9	81	1	-
Satkhira	Kolaroa	Derra	9	9	81	1	1
Jessore	Monirampur	Monirampur	9	9	81	-	-
Khulna	Dumoria	Atalia	9	9	81	1	1
Total			45		405	4	3

Sampling technique

The target population for this study comprises of the 17000 livestock producers in Rajshahi and Khulna region. Currently BDEP is planning to provide support and training in 8 districts of Khulna and Rajshahi. These 8 districts are tabulated below:

Table 20: Target regions for the sample

Divisions	Rajshahi	Khulna
Districts	Sirajganj	Satkhira
	Pabna	Khulna
	Naogaon	Jessor
	Chapainawabganj	
	Bogra	

A multistage purposive sampling procedure was applied to select a representative sample from the population.

The sampling procedure is mentioned below:

Table 21: Sampling procedure

Stages	Procedure
1st stage	In the first stage, 5 districts (3 from Rajshahi and 2 from Khulna) were chosen randomly from 8 districts currently considered in the study.
2nd Stage	In the second stage, all the upazila were stratified into two strata. 1st strata contained list of upazilas those contained proposed BDEP supported MCCs and 2nd strata contained upazilas with no proposed/any MCCs. Separate strata were constructed for each division.

Stages	Procedure
3rd Stage	From the 1st strata 1 upazila were selected randomly from each district and similarly from 2nd strata 1 upazila were selected randomly. A total of 10 upazilas were selected from 5 districts.
4th stage	Selection from Upazilas with proposed MCC: 1 union /MCC location were selected from each upazilas randomly. The upazila that contains single proposed BDEP MCC location, union was selected eventually. Selection of unions from upazilas containing no proposed BDEP supported MCC, were selected randomly.
5th Stage	From Unions, 5 villages from each union were selected from treatment group and 9 villages were selected from control groups. Random selection of villages will be done. A total of 70 villages were drawn for the baseline survey.
6th Stage	9 households from each proposed BDEP covered villages were selected randomly and 9 households from non-BDEP covered villages were selected randomly. A total of 225 households were taken from MCC covered villages and a total of 405 households were selected randomly from non-BDEP covered villages.

Special Note:

- In the second stage, Stratification was necessary to set treatment and control groups. In this study, BDEP covered livestock producers were considered as treatment groups and other respondents will be considered as control group.
- List of BDEP covered upazila is attached (see appendix A), other upazila will be selected from the list of BBS (See appendix B).
- Random selection of villages was done at the implementation phase. No sampling frame was available for villages.
- It is important to mention that each respondent in treatment groups should be incorporated in the BDEP interventions as in the panel /follow-up survey it is required to evaluate treatment affects.
- Variation in sample sizes of treatment and control groups were imposed to achieve better Propensity Score Matching.

Annex 2.3: Data Entry and Analysis

All filled in questionnaires of the household survey were entered in the Statistical Package for Social Scientist (SPSS), cleaned and analyzed as per analysis plan. The survey results were disaggregated and presented by divisions, treatment and control groups. Besides propensity score matching was done to get the matching villages.

Annex 3: Evaluation Strategy for BDEP

The evaluation strategy taken under consideration in this study is based on longitudinal propensity score matching (PSM) design. Primarily a baseline data is collected from the respondents of future BDEP coverage area as well as different regions of Rajshahi and Khulna divisions of Bangladesh. The baseline survey was conducted in May 2014. In this study, respondents from future BDEP coverage area are considered as treatment group while respondents from other selected regions (see sampling distribution for more detail) is considered as control group. Based on the responses from BDEP coverage area, village level data is obtained to find similar villages from control group through PSM. Responses from same treatment villages and control villages will be studied in future to assess the changes in outcome due to interventions.

In this study, BDEP requires sample units of villages. In the baseline survey, households are surveyed and each variable is measured based on household. Averages of these variables from respective villages are calculated to proceed for PSM. At the final stages, treatment villages are matched with control villages based on all average values obtained from households.

Overall evaluation methodology incorporates a difference-in-differences (DiD) propensity score matching (PSM) estimation procedure to evaluate the impact of BDEP interventions. Baseline survey provides the data on 27 future BDEP beneficiary villages as well as 45 non-BDEP beneficiary villages. PSM methodology will be employed to match treatment villages with control villages. Villages' level data was obtained from the responses from each randomly selected village. The PSM methodology in this study will help to evaluate the impact assessments of the interventions implemented by BDEP over time. The matched treatment and control groups will provide the platform of evaluation with lower bias and similar structures so that the study will be able to evaluate the impacts of interventions. The present section conducts the PSM analysis to obtain the appropriate matches from future BDEP coverage area and non-BDEP coverage area and will diagnose the appropriateness of the match.

Selection of comparison groups through PSM

Propensity score matching method employed in this study will select proper matches of each treatment villages with control villages. A set of village level characteristics those seem to be relevant and influential for BDEP, is used to calculate propensity scores. This score indicates the probability of the village being part of BDEP interventions and then treatment villages will be matched with control villages by similar propensity scores. The whole process of PSM depends on several stages. Primarily, a set of household characteristics was obtained through baseline survey from future BDEP coverage region and non-BDEP coverage region. Then household characteristics were averaged to obtain village level characteristics. These characteristics include average milk production per household per village, average milk price in the village, average income level of households in the village. Based on these characteristics, propensity scores were calculated for all 71 villages considered in this study. Finally, each future BDEP coverage village is matched with each non-BDEP coverage village based on the propensity scores.

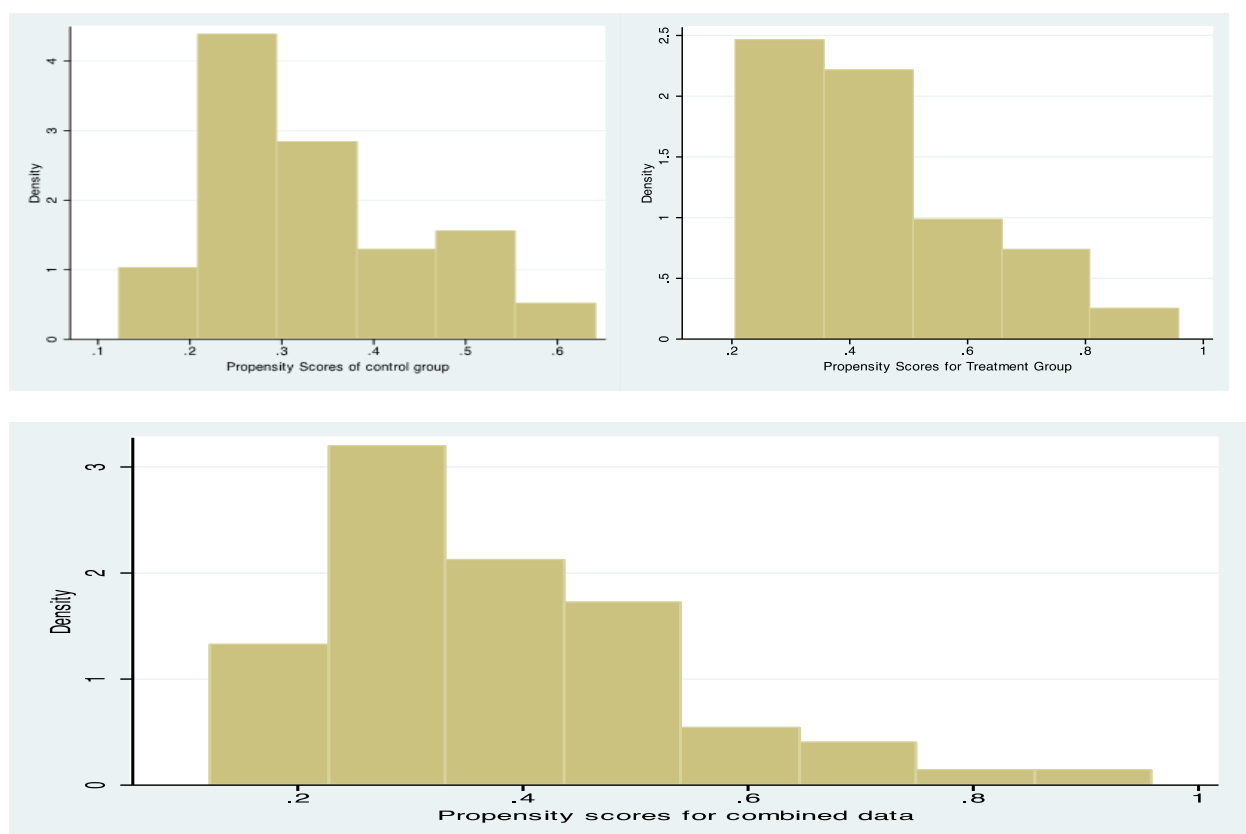
Strategic decisions in propensity score matching process can be crucial as the quality and goodness of fit of the PSM model vastly depends on the choices that were made in model selection and matching criterions. As the sample size of the villages is relatively low (treatment village: 26 and control village: 45), choice of selection procedure becomes limited. One major decision was to allow more than one non-BDEP villages paired with the treatment villages. As the sample size for each treatment and control group is low, multiple match option seems to be an optimal choice. Based on several

approaches, nearest neighbor matching of size 3 with caliper 0.16 (with common support) provides matches for all treatment villages.

In the Logistic regression model-building phase, a dichotomous variable was constructed. The variable (Treat) takes value 1 if the village is in the future BDEP coverage region. Otherwise, the variable takes value 0. Considering the covariates, average milk production per household per village, average milk price in the village, average income level of households in the village, the regression model was obtained (see appendix 1).

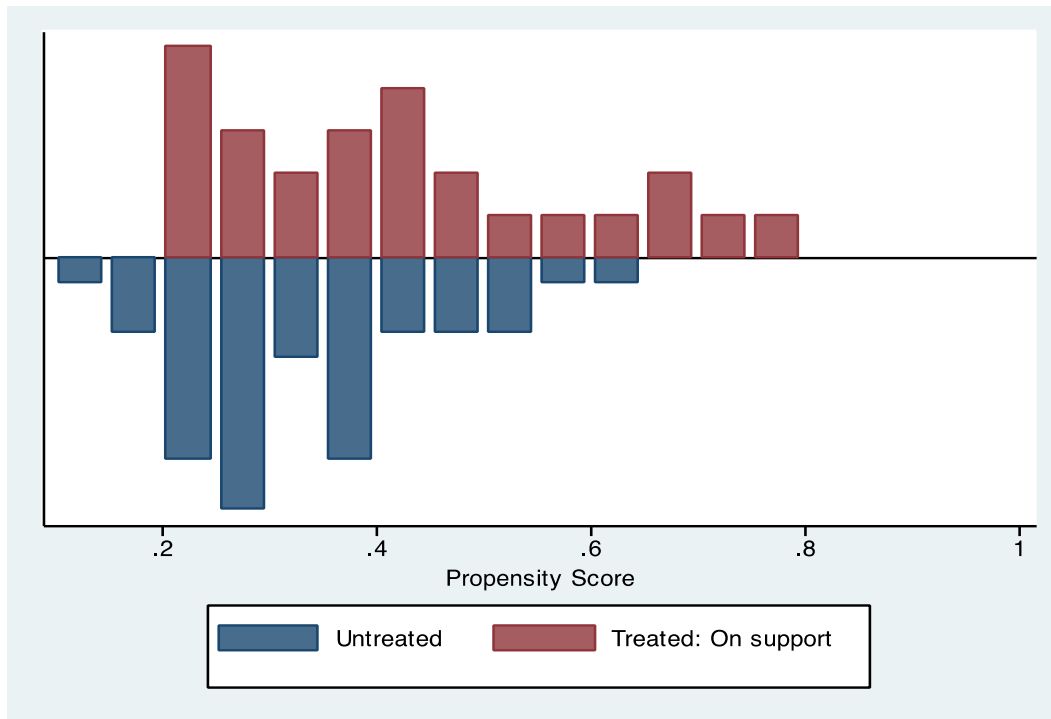
Given below are the graphs representing propensity scores for the treatment, control and all villages considered in the study. Due to lower sample size, the shape of the propensity score distribution is different in control and treatment group. But presence of similar propensity score indicates possible matches in treatment and control groups.

Chart 17: Propensity scores for Treatment villages, Control Villages and All Villages



After calculating the propensity scores, nearest neighbor with caliper matching is implemented to find matches for treatment villages from the control villages. In this case, 3 nearest neighbors with caliper (0.16) were considered. As the sample size is low in the treatment and in the control group, matching was done with replacement to find appropriate matches. The propensity score distribution after the match is given below,

Chart 18: Propensity Scores after the Match



The following table shows the matched villages for the treated group from the control group. In the panel survey, only the tabulated villages will be considered in future.

Table 22: Matched Villages for the Treatment Group (neighbor 3, caliper .16)

SN	Treatment Group	Control Group		
		Village 1	Village 2	Village 3
1	7	17	11	25
2	10	12	14	25
3	50	26	30	34
4	8	34	40	30
5	5	34	40	30
6	9	41	39	40
7	2	35	36	39
8	3	19	38	36
9	6	18	33	32
10	1	32	18	33
11	22	65	42	72
12	43	28	60	70
13	23	60	28	70
14	48	57	71	60

SN	Treatment Group	Control Group		
		Village 1	Village 2	Village 3
15	53	57	71	59
16	21	71	59	57
17	4	59	71	57
18	49	59	71	68
19	46	61	66	68
20	24	67	56	62
21	54	63	67	56
22	47	63	58	67
23	55	58	63	67
24	20	58	63	67
25	51	58	63	
26	44	58		

Table 23: List of Unmatched Villages from Control group

Unmatched Villages	
13	31
15	45
16	52
27	64
29	69

Now it is important to check whether biases from initial differences in observed covariates are reduced or not. If the initial difference still remains in the matched villages, then the match will not be appropriate for the study. The following table shows the average of the covariates from the matched and the unmatched samples.

Table 24: Bias and Difference in covariates before and after match

Variable	Matching Level	Mean		% Bias	T test	
		Treatment	Control		t	Sig.
Average Milk price in village	Unmatched	34.59	32.044	28.8	1.53	0.130
	Matched	34.57	33.14	18.5	0.44	0.66
Average livestock size per household per village	Unmatched	8.14	2.711	55.4	2.5	0.015
	Matched	7.11	6.667	64.3	0.20	0.840
Average income per household per village	Unmatched	12928	12092	37.8	1.20	0.236
	Matched	12836	12298	12.2	0.68	0.499

The table 1 shows that for each covariate, the mean difference in each matched samples are statistically insignificant. The initial difference and bias was reduced after the matching is done. So it is indicative that the matched villages from treatment and control group should suffice any further evaluation strategy.

For future DiD reference, current average of different variables are obtained. These differences will be used in future difference-in-difference model as well. In the matched sample, few variables have significant differences (See Table 3). It is observed that average livestock size, i.e., total number of cows, bulls, calves etc differs significantly in Treatment and control villages. BDEP will provide training in the sectors of water, food and disease management, milk production, product marketing, hence, the study provides additional insight in these sectors.

The mean tables of these outcome variables will define the current condition and in the panel current differences will be deducted from the future differences to obtain the treatment affects provided by the BDEP.

Table 25: Outcome/indicator variables across treatment and control groups (means)

Variable	Matched Samples		Sig.
	Treatment	Control	
Average Land ownership	116.65	144.08	0.297
Income	12836	12298	0.499
Livestock size	3.86	3.79	0.840
Water Management			
Feed water with food (Binary)	0.92	0.87	0.089
Amount of Water provided Milk cow	36.19	36.21	0.992
Number of Times usually feed water	2.42	2.47	0.736
Food Management			
Process Food at home (Binary)	0.78	0.81	0.412
Disease Management			
Treatment Cost	603.76	330.82	0.001
Medicine	391.73	180.83	0.001
Vaccine	68.52	41.18	0.002
Doctors fee	143.51	108.81	0.02
Milk Production			
Number of Milking cow	1.15	1.16	0.914
Production of Milk per Day	3.61	2.10	0.007
Production of Milk per year per household	7316.7	1560.58	0.001
Milk Marketing			
Sells milk (Binary)	0.8	0.75	0.662
Quantity of Milk sold per day	5.25	2.013	0.001
Price obtained per liter	35.76	35.31	0.663
Lowest price obtained per liter	33.84	30.64	0.057
Highest price obtained per liter	38.19	37.33	0.706
Obtained formal contract with buyer (binary)	0.33	0.24	0.511

Variable	Matched Samples		Sig.
	Treatment	Control	
Training			
% Family obtained training(at least one person in family)	0	0.02	0.42
Assistance			
% Obtained assistance	0.06	0.03	0.327
Obtained capital through loan	0.0507	0.0582	0.791
Capital Management			
Amount of outstanding loan	38107	8510.8	0.001

Project Evaluation Strategy from Impact Survey

Difference in Difference model

Difference in Difference model will be applied once the panel data of outcomes are available before and after the treatment with matched samples. Once the panel data is ready, difference in difference models will be developed based on different indicator variables/ outcome variables. In difference in difference model, average treatment effects of the treated will be estimated after propensity score matching and after obtaining at least two period data.

Outcome variables for different treatment/interventions

BDEP has several training/intervention programs, so outcome for different program will be different. The following table (Table 2) shows the treatment/ intervention strategy and desired /assumed outcomes after intervention.

The target treatment considered in this Difference in Difference model is based on primary objectives of BDEP TOR. Other indicators can be assessed through the field survey /baseline and panel survey. The major embedded outcome variable is that whether the earning from livestock milk production increases or not. So in most of the cases, earning through milk production can be considered as an embedded outcome variable in the Difference in Difference model.

Table 26: Interventions, Objectives and outcome variables for Difference in Difference model

Interventions/ Treatments	Objective	Outcome /Indicator variable
Increased agricultural productivity		
Training on the use of improved agricultural techniques and technology	Farmers will apply improved agricultural techniques and technology to improve milk productivity	Amount of milk production per person and earning through milk production
Increased availability of improved inputs	Farmers will use improved inputs and will improve milk productivity	Amount of milk production per person and earning through milk production

Interventions/ Treatments	Objective	Outcome /Indicator variable
Increased knowledge by farmers of improved agricultural technologies and techniques	Farmers will adopt cost-effective, productivity enhancing practices.	a. Average cost of milk production b. Amount of milk production and c. earning through milk production
Expanded trade of Agricultural products		
Increased value added to post production agricultural products	To increase the margin of farm gate price and end market price	Selling price of milk per unit.
Improved quality of post-production agricultural products	To improve the quality of milk	Selling price and average quantity sold per month.
Increased use of financial services	To make financial services available to the farmers	Amount of Finance obtained from third party institution.
Increased access to markets to sell products	To increase access to market for the farmers	Quantity of milk sold in a month and price obtained per quantity.
Improved linkages between buyers and sellers	Long term linkage between buyer and seller	Number of months, a farmer is selling milk to the same buyer

Additional indicators of BDEP projects can be evaluated through descriptive statistics for matched samples.

Table 27: Logistic regression model used to calculate Propensity score

Treatment	Coefficient	Std. Error
Average Livestock size per household per village	0.462*	0.23
Average Milk price in villages	0.064	0.074
Average Income per household per village	0.00003	0.00001
Constant	-4.8	2.41
Number of Observations	72	
Pseudo R-Square	0.1452	

** Significant at 0.01 level of significance.

Annex 4 Data Tables

1. Household Demographic & Socio-economic Information

1.1 Household profile

Table 28: Average No. of Household Members

	Division				All	
	Khulna		Rajshahi			
Average	Treatment	Control	Treatment	Control	Treatment	Control
Male	2.4	2.4	3.3	2.5	2.8	2.4
Female	2.1	2.2	2.9	2.1	2.4	2.2
<5 years children	1.1	1.1	1.2	1.2	1.2	1.2
<2 years children	1.1	1.1	1.1	1.2	1.1	1.1
Adolescent (10-18 yrs.)	1.6	1.4	1.5	1.3	1.5	1.4
50 year +	1.5	1.5	1.4	1.4	1.4	1.4
Disable	1.6	1.4	1.1	1.4	1.4	1.4
Eligible for school going	1.4	1.5	1.9	1.5	1.6	1.5
School going children	1.5	1.5	2.0	1.6	1.7	1.5
Earning Member	1.7	1.6	1.6	1.3	1.7	1.5
Dependent	2.9	3.1	4.6	3.3	3.6	3.2

Table 29: Household Profile

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Gender						
Male	53.23	51.37	53.50	53.41	53.36	52.25
Female	46.77	48.63	46.50	46.59	46.64	47.75
Age						
<5 years children	17.29	17.66	25.11	20.87	20.62	18.92
<2 years children	6.44	6.81	14.16	9.35	9.73	7.82
Adoloscent (10-18 yrs.)	39.32	38.30	29.68	38.94	35.21	38.71
50 year +	36.95	37.23	31.05	30.84	34.44	34.55
Disable						
Disable	7.91	10.55	8.00	4.32	7.95	8.00
School going habit						
Eligible for school going	55.24	54.13	52.68	55.49	53.85	54.65
School going children	44.76	45.87	47.32	44.51	46.15	45.35
Status						
Earning Member	37.80	34.55	25.85	28.38	31.92	32.03
Dependent	62.20	65.45	74.15	71.62	68.08	67.97

1.2 Education status of the household members

Table 30: Education status of female members of the household

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Illiterate (Female)	13.0	15.4	19.4	11.3	15.8	13.8
Can sign only, (Female)	14.7	17.7	38.7	35.3	25.4	24.5
Not primary school passed (Female)	13.3	16.8	17.6	19.9	15.2	18.0
Primary passed (Female)	12.1	12.0	5.0	9.5	9.0	11.0
High school level (Female)	22.5	21.4	10.8	13.9	17.3	18.5
Secondary School Certificate (Female)	18.8	9.8	5.4	4.9	12.8	7.9
Higher Secondary passed (Female)	3.8	3.2	1.8	2.6	2.9	3.0
Graduate/Bachelor and above (Female)	1.7	3.8	1.4	2.6	1.6	3.3
Respective Base						

Table 31: Education status of male members of the households

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Illiterate (Male)	9.6	9.3	13.4	9.0	11.4	9.2
Can sign only, (Male)	14.5	17.6	25.7	27.8	19.9	21.8
Not primary school passed (Male)	16.3	19.8	17.9	16.1	17.1	18.2
Primary passed (Male)	19.0	9.1	11.4	5.9	15.3	7.8
High school level (Male)	19.0	17.1	16.0	18.3	17.5	17.7
Secondary School Certificate (Male)	9.0	8.5	7.8	7.8	8.5	8.2
Higher Secondary passed (Male)	6.9	6.6	4.9	7.6	5.9	7.0
Graduate/Bachelor and above (Male)	5.7	12.0	2.9	7.6	4.4	10.2
Respective Base						

1.3 Occupation of household members

Table 32: Occupation of head of the household (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Fish Farmer	11	1	1	1	7	1
Agro-business	8	0	0	0	5	0
Driver	1	3	0	0	0	2
Labor	11	5	0	2	6	4
Housewife	1	2	1	4	1	3
Terracotta business	1	0	0	0	0	0
Carpenter	1	2	1	1	1	1
Grocery shopkeeper	1	0	0	0	0	0
Business	14	15	21	15	17	15
Crop Farmer	34	49	62	70	46	58
Service	5	4	3	2	4	4
Sculpture producer	1	0	0	1	1	0
Mason	1	2	0	1	1	2
Livestock rearing	4	2	3	1	3	2
Van Driver	1	4	2	0	1	2
Barber	0	1	0	0	0	1
Clerk	1	0	0	0	0	0
Teacher	0	2	2	1	1	2
Village doctor -	1	0	0	0	0	0
Pharmacy	1	0	0	0	0	0
Mechanic	0	1	0	0	0	0
Fishermen	0	3	0	1	0	2
Shopkeeper	0	0	1	0	0	0
Tanti (Weaver)	0	0	1	0	0	0
Doctor	0	0	0	1	0	0
Unemployed	2	0	1	0	1	0
Count	139	238	100	162	239	400

Table 33: Occupation of the female household members (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Housewife	69.18	66.19	78.69	74.47	73.59	69.52
Crop farmer	1.26	1.96	0.91	0.53	1.10	1.38
Livestock rearing	14.31	15.93	5.46	9.52	10.21	13.38
Aquaculture	1.73	0.53	.	0.53	0.93	0.53
Day labor	1.42	0.44	0.36	0.66	0.93	0.53
Services	1.42	2.40	0.73	0.93	1.10	1.81
Student	10.22	10.85	11.11	11.51	10.63	11.10
Business	0.47	1.51	2.73	1.85	1.52	1.65
Disabled	0.00	0.09	0.00	0.00	0.00	0.05

Table 34: Occupation of male members of the household (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Crop farmer	13.04	18.18	17.35	17.73	15.07	17.94
Livestock rearing	17.91	12.64	14.81	16.84	16.45	14.34
Aquaculture	6.96	3.03	1.17	2.51	4.23	2.81
Day labor	6.61	5.64	1.17	5.17	4.04	5.43
Service	4.87	4.91	4.87	2.51	4.87	3.90
Rickshaw / Van pulling	0.87	1.15	0.58	0.15	0.74	0.79
Student	13.74	19.44	17.93	20.53	15.72	19.95
Dependent	24.35	27.59	34.31	28.21	29.04	27.88
Business	11.13	7.42	7.80	6.35	9.56	6.96
Disabled						
Unemployed	0.52				0.28	
Respective base						

2. Assets Ownership

Table 35: Status of the assets (average)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
What is your homestead size?	13.68	13.58	17.73	17.23	15.39	15.01
How much cultivated land do you have?	151.77	99.44	141.73	218.36	147.17	148.17
How much cultivable land you are currently using?	151.93	95.72	139.12	218.51	145.57	146.56
How much fallow land do you have?	14.58	41.61	29.60	70.80	21.41	44.31
Total land under possession	107.60	121.52	139.72	166.44	120.54	140.21
Total own land	105.70	131.98	128.59	157.01	115.48	141.43

3. Expenditure

Table 36: Average Monthly Household Expenses (BDT)

	Division				ALL	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Food	5081	5650	6266	6078	5577	5821
Clothes	468	546	554	575	504	557
Education	800	698	1011	839	900	755
Travel	662	512	609	476	640	496
Medical	376	362	412	422	391	386
Loan Repayment	3036	2034	3286	4896	3130	3010
Savings	299	323	333	216	308	280
Others	549	514	732	580	615	541
Total	11270	10639	13202	14081	12064	11847

Table 37: Percentage of expenditures on different items

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Food	45	53	47	43	46	49
Clothes	4	5	4	4	4	5
Education	7	7	8	6	7	6
Travel	6	5	5	3	5	4
Medical	3	3	3	3	3	3
Loan Repayment	27	19	25	35	26	25
Savings	3	3	3	2	3	2
Others	5	5	6	4	5	5

4. Dairy Farm Management

4.1 Breeds and Breeding of Livestock

Table 38: Households distribution by herd type (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Local	73	78	25	58	53	70
Crossed breed	17	9	55	22	33	14
Both local and crossed breed	9	14	20	20	14	16
Base - All Respondents	139	237	100	162	239	400

Table 39: Percentage of households having different breeds of Cows

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Local	82.73	91.14	45.00	77.78	66.95	85.50
Jersey / Crossed	23.02	10.13	5.00	5.56	15.48	8.50
Holstein-Friesian/Crossed	4.32	5.06	68.00	25.93	30.96	13.50
Pabna Hariana Crossed	0.72	0.84	0.00	0.00	0.42	0.50
Sindhi / Crossed	0.72	6.75	9.00	18.52	4.18	11.50
Shahiwaal/Crossed	0.00	0.00	2.00	0.00	0.84	0.00
Other (Red Chittagong, Nepali)	0.00	0.84	1.00	0.00	0.42	0.00
Base - All Respondents	139	237	100	162	239	400

Table 40: Average No. of Cows of different breeds per household (applicable for those who have respective cows)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Native / Local	3	3	4	4	3	3
Jersy / Crossed	3	2	2	2	3	2
Holstein-Friesian/Crossed	2	2	5	2	4	2
Pabna Hariana Crossed	2	2	.	.	2	2
Sindhi / Crossed	1	2	5	2	4	2
Shahiwaal/Crossed	.	.	5	.	5	.
Other (Red Chittagong, Nepali)	.	1	2	.	2	.
Respective Base						

Table 41: Percentage of different types of cows per farm (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Milk Cow	30.49	31.03	33.35	33.49	31.68	31.95
Dry Cow	3.59	5.59	9.89	5.45	6.23	5.52
Pregnant Cow	7.93	9.06	6.07	3.56	7.15	6.81
Milking and pregnant	8.50	6.24	7.73	4.18	8.18	5.47
Heifer	26.33	29.24	23.90	30.37	25.31	29.79
Ox	21.02	16.98	19.07	22.52	20.20	19.18
Bullock	2.15	1.85	0.00	0.43	1.25	1.27

Table 42: Average of different type of cows per household

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Milch Cow	1	1	2	1	2	1
Dry Cow	1	1	2	1	1	1
Pregnant Cow	1	1	2	1	1	1
Milking and pregnant	1	1	2	1	1	1
Heifer	1	1	2	2	2	1
Ox	1	1	1	1	1	1
Bullock	2	1	.	1	2	1

Table 43: Percentage of Households with changed no. of animal

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Increased	50.36	35.44	40.00	49.69	46.03	41.35
Decreased	31.65	43.04	45.00	33.54	37.24	39.10
Same	15.11	13.92	12.00	11.80	13.81	13.03
First year farmer	2.88	7.59	3.00	4.97	2.93	6.52

Table 44: Reasons for which the number of cows increased (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Breeding	82.86	95.18	92.50	93.75	86.36	94.51
Purchased	14.29	4.82	12.50	10.00	13.64	7.32
Leased/others	1.43	0.00	0.00	0.00	0.91	0.00
Base - Whose cow's number were increased (count)	70	83	40	80	110	164

Table 45: Reasons for reduced no. of cows(%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Death	20.45	11.76	22.22	7.41	21.35	10.26
Sold	77.27	85.29	75.56	92.59	76.40	87.82
Others	2.27	2.94	2.22	0.00	2.25	1.92
Base - Whose cow's number were decreased (count)	44	102	45	54	89	156

Table 46: Reasons for no. of cows remaining same (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Death and breed simultaneously	14.29	12.12	8.33	0.00	12.12	7.69
Sold and breed / purchase again	80.95	84.85	91.67	94.74	84.85	88.46
Others	4.76	6.06	0.00	10.53	3.03	7.69
Base - Whose cow's number were remained same (count)	21	33	12	19	33	52

Table 47: Farmers adopting different techniques for breeding (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Artificial Insemination (AI)	52.5	67.5	87.0	74.1	66.9	70.3
Natural with Local Breed	55.4	46.4	25.0	40.1	42.7	43.8
Natural with Cross Breed	2.2	1.3	1.0	0.0	1.7	0.8
Base - All Respondents (count)	139	237	100	162	239	400

Table 48: Who does AI (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Self-practice	12.33	10.63	5.75	5.83	8.75	8.54
Private / NGO Service Provider	57.53	45.00	82.76	84.17	71.25	61.92
Govt. AI Center	38.36	51.88	12.64	16.67	24.38	36.65
Base - Those followed AI (count)	73	160	87	120	160	281

Table 49: Reasons for not going to AI centre

	Division				All	
	Khulna		Rajshahi			
	Treatm ent	Control	Treatment	Control	Treatment	Control
Costly	20.87	24.32	6.90	13.01	14.85	18.64
Distant from my home	46.09	32.43	68.97	73.29	55.94	52.54
Unavailability of semen in AI Center	6.09	7.43	17.24	12.33	10.89	9.83
Do not know about AI Center	13.04	23.65	20.69	19.17	16.34	21.36
Frequent Unsuccessful AI	31.30	29.73	13.79	8.90	23.76	19.32
Not interested	33.91	16.89	2.30	9.59	20.30	13.22
Misbehavior of service provider	0.00	0.00	10.34	6.85	4.46	3.39
Doctor comes to home	2.61	2.03	0.00	0.68	1.49	1.36
Difficult to take cow to the center	0.00	0.00	1.15	2.05	0.50	1.02
Use traditional method	0.00	2.03	1.15	0.00	0.50	1.02
Death risk	6.09	6.08	0.00	0.00	3.47	3.05
Base - Those did not follow AI (count)	115	148	87	146	202	295

Table 50: Cost distribution of AI (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Up-to Taka 100.00	8.8	11.8	34.6	0.9	23.9	6.9
Taka 101.00-200.00	29.8	34.0	48.1	6.1	40.6	21.6
Taka 201.00-250.00	19.3	22.2	6.2	13.9	11.6	18.5
Taka 251.00-300.00	36.8	27.8	8.6	61.7	20.3	42.9
More than taka 300.00	5.3	4.2	2.5	17.4	3.6	10.0
Average	245	227	174	294	203	257
Base - Those followed AI (Count)	57	144	81	115	138	259

Table 51: What do you do for breeding of your cow?

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Focus on heat detection	89.13	94.49	89.00	93.21	89.08	93.98
Purchase fit cow	10.87	10.17	0.00	0.62	6.30	6.27
Mating with healthy bull	40.58	19.07	14.00	9.26	29.41	15.04
Improved management & care	9.42	7.63	2.00	6.17	6.30	7.02
Notice Frequent noise from cow	2.90	2.54	4.00	1.85	3.36	2.26
Call doctor	1.45	0.85	0.00	1.23	0.84	1.00
Do nothing	0.72	0.00	0.00	0.00	0.42	0.00
Go to AI center	0.72	2.54	0.00	0.00	0.42	1.50
Base - All Respondents (Count)	139	237	100	162	239	400

Table 52: Problems regarding breeding of cows (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Cost of AI	18.71	15.19	27.00	26.88	22.18	19.85
Missing heat detection	36.69	24.05	19.00	9.38	29.29	18.09
Lack of AI facility	9.35	4.64	5.00	5.63	7.53	5.03
Failure of conception	71.22	63.71	45.00	55.63	60.25	60.30
No oestrus	46.04	26.16	24.00	19.38	36.82	23.37
Sick / weak animals	17.99	15.61	3.00	6.88	11.72	12.31
Lack of knowledge	11.51	6.33	27.00	20.00	17.99	11.81
Need to do AI many times	2.16	3.38	2.00	1.88	2.09	2.76
There is no problem	2.16	2.11	4.00	8.13	2.93	4.52
Do not know the problem	3.60	3.80	1.00	0.63	2.51	2.51
Faulty bull	8.63	1.69	0.00	1.25	5.02	1.51
Do not get doctor on time	0.00	0.42	0.00	0.00	0.00	0.25
Base - All Respondents (Count)	139	237	100	162	239	400

Table 53: Percentage of respondents knowing the age a heifer comes to first heat

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	98.56	97.89	95.00	88.89	97.07	94.25
No	1.44	2.11	5.00	11.11	2.93	5.75
Base - All Respondents	139	237	100	162	239	400

Table 54: of respondents' perception on age at which a heifer comes to first heat (%)

	Division				All	
Age of heifer	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
One year	0.73	2.16	0.00	0.69	0.43	1.59
Two years	3.65	7.33	30.53	9.03	14.66	7.96
Three years	24.09	14.66	34.74	28.47	28.45	19.89
Four years	33.58	29.31	17.89	45.14	27.16	35.54
Five years	37.96	46.55	16.84	16.67	29.31	35.01
Base - Those aware	137	232	95	144	232	377

Table 55: No. of days a local cow require to come to heat again after parturition (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Up-to 45 days	12.3	11.6	3.2	1.4	9.5	7.8
45-90 days	32.6	32.8	75.8	61.0	46.0	43.3
90-120 days	31.2	25.4	12.9	23.4	25.5	24.6
More than 120 days	23.9	30.2	8.1	14.2	19.0	24.3
Average(days)	106.5	112.6	90.4	99.8	101.5	107.9
Mode(days)	120	120	90	90	90	90
Base - Those aware	138	232	62	141	200	374

Table 56: No. of days a crossed cow require to come to heat again after parturition (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Up-to 45 days	15.69	2.70	17.11	5.80	16.54	4.72
45-60 days	31.37	24.32	19.74	13.04	24.41	16.98
60-90 days	37.25	54.05	30.26	37.68	33.07	43.40
More than 90 days	15.69	18.92	32.89	43.48	25.98	34.91
Average(days)	78.98	88.65	86.25	100.80	83.33	96.56
Mode(days)	90.00	90.00	90.00	90.00	90.00	90.00
Base - Those aware	51	37	76	69	127	106

4.2

4.3 Animal Shed Management

Table 57: Materials used by percent of respondents to make the roof of cow shed

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Tin	51.80	37.13	98.00	93.21	71.13	60.00
Brick/cemented	4.32	3.80	5.00	0.62	4.60	2.50
Leaf / Straw	23.74	3.80	4.00	6.17	15.48	4.75
Wood	4.32	9.28	1.00	0.00	2.93	5.50
Tally(Tiles)	20.14	54.01	1.00	0.62	12.13	32.25
Base - All Respondents (count)	139	237	100	162	239	400

Table 58: Materials used for making the floor of the cow shed

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Earthen	29.50	45.57	40.00	79.63	33.89	59.25
Brick / cemented	71.22	54.43	68.00	23.46	69.87	42.00
Base - All Respondents (count)	139	237	100	162	239	400

Table 59: Materials used for making wall of cow shed

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
No Wall	7.91	8.02	58.00	20.99	28.87	13.25
Wood	1.44	1.69	1.00	0.00	1.26	1.00
Leaf	28.78	16.46	28.00	35.19	28.45	24.00
Brick	55.40	58.23	2.00	6.79	33.05	37.25
Tin fence	0.00	2.95	11.00	18.52	4.60	9.25
Mud walls	10.07	14.77	0.00	21.60	5.86	17.75
Base - All Respondents (count)	139	237	100	162	239	400

Table 60: Cow shed cleaning practiced by respondent households (%).

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Once a day	42.45	24.89	8.00	38.89	28.03	30.50
Twice or more a day	57.55	75.11	92.00	61.11	71.97	69.50
Base - All Respondents (count)	139	237	100	162	239	400

Table 61: Size of the Cowshed (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Small (100 sqft)	49.64	37.13	16.00	14.81	35.56	28.25
Medium (101-300 sqft)	41.01	58.65	47.00	67.28	43.51	62.00
Large (more than 300 sqft)	9.35	4.22	37.00	17.90	20.92	9.75
Base - All Respondents (count)	139	237	100	162	239	400

Table 62: How many cows are kept under one shed (%)

	Division				All	
	Khulna		Rajshahi			
Number of cow	Treatment	Control	Treatment	Control	Treatment	Control
1	9.35	12.24	3.00	0.62	6.69	7.50
2	33.09	38.82	17.00	27.16	26.36	34.00
3	29.50	25.74	23.00	31.48	26.78	28.25
4	10.79	13.92	14.00	13.58	12.13	13.75
5	7.19	4.64	10.00	11.11	8.37	7.25
6	5.04	2.11	9.00	6.79	6.69	4.00
More than six cows	5.04	2.53	24.00	9.26	12.97	5.25
Average	3	3	5	4	4	3
Base - All Respondents (count)	139	237	100	162	239	400

Table 63: Summary of Cow shed management

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
% of cow stayed in cowshed	97.34	94.29	93.09	98.56	95.00	96.32
Average number of cow reared by a household	3	3	6	4	4	3
Average number of cow was kept in cowshed by a respondent	3	3	5	4	4	3

4.4 Feeding Management

Table 64: Farmers having feed trough inside the shed (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	87.05	94.09	94.00	77.16	89.96	87.25
No	12.95	5.91	6.00	22.84	10.04	12.75
Base - All Respondents (count)	139	237	100	162	239	400

Table 65: Types of animal feeds used by respondents (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Grass	89.2	88.2	94.0	92.0	91.2	89.8
Straw	90.6	94.1	95.0	97.5	92.5	95.5
Leaf	21.6	25.7	13.0	9.9	18.0	19.3
Pulse leaf	12.9	10.1	30.0	11.1	20.1	10.5
Water Hyacinth	6.5	5.1	13.0	1.9	9.2	3.8
Rice Bran	67.6	82.3	32.0	32.1	52.7	61.8
Wheat Bran	55.4	62.9	86.0	93.8	68.2	75.5
Mustard Oil cake	36.7	65.4	43.0	48.1	39.3	58.5
Soybean Oil Cake	1.4	5.1	76.0	16.7	32.6	9.8
Urea Treated Straw	0.0	1.3	3.0	0.0	1.3	0.8
Salt	39.6	43.9	76.0	81.5	54.8	59.0
Little rice	30.2	55.3	22.0	38.3	26.8	48.5
Grainy feed	13.7	11.0	13.0	11.7	13.4	11.3
Urea Molasses Straw	0.7	0.0	4.0	3.7	2.1	1.5
Vitamin feed	10.8	11.4	38.0	22.2	22.2	16.0
Sugar Syrup	0.7	0.0	0.0	0.6	0.4	0.3
Maize powder	0.0	0.4	1.0	0.0	0.4	0.3
Rice starch	3.6	0.8	0.0	0.0	2.1	0.5
Base - All Respondents (count)	139	237	100	162	239	400

Table 66: Feeding Technique (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Grazing only	5	5	2	4	5	4
Feeding in shed only	40	51	84	34	57	45
Feeding in shed + Grazing	55	44	14	62	38	51
Base - All Respondents	139	237	100	162	239	400

Table 67: Percentage of respondents used chopping methods for serving grass to cattle

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Give feeds without chopping	15.11	1.69	55.00	48.77	31.80	20.75
Give chopped feed always	43.88	61.18	18.00	10.49	33.05	40.75
Both chopped & without chopping	41.01	37.13	27.00	40.74	35.15	38.50
Base - All Respondents	139	237	100	162	239	400

Table 68: Frequency of serving feed (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Once a day	10.79	2.53	1.00	0.62	6.69	1.75
Twice a day	38.13	33.76	68.00	30.86	50.63	32.75
Thrice a day	40.29	53.16	26.00	38.89	34.31	47.25
Four times a day	9.35	6.33	1.00	12.35	5.86	8.75
Always keep feeds available	1.44	4.22	4.00	17.28	2.51	9.50
Base - All Respondents	139	237	100	162	239	400

Table 69: Source of feed (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Own source of fodder / grass	48.20	65.40	62.00	53.70	53.97	60.50
Purchase fodder / grass	41.01	45.57	57.00	46.91	47.70	46.25
Own source of bran	7.91	11.81	9.00	7.41	8.37	10.00
Purchase bran	61.15	58.65	79.00	66.67	68.62	61.75
Own source of oil cake	8.63	20.68	7.00	6.79	7.95	15.00
Purchase oil cake	58.27	52.74	37.00	24.07	49.37	41.25
Gift / Donation	2.88	1.27	1.00	0.62	2.09	1.00
Collect from Khash / Govt. Land	35.97	27.00	9.00	28.40	24.69	27.75
Purchase Vitamins	17.99	9.28	17.00	11.11	17.57	10.00
Self-prepared concentrates	8.63	8.02	0.00	3.70	5.02	6.25
Purchase concentrates	5.76	8.02	4.00	2.47	5.02	5.75
Loose Molasses	0.00	0.42	1.00	0.00	0.42	0.25
Base - All Respondents	139	237	100	162	239	400

4.5 Feed Processing

Table 70: Respondents processing animal feed (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	89.21	94.94	62.00	61.73	77.82	81.50
No	10.79	5.06	38.00	38.27	22.18	18.50
Base - All Respondents	139	237	100	162	239	400

Table 71: % of respondents used feed processing techniques

Feed processing techniques	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Chop fodder / grass	67	73	65	85	66	77
Mix vitamins	30	23	29	26	30	24
Treat straw with urea	2	2	5	0	3	1
Treat straw with urea & molasses	1	0	5	3	2	1
Mix water	85	88	71	70	81	82
Mix salt	48	46	68	81	54	57
Keep in silage	0	0	0	0	0	0
Prepare urea molasses block	1	0	0	0	1	0
Ready feed	1	3	6	1	3	2
Feed cow by mixing all type of feed	7	7	10	2	8	5
Chopping straw	6	3	0	1	4	2
Base -Those prepare fodder	124	224	62	100	186	325

4.6 Water Management

Table 72: Serving Water (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
In pond	4.32	2.95	0.00	0.62	2.51	2.00
In small water pots	46.04	34.18	18.00	37.04	34.31	35.50
In water trough	69.78	84.81	84.00	62.96	75.73	75.75
In river/canal	0.72	2.11	0.00	0.62	0.42	1.50
Base - All Respondents	139	237	100	162	239	400

Table 73: Do you mix water with feed? (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	90.65	94.94	93.00	90.74	91.63	93.25
No	9.35	5.06	7.00	9.26	8.37	6.75
Base - All Respondents	139	237	100	162	239	400

Table 74: Average amount of water consumed per day per cow

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Up-to 20 liters	29.50	18.14	25.00	22.22	27.62	19.75
21-30 liters	23.02	43.04	18.00	27.78	20.92	37.00
31-40 liters	15.11	15.19	30.00	16.67	21.34	15.75
41-50 liters	12.95	5.06	17.00	20.37	14.64	11.25
More than 50 liters	19.42	18.57	10.00	12.96	15.48	16.25
Average(liter)	36.97	36.62	35.79	36.04	36.48	36.37
Base - All Respondents (count)	139	237	100	162	239	400

Table 75: Frequency of serving water (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
2 times	44	48	70	53	55	50
3 times	47	41	28	44	39	42
4 times	6	8	2	3	4	6
5 times	2	2	0	0	1	1
6 times	1	1	0	0	0	1
Average (times)	3	3	2	3	3	3
Base - All Respondents (count)	139	237	100	162	239	400

Table 76: Source of water (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Own Tube-well	89	94	96	98	92	95
Own well	1	0	2	0	1	0
Own pond	7	2	0	1	4	1
Other's Tube-well	6	6	1	2	4	4
Other's well	1	0	1	0	1	0
Other's pond	1	0	2	0	2	0
Rain water	2	0	2	0	2	0
Base - All Respondents (count)	139	237	100	162	239	400

Table 77: Water quality (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Clean	97.8	99.6	99.0	100.0	98.3	99.8
Dirty	0.0	0.0	3.0	0.0	1.3	0.0
Muddy	3.6	0.4	0.0	0.0	2.1	0.3
Mixed rotten leaves	0.0	0.4	0.0	0.0	0.0	0.3
Base - All Respondents (count)	139	237	100	162	239	400

4.7 Disease Management

Table 78: Measures taken to treat diseases

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Call in Vet. Doctor	43.88	43.04	10.00	17.28	29.71	32.50
Take to Animal Hospital	5.04	3.80	0.00	0.00	2.93	2.25
Go to local Paravets	76.98	65.40	93.00	90.74	83.68	75.75
Try myself at home	12.23	2.11	3.00	6.17	8.37	3.75
Do nothing	4.32	1.69	1.00	0.00	2.93	1.00
Take preventive measures	5.04	2.53	4.00	4.94	4.60	3.50
Consult with neighbors	23.02	14.77	8.00	14.20	16.74	14.50
Sell disease infected cattle	5.04	0.84	1.00	0.00	3.35	0.50
Slaughter	0.72	0.00	0.00	0.00	0.42	0.00
Others including traditional remedies	0.00	1.27	0.00	0.00	0.00	0.75
Base -All Respondents(count)	139	237	100	162	239	400

Table 79: Average treatment cost (BDT)

	Division				Cow			
	Khulna		Rajshahi		Local		Cross	
	Treatment	Control	Treatment	Control	Treatment	Control	Treatment	Control
Medicine	138	111	202	179	153	134	186	152
Vaccine	52	59	139	112	81	76	109	92
Fees(Physician)	115	73	209	191	157	118	178	164

Table 80: Percentage of respondents having different cost (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Medicine	83	91	99	88	90	90
Vaccine	53	56	66	54	59	55
Fees(Physician)	72	70	96	90	82	78
No expenses	15	6	0	0	9	4
Base - All Respondents	139	237	100	162	239	400

Table 81 : Measures taken to prevent diseases

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Vaccination	61	63	78	52	68	59
Maintain safe cow shed	38	42	53	51	44	46
Provide enough & nutritious feed	19	20	8	3	15	13
Provide adequate water	35	45	13	4	26	29
Isolate disease infected animal	15	10	20	27	17	17
Purchase healthy livestock	1	1	1	1	1	1
De-worming	54	59	45	49	50	55
Sell sick & weak animals	4	0	6	0	5	0
Do not take any precaution	0	0	0	1	0	1
Clean cow regularly	1	0	1	0	1	0
Keep cow in shed	0	0	0	1	0	1
Cannot say specifically	6	10	5	20	6	14
Base - All Respondents (count)	139	237	100	162	239	400

4.8 Milk Production

Table 82: Regional Milk Production (average)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Average milk production(liter)/day per cow	2.39	1.49	5.68	2.81	3.77	2.03
Average number of milking cow per herd	1.12	1.02	2.14	1.33	1.55	1.15
Average milk production(liter)/year per herd	723	410	3282	1009	1578	630

Table 83: Milk Production for different type of cow (%)

	Division								All			
Milk Production Categories	Khulna				Rajshahi							
	Treatment		Control		Treatment		Control		Treatment		Control	
	Local	Cross	Local	Cross	Local	Cross	Local	Cross	Local	Cross	Local	Cross
Up-to 1 kg	62.9	0.0	52.5	0.0	32.0	0.0	35.1	0.0	56.6	0.0	46.1	0.0
1-2 kg	35.1	4.5	43.1	26.3	64.0	1.8	53.2	8.3	41.0	2.6	46.9	14.3
2-5 kg	2.1	27.3	4.4	73.7	4.0	3.6	11.7	58.3	2.5	10.4	7.1	64.3
5-10 kg	0.0	27.3	0.0	0.0	0.0	49.1	0.0	22.2	0.0	42.9	0.0	14.3
More than 10 kg	0.0	40.9	0.0	0.0	0.0	45.5	0.0	11.1	0.0	44.2	0.0	7.1
Average milk production(kg)/day per cow	1.25	6.37	1.26	2.65	1.60	7.47	1.63	5.72	1.32	7.13	1.38	4.59
Average milk production(kg)/year	263	1338	265	557	336	1569	342	1201	277	1497	290	964
Base - Those have milked cow	97	22	160	19	25	55	94	36	122	77	254	56

Table 84: Milk Production for different districts (average)

	District				
	Satkhira	Khulna	Jessore	Sirajganj	Pabna
Average milk production (liter) per animal per day	2.26	1.59	1.28	3.9	3.91

Table 85: Calves still feed in from the mother

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	84	78	97	99	90	87
No	16	22	3	1	10	13
Base - Those have calf	128	223	97	161	225	385

Table 86: Who does the milking? (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Myself	48.85	55.50	70.00	61.73	58.01	58.06
Family member	21.37	15.31	26.00	39.51	23.38	26.08
Gowala	35.11	33.49	6.00	0.00	22.51	18.82
Base – Those who does the milking	131	209	100	162	231	372

Table 87: Frequency of milking

	Division			
	Khulna		Rajshahi	
	Treatment	Control	Treatment	Control
Once	70	87	7	69
Twice	30	13	88	29
Thrice	0	0	5	1
Four times	0	0	0	1
Five times	0	0	0	1
Average	1	1	2	2
Base-Those have milked cow	131	210	100	162

Table 88: Farmers find milk production satisfactory (%)

	Division			
	Khulna		Rajshahi	
	Treatment	Control	Treatment	Control
Yes	67	60	66	43
No	33	40	34	57
Base-Those have milked cow	131	209	100	162

Table 89: Reasons for satisfaction

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Lack of feed	16	13	2	4	10	10
Better than others	5	12	2	3	3	9
Meets expectation	78	75	92	89	84	80
Production increased	2	0	5	1	3	1
Quality is good	0	1	0	3	0	2
Base - Those satisfied	88	126	66	70	154	196

Table 90: Reasons for dissatisfaction

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Lack feed	19.51	15.66	17.65	23.91	18.67	19.89
Low return	0.00	1.20	2.94	3.26	1.33	2.27
Low yield	36.59	37.35	44.12	29.35	40.00	33.52
Expect more yield	14.63	7.23	0.00	9.78	8.00	8.52
Inputs are expensive	2.44	1.20	17.65	14.13	9.33	7.95
Base - Those dissatisfied	43	83	34	92	77	176

Table 91: Trend of Milk Production

	Division				Type	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Local	Cross
Increased	25.90	20.68	29.00	11.73	18.13	27.35
Decreased	33.09	29.54	52.00	43.83	39.24	39.32
Same	35.97	28.69	12.00	23.46	26.89	19.66
First year farmer	0.00	0.00	3.00	6.79	1.20	3.42
Do not know	5.04	21.10	4.00	14.20	14.54	10.26
Base - All Respondents	139	237	100	162	502	234

Table 92: Reasons for increment in milk production

	Division				Type	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Local	Cross
Increased water provision	41.67	61.22	44.83	15.79	42.86	50.00
Increased nutritious feeds	50.00	55.10	82.76	57.89	56.04	68.75
More lactating cow	22.22	14.29	24.14	15.79	16.48	21.88
Early weaning	5.56	6.12	24.14	31.58	13.19	12.50
Disease prevention / treatment	19.44	22.45	3.45	5.26	14.29	12.50
Do not know	2.78	6.12	3.45	5.26	5.49	3.13
Base - Those said production increased	36	49	29	19	91	64

Table 93: Reasons for decrease in milk production

	Division				Type	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Local	Cross
Death of animals	8.70	0.00	19.23	0.00	5.58	10.87
Lack of feed stuffs	54.35	67.14	57.69	74.65	64.47	63.04
Lack of knowledge	23.91	7.14	5.77	22.54	15.74	11.96
Inadequate water feeding	21.74	4.29	11.54	1.41	7.61	7.61
Lack of training	2.17	4.29	1.92	4.23	3.05	3.26
Do not know	10.87	11.43	7.69	4.23	8.63	8.70
Base - Those said production decreased	46	70	52	71	197	92

Table 94: Reasons for having same volume of milk

	Division				Type	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Local	Cross
Do not know	90.00	92.65	91.67	81.58	89.63	91.30
Others	4.00	1.47	0.00	5.26	2.96	2.17
Lack of feed management	0.00	1.47	0.00	2.63	0.74	2.17
Weak cow	0.00	1.47	0.00	5.26	2.22	0.00
Lack feed	0.00	0.00	0.00	2.63	0.00	2.17
Base - Those said production has been changed	50	68	12	38	135	46

4.9 Marketing

Table 95: Households selling milk (%)

	Division				Type	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Local	Cross
Yes	67.63	64.98	98.00	64.20	64.94	85.47
No	32.37	35.02	2.00	35.80	35.06	14.53
Base- All Respondents	139	237	100	162	502	234

Table 96: Milk Sold/day/farm

	Division					
	Khulna		Rajshahi		All	
	Treatment	Control	Treatment	Control	Treatment	Control
Average Milk sold/farm	3.45	1.64	8.45	3.14	6	2.25

Table 97: Amount of milk sold every day/farm (Kg)

	Division								All			
	Khulna				Rajshahi							
	Treatment		Control		Treatment		Control		Treatment		Control	
	Local	Cross	Local	Cross	Local	Cross	Local	Cross	Local	Cross	Local	Cross
Up-to 1 kg	66.67	4.55	58.41	17.65	30.43	0.00	31.37	10.00	56.98	1.30	50.00	12.77
1-2 kg	31.75	4.55	38.05	35.29	60.87	1.82	58.82	23.33	39.53	2.60	44.51	27.66
2-5 kg	1.59	22.73	3.54	41.18	8.70	10.91	9.80	43.33	3.49	14.29	5.49	42.55
5-10 kg	0.00	22.73	0.00	0.00	0.00	41.82	0.00	10.00	0.00	36.36	0.00	6.38
More than 10 kg	0.00	45.45	0.00	5.88	0.00	45.45	0.00	13.33	0.00	45.45	0.00	10.64
Average (kg)/herd	1.14	9.39	1.25	2.43	1.46	10.29	1.66	5.00	1.22	10.03	1.38	4.07
Base - Those sells milk	63	22	113	17	23	55	51	30	86	77	164	47

Table 98: Buyer of milk (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
To neighbors / relatives	18	19	1	17	9	18
Local open market	8	7	10	68	9	32
Middleman/goala	76	78	47	11	61	51
Processor	1	0	44	2	23	1
Sweetshops	3	5	3	8	3	6
Tea store	1	3	1	1	1	2
Base - Those sold milk (count)	94	154	98	104	192	258

Table 99: Price of Milk (BDT)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Average price of one liter- Current	35.15	31.92	36.14	38.14	35.58	34.63
Average lowest price - last year	31.27	26.28	35.28	35.15	33.24	29.71
Average highest price - last year	36.00	29.51	38.23	43.55	37.09	37.53

Table 100: Reasons for not selling milk (%)

	Division			
	Khulna		Rajshahi	
	Treatment	Control	Treatment	Control
Less production	66.67	46.99	0.00	36.21
Low price	0.00	3.61	0.00	1.72
Distant market place	2.22	0.00	0.00	0.00
Family consumption	57.78	66.27	50.00	72.41
Produce curd	0.00	3.61	50.00	1.72
Calf is too young	0.00	3.61	0.00	0.00
Base - Those did not sell	45	83	2	58

Table 101: Respondents having formal agreements with buyer (%)

	Division				All		Type	
	Khulna		Rajshahi					
	Treatment	Control	Treatment	Control	Treatment	Control	Local	Cross
Yes	51.04	50.65	33.67	3.85	42.27	31.78	38.41	34.00
No	48.96	49.35	66.33	96.15	57.73	68.22	61.59	66.00
Base - Those sold	96	154	98	104	194	258	328	200

Table 102: Whom do they have formal agreement with (%)

	Division			
	Khulna		Rajshahi	
	Treatment	Control	Treatment	Control
Local Market	6.12	5.13	0.00	0.00
Tea stall	2.04	1.28	0.00	25.00
Middlemen	91.84	94.87	57.58	75.00
Processing company	2.04	0.00	42.42	0.00
To Neighbor	2.04	0.00	0.00	0.00
Base - Those have formal agreement	49	78	33	4

Table 103: Agreements with buyer (%)

	Division			
	Khulna		Rajshahi	
	Treatment	Control	Treatment	Control
Deliver specific amount milk	33.33	60.53	18.18	0.00
Milk price is pre-fixed	75.00	46.05	63.64	66.67
Advance money was taken	0.00	0.00	6.06	33.33
Established group	0.00	0.00	12.12	0.00
Base- Those who has agreements with buyer	48	76	33	3

Table 104: Reasons for going for agreements

	Division			
	Khulna		Rajshahi	
	Treatment	Control	Treatment	Control
To confirm sale	77.55	79.49	60.61	25.00
To get confirmed price	28.57	21.79	12.12	50.00
To get loan	20.41	1.28	33.33	25.00
Buyer help to do the milking	2.04	0.00	0.00	0.00
Base- Those have formal agreement (count)	49	78	33	4

Table 105: Respondents who are interested to increase milk production (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	98.56	99.16	99.00	99.38	98.74	99.25
No	1.44	0.84	1.00	0.62	1.26	0.75
Base - All Respondents	139	237	100	162	239	400

Table 106: Presence of Milk Collection Centre in the Locality (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	14.39	13.50	89.00	0.62	45.61	8.25
No	84.89	84.39	11.00	99.38	53.97	90.50
Do not know	0.72	2.11	0.00	0.00	0.42	1.25
Base - All Respondents	139	237	100	162	239	400

5. Training & Skill development

5.1 Technical Support

Table 107: Family members Trained in Livestock Management

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	6	6	14	3	9	5
No	94	94	86	97	91	95
Count	139	238	100	162	239	400

Table 108: Sources of Training (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Govt. Office	12	67	50	20	36	55
Processing companies	12	0	50	0	37	0
Local private experts	12	0	0	0	5	0
Other NGO / Project	62	33	7	80	27	45
Count	8	15	14	5	22	20

Table 109: Person Received Training on Livestock Management (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Self	75	60	86	40	82	55
Spouse	12	13	0	20	5	15
Other male member	12	13	14	20	14	15
Other female member	0	7	0	20	0	10
Husband & wife	0	7	0	0	0	5
Others	0	0	0	20	0	5
Count	8	15	14	5	22	20

Table 110: Topics of the Training Provided (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Dairy farm management	62	60	50	40	55	55
Feed preparation / Feeding	88	73	79	60	82	70
Vaccination	12	40	36	20	27	35
Disease symptoms	62	80	64	60	64	75
Breeding techniques	50	47	57	20	55	40
Disease primary treatment	38	27	50	40	45	30
Identifying quality animals	12	53	21	0	18	40
Milk collection / quality	12	40	21	40	18	40
Disease Prevention	12	7	7	40	9	15
Communication	12	7	7	0	9	5
Heat detection	25	33	14	40	18	35
Fodder cultivation	12	40	14	20	14	35
Milk Hygiene	0	7	0	0	0	5
Disease control	0	20	21	0	14	15
AI	12	7	7	0	9	5
Business planning	0	0	7	0	5	0
Fertility Improvement	0	0	0	0	0	0
Record keeping	0	7	7	0	5	5
Beef fattening	12	0	0	0	5	0
Count	8	15	14	5	22	20

Table 111: Respondents Interested to Receive Training (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	96	93	97	86	96	90
No	4	7	3	14	4	10
Count	139	238	100	162	239	400

Table 112: Respondents having Training in other topics than Livestock Management

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	9	12	6	6	8	10
No	91	88	94	94	92	90
Count	139	238	100	162	239	400

Table 113: Person who Received Training on other topics

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Self	58	52	67	78	61	58
Spouse	33	31	17	0	28	24
Other male member	8	7	0	22	6	11
Other female member	0	3	17	0	6	3
Both husband & wife	0	17	0	0	0	13
Others	0	0	0	0	0	0
Count	12	29	6	9	18	38

Table 114: Respondents who applied knowledge obtained from the training (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	75	87	79	20	77	70
No	25	13	21	80	23	30
Count	8	15	14	5	22	20

Table 115: Reasons for not applying knowledge obtained from the training (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Do not have enough time	0	50	33	0	20	17
Not allowed to go outside of home	0	0	0	0	0	0
Over aged	0	0	0	0	0	0
Financial problem	0	0	0	25	0	17
Count	2	2	3	4	5	6

Table 116: Existence of farmers group in the locality (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	14	8	40	3	25	6
No	79	83	48	93	66	87
Don't know	6	8	12	4	9	6
Count	139	238	100	162	239	400

6. Access to input and capital

6.1 Capital Management

Table 117: Respondents received support from any dairy development organization (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	6	4	5	2	5	3
No	94	96	95	98	95	97
Count	139	238	100	162	239	400

Table 118: Type of assistance received by the respondents (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Animals	50	67	60	67	54	67
Feed	0	0	0	0	0	0
Vitamins / medicine	12	0	20	0	15	0
AI	0	0	0	0	0	0
Money/capital	25	11	20	33	23	17
Informal training	0	22	0	0	0	17
Training	12	0	20	0	15	0
Others	0	0	0	0	0	0
Count	8	9	5	3	13	12

Table 119: Type of organization who provided the assistance

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Govt. Office	38	0	0	0	23	0
BDEP Partner	0	0	0	0	0	0
NGO / other project	25	67	40	67	31	67
Company Representatives	12	22	20	33	15	25
Relatives	12	11	20	0	15	8
Private entrepreneur	12	0	20	0	15	0
Count	8	9	5	3	13	12

Table 120: Sources of capital (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Money from savings	80	67	76	74	79	70
Sell other assets	9	7	23	14	15	10
Take loan	7	2	1	1	4	2
Income from dairy activity	3	0	9	10	5	4
Income from non-dairy activity	21	9	23	28	22	17
Microfinance	6	7	2	6	4	6
None	1	0	4	5	2	2
Lease out land	2	3	1	4	2	3
JuboUnnoyon	0	0	0	0	0	0
Lending from relatives	8	14	1	1	5	9
Advance from Gowala/middlemen	1	0	1	0	1	0
Takes loan against collateral	1	0	1	0	1	0
From cooperative	0	1	0	0	0	1
Grameen bank	0	0	0	0	0	0
Count	138	238	100	162	238	400

Table 121: Source of loan (%)

	Khulna		Rajshahi		All	
	Treatment	Control	Treatment	Control	Treatment	Control
Relatives	4	1	3	3	3	2
Neighbor	1	0	4	1	2	1
Bank	1	1	2	2	1	2
NGO	4	2	7	9	5	5
Middleman/goala	9	0	10	1	10	0
Other informal finance	1	1	2	0	2	1
Dairy milk company	0	0	1	0	0	0

Respective Base

Table 122: Benefits provided if taken loan from intermediary

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Sell milk at pre-fixed price	0	14	14	0	14	3
Has to sell entire milk production	0	0	10	0	9	0
Has to deliver milk on time	0	0	14	0	14	0
Sell at lower price	0	0	29	0	27	0
Share profit with middlemen	100	86	10	0	14	21
No comments	0	0	24	100	23	76
Count	1	7	21	22	22	29

Table 123: Differences in price due to the loan

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Has to sell at lower price than market price	0	0	12	0	12	0
Has to sell at lower price than market price	0	0	12	0	12	0
Has to sell at lower price than market price	0	0	38	0	35	0
No difference	0	0	12	0	12	0
Minor difference	100	100	25	0	29	100
Count	1	7	16	0	17	7

Table 124: Person who took loan (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Self	56	75	72	65	67	68
Spouse	33	25	17	15	22	18
Other male member	6	0	11	8	9	5
Other female member	0	0	0	8	0	5
Both husband & wife	0	8	3	8	2	8
Others	0	0	0	0	0	0
Count	18	12	36	26	54	38

Table 125: Person who repays the loan (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Self	50	50	75	73	67	66
Spouse	44	42	14	15	24	24
Other male member	6	0	11	12	9	8
Other female member	0	0	0	0	0	0
Both husband & wife	0	8	0	4	0	5
Others	0	0	0	0	0	0
Count	18	12	36	26	54	38

Table 126: Do you pay interest on this loan (%)

	Divisions					
	Khulna		Rajshahi		All	
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	50	67	69	81	63	76
No	50	33	31	19	37	24
Count	18	12	36	26	54	38

Table 127: Average interest rate

Khulna				Rajshahi			
Treatment		Control			Treatment		Control
Mean	Median	Mean	Median	Mean	Median	Mean	Median
11%	12%	13%	15%	14%	14%	18%	15%

Table 128: Who takes the decision regarding taking loan (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Self	50	67	69	81	63	76
Spouse	50	33	31	19	37	24
Other male member	0	0	0	0	0	0
Other female member	0	0	0	0	0	0
Both husband & wife	0	0	0	0	0	0
Others	0	0	0	0	0	0
Count	18	12	36	26	54	38

7. Gender Section

Table 129: Female having own land (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	17	21	20	24	18	22
No	83	79	80	76	82	78
Count	139	238	100	162	239	400

Table 130: Female owned average land size (decimal)

Khulna				Rajshahi			
Treatment		Control		Treatment		Control	
Mean	Median	Mean	Median	Mean	Median	Mean	Median
39	25	28	12	30	20	53	33

Table 131: Female having own livestock (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	27	28	32	44	29	34
No	73	72	68	56	71	66
Count	139	238	100	162	239	400

Table 132: Female owned average quantity of livestock (no.)

Khulna				Rajshahi			
Treatment		Control		Treatment		Control	
Mean	Median	Mean	Median	Mean	Median	Mean	Median
4	2	5	2	4	3	7	4

Table 133: Can female sell their assets without anyone's permission (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	17	34	59	66	34	47
No	83	66	41	34	66	53
Count	139	238	100	162	239	400

Table 134: Reasons for not being able sell assets without permission (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Need permission from husband	91	82	49	35	78	70
Do not have any right	9	17	15	22	10	15
Do not have enough time	0	0	5	0	1	0
Social barrier	0	0	5	0	1	0
Not interested	0	1	2	4	1	1
Count	115	157	41	55	156	212

Table 135: Female selling milk without anyone's permission (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	35	63	90	91	58	74
No	65	37	10	9	42	26
Count	139	238	100	162	239	400

Table 136: Reasons for not being able sell milk without permission (%)

Division					All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Need permission from husband	75	71	70	71	74	71
Need to consult with other family members	25	29	30	0	25	29
Husband sell by himself	1	0	10	21	2	3
Count	91	89	10	14	101	103

Table 137: Who makes the following decisions (%)

	All				
	All by male	Mostly by male	Female	Mostly by female	Jointly
Buying/selling animals (adults and calves)	21	20	3	4	52
Investing in shelter maintenance	26	26	3	4	41
Buying services	22	23	5	7	44
Buying inputs	23	24	4	5	44
Selling the milk	11	11	6	15	57
Using the income men earn from dairy	24	22	4	5	46
Using the income women earn from dairy	13	9	7	15	56
Where to sell milk?	12	12	5	14	56
Taking loans	19	15	4	4	59
Spending on breed improvement	18	20	4	6	52
Treatment of animals	18	23	4	5	50

Table 138: How the female are responsible for the following activities(%)

	All		
	Fully	Partially	Don't know
Shelter construction	6	91	3
Shelter maintenance	42	58	0
Feed collection	12	84	4
Feed processing	22	69	9
Feeding	49	51	0
Insemination	11	83	7
Treatment	10	85	4
Selling milk	25	70	5

Table 139: Average of outstanding loan (BDT)

Division							
Khulna				Rajshahi			
Treatment		Control		Treatment		Control	
Mean	Median	Mean	Median	Mean	Median	Mean	Median
48500	19000	12792	12000	33908	25000	10346	6000

Table 140: Female who got opportunity to get training (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	10	13	2	4	7	9
No	90	87	98	96	93	91
Count	139	238	100	162	239	400

Table 141: Female who attended the training (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	50	84	50	83	50	84
No	50	16	50	17	50	16
Base Count-Those who got opportunity	14	31	2	6	16	37

Table 142: Topics on which % of females received training (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Homestead gardening	0	35	0	0	0	29
Crop cultivation	14	15	0	0	12	13
Livestock rearing	57	35	0	100	50	45
Poultry rearing	0	23	0	20	0	23
Fish culture	14	0	0	0	12	0
Milk processing	0	0	0	0	0	0
Knowledge on food nutrition	14	4	100	0	25	3
Improved livestock farming	0	4	0	0	0	3
Count	7	26	1	5	8	31

Table 143: Respondents (only female) found the training useful (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	100	65	100	40	100	61
No	0	35	0	60	0	39
Count	7	26	1	5	8	31

Table 144: How the training was useful (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
No comments	0	12	0	0	0	11
Applied at home	71	71	0	50	62	68
Got to know about nutritious feed	14	0	100	0	12	5
Better care of calf and cow	14	6	0	0	12	0
Count	7	17	1	2	8	19

Table 145: Reasons why training was not effective (%)

	Division		All
	Khulna	Rajshahi	
	Control	Control	Control
Lack of instruments	44.44	0.00	33.33
Forgot what had been learned	11.11	33.33	16.67
Could not learn because of lack of concentration during training session	33.33	0.00	25.00
Training was not useful	11.11	66.67	25.00
Base	9	3	12

*Only control group responded to this question.

Table 146: Who gave the opportunity of training (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Govt. Office	18	23	0	17	15	22
BDEP Partner	0	0	0	0	0	0
NGO / other project	82	81	100	83	85	81
Count	11	31	2	6	13	37

Table 147: Reasons for not availing training opportunity (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Barrier from in laws	0	40	0	0	0	33
Training Centre was far away from home	43	0	0	0	38	0
Do not have enough time	57	60	100	100	62	67
Count	7	5	1	1	8	6

Table 148: Percentage of female who has opportunity to be a member of a group (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	49	64	0	9	28	42
No	51	36	100	91	72	58
Count	139	238	100	162	239	400

Table 149: Percentage of female who has been member of a group (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	10	20	1	4	6	13
No	90	80	99	96	94	87
Count	139	238	100	162	239	400

Table 150: Experience (of female)of being part of a group (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Good and useful	36	49	0	83	33	53
Had learning opportunity	29	34	0	0	27	30
Shared knowledge	7	4	100	0	13	4
Males were cooperative	14	13	0	0	13	11
Not good	29	9	0	17	27	9
Count	14	47	1	6	15	53

Table 151: Reasons for not becoming a member of a group (For female) (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Do not have enough time	8	21	36	16	21	19
There is no such group	15	16	10	22	13	19
Husband do not allow	8	9	9	10	9	10
Did not get any chance	33	29	33	31	33	30
Not comment	0	0	2	1	1	0
Illiterate	0	0	1	0	0	0
Do not find its importance	32	19	8	22	22	20
Ego problem	1	1	0	0	0	1
Count	124	191	99	156	223	347

Table 152: Female who are interested about joining a group (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	25	42	37	65	30	52
No	75	58	63	35	70	48
Count	139	238	100	162	239	400

Table 153: Reasons for not having interest to join a group (for female) (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Family does not allow	19	34	35	30	25	33
Do not have enough time	15	15	46	54	27	26
Do not have land	2	5	3	4	2	5
Do not get chance	50	16	14	9	36	14
Lack of better working environment	16	31	2	4	10	23
Count	103	137	63	56	166	193

Table 154: Where do the women sell milk (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
From household	52	65	88	98	70	78
To middleman	59	52	14	6	36	33
MCC	0	0	2	0	1	0
Direct sell to market	0	0	2	0	1	0
Count	94	154	98	103	192	257

Table 155: Do you think increment in production will change the selling channel

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	77	69	75	65	76	68
No	23	31	25	35	24	32
Count	139	238	100	162	239	400

Table 156: Female facing barriers in performing dairy activities

	Division					
	Khulna		Rajshahi		All	
	Treatment	Control	Treatment	Control	Treatment	Control
Yes	44	34	30	22	38	29
No	56	66	70	78	62	71
	139	238	100	100	100	100

Table 157: Percentage of people who see different barriers to receive training (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Pressure of household chores	71	54	63	53	68	54
Lack of human resource	58	25	19	9	42	19
Sickness / weak health	1	0	2	0	1	0
Husband does not allow	8	8	22	21	14	13
In-laws do not allow	1	1	16	17	8	8
Training center was far away from home	38	12	4	9	24	11
Training center is not favorable for women	7	0	5	0	6	0
Did not get any chance	1	3	1	2	1	3
Do not know the source	0	3	0	1	0	2
Family barrier	1	1	1	1	1	1
Aged	1	0	0	0	0	0
Count	138	237	100	162	238	399

Table 158: Female facing barriers in performing dairy activities (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Pressure of household chores	80	85	73	97	78	89
Lack of knowledge / training	79	57	40	40	66	52
Sickness / weak health	5	4	23	9	11	5
Husband does not allow	7	2	20	0	11	2
In-laws do not allow	0	0	7	6	2	2
Don't like to go outside	23	4	0	0	15	3
Lack of human support during my absence in home	0	0	0	0	0	0
Do not have any barrier	3	4	0	0	2	3
Do not know how to milking cow	3	0	0	0	2	0
Lack of knowledge / training	0	1	0	0	0	1
Count(base who told having barriers)	61	81	30	35	91	116

Table 159: Barriers for women in selling milk (%)

	Division				All	
	Khulna		Rajshahi			
	Treatment	Control	Treatment	Control	Treatment	Control
Pressure of household chores	59	52	69	85	63	66
Lack of knowledge / training	26	5	7	2	18	4
Sickness / weak health	6	6	3	4	5	5
Husband does not allow	22	17	13	5	18	12
In-laws do not allow	9	2	5	6	8	4
Don't like to go outside home	57	40	23	6	43	26
Training center is not favorable for women	1	0	0	0	0	0
Lack of human support during my absence in home	1	0	1	4	1	2
Distance market	1	0	1	2	1	1
Domination of middlemen	1	3	1	1	1	2
Count	139	238	100	162	239	400

Annex5: ToR

TERMS OF REFERENCE (“TOR”) Bangladesh Dairy Enhancement Project Baseline Study

A. BACKGROUND AND JUSTIFICATION

In September 2013 Land O’Lakes was awarded a three-year long United States Department of Agriculture (USDA) sponsored ‘Food for Progress’ project in Khulna and Rajshahi divisions of Bangladesh. The donor requires a baseline report before start of the implementation of the project for the reasons listed in section below.

B. OBJECTIVE

The baseline study is being conducted to:

- Assess the prevailing conditions relating to the dairy value chain where BDEP plans programmatic interventions,
- Establish both qualitative and quantitative baseline information for the indicators for which the project will regularly measure performance,
- Gather findings in light of which the annual targets for the indicators will be established or validated in the Performance Management Plan (PMP),
- Establish quantitative and qualitative methodologies for specific indicators according to which subsequent data will be collected and compared to track and evaluate the project’s progress and impact over the project lifespan,
- Gather necessary information regarding the situation and challenges on ground to make appropriate implementation decisions to maximize efficiency, effectiveness and impact of the project,
- Explain and/or validate the relevance and potential impact of BDEP to key stakeholders, incorporate stakeholder views and ensure strong partnerships,
- Generate accurate information that can be used in developing the dairy sector,
 - Gather information to analyze the gender situation and perspectives regarding dairy value chain improvement,
 - Gather information on the success achieved by demonstration farms supported by international experts, and
 - Gather information to guide organization for making interventions sustainable.

C. SCOPE OF WORK

To meet the objectives of the baseline study, the contractor will conduct a quasi-experimental design where both qualitative and quantitative approaches of data collection will be used so that LOL can identify the best strategies and technical interventions to bolster the dairy sector in Bangladesh.

The contractor will use a combination of propensity score matching (PSM) and Difference in Difference (DiD) in the study to select livestock producers. This will help the BDEP team to replicate the project selection process to the control group (non- project stakeholders) this will also make sure that the selection method is based on apparent characteristics in order to deduce what would have happened to the beneficiaries without the project. The selection criteria will include but is not limited to, gender, average livestock holding, house hold size, average landholding, and membership of production cooperative/group.

The study will be conducted in two phases:

1. Inception phase
2. Implementation phase

In Inception Phase, the contractor will review the relevant documents, hold project kick-off meetings and prepare detailed implementation plans in coordination with BDEP team. A detailed sector assessment will also be conducted in the total of five selected districts in the two divisions. The districts will be chosen based on the secondary literature review where one will be strong in terms of production in the sector and another one will be weak in the sector. The following tools will be used:

- Six (06) Key informant interviews
- Twelve (12) In-depth interviews with the market actors
- Five (05) Focus Group Discussions with livestock producers

The implementation phases will also be divided in to two components:

- Baseline survey for the livestock producers
- Qualitative Assessment on livestock producers and other market actors

A sample of about 640 livestock producers' households from 70 villages in five districts selected from the two divisions will be contacted for baseline data and gender assessment.

To know the baseline information of other actors in the sector, in-depth interviews with the actors will be conducted. The sample will be identified through snowball sampling method.

To get the qualitative information for the baseline study on livestock producers, we will conduct 08 FGDs with the livestock producers. We will also conduct 6 FGDs exclusively with the female livestock producers to assess the gender issues of the livestock producers. 31 in depth interviews will be conducted with stakeholders like Input suppliers, Traders, Processors etc.

D. OUTPUTS AND DELIVERABLES

The contractor will produce the following deliverables within the timeframe under this assignment:

Sl.	Deliverables	Format	Date
01.	Inception report ○ Understanding of the project based on project documents and literature review ○ Finalized methodology including detailed sampling plan ○ Quality control measures ○ Communication protocol ○ Finalized timeline (activities, responsible party, outputs, and timing). ○ Survey instruments (quantitative and qualitative) developed and approved	Both Hard copy and soft copy	11 April 2014
03.	Presentation on major findings and identified trends after the conclusion of fieldwork Sheet of GPS Coordinates for location of focus groups, main contact persons among potential beneficiaries and main	Both Hard copy and soft copy	16 May 2014

	sites/villages visited/suggested for control/intervention groups		
04.	20-30 high resolution pictures (JPEG Format, portrait and landscape as suitable to capture the picture, action oriented) with description on CD-ROM or thumb drive to show the field activities and inform of beneficiaries present practices/situation [Picture Folder Name : BDEP BLS Picture -2014. Picture Caption : Upazila - Union - Object's name (Copy #) – Date - Photographer's name. Ex. : Shariakandi-Hatsherpur-Monira(1)-12.03.14-Masud. Must take written Photo Consent from respondent and submit to LOL.]	Both printed copy and soft copy	16 May 2014
05.	Cleaned quantitative and qualitative datasets in both Microsoft Excel and SPSS format.	Soft copy (CD) - 02 No	16 May 2014
06.	Bound copies of the final comprehensive baseline report. Illustrative structure of which is given below. Revised Evaluation Plan which incorporates recommendations from the final report document.	Hard Copy - 05 No Soft copy (CD) - 05 No	23 May 2014
07.	An electronic version of the final Power Point presentation based on the baseline report. A presentation to the Land O'Lakes/Bangladesh office and stakeholders.		To be negotiated with project Chief of Party

The baseline report shall be in English and follow the structure below. It will include but not be limited to the following:

- Acknowledgements
- List of Acronyms and Abbreviations
- Table of Contents
- Executive Summary
- A brief description of the purpose of the study
- Methodology (Area selection, sampling, data collection, data entry / management / processing / validation, data analysis, data presentation, reporting and findings sharing etc. ...)
- Results and Findings :
- Baseline values for indicators as set in the Results Table (APDT)
- Supporting information in order that BDEP may set the annual and overall targets ○
- Suggest amendments to the Results table (APDT), supported by data
- Suggest improvements to the PMP with respect to data collection methodology, data quality assurance etc.
- Establish baseline description and values for other monitoring and impact variables supporting program's strategic objectives as discussed with the program team during the inception
- Component-wise analysis of anticipated problems or constraints for the implementation of activities
- Actionable recommendations to improve the design and implementation of the overall program and each component
- References

- Annex - Terms of Reference for the survey
- Annex - Survey instruments: questionnaire, interview guide (s), etc. as appropriate
- Annex - Monitoring tools (questionnaire) to assess indicator performance in future
- Annex - Map of survey areas.

E. DETAILED DELIVERY SCHEDULE

DELIVERABLE	DUE DATE
Signing of the contract	
Approval of Data Collection Tools	11 April 2014
Submission of Draft Report	16 May 2014
Approval of Final Report	23 May 2014

F. TECHNICAL DIRECTION

The contractor will seek advice on monitoring and evaluation technical aspects from Asim Hussnain, Manager Monitoring & Evaluation, and technical advice on all other matters Geoff Walker, Chief of Party. All the deliverables will be finally approved by the Chief of Party.

Annex 6: Survey Instruments

FGD guideline for Livestock Producers (Male)

Number of participants:

GPS Coordinates:

Land Mark:

District:

Upazila:

Union:

Village:

Details of the participants:

S/N	Name	Village	Union	Upazila	Mobile
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Check list

1. How many families in the village?
2. Average family size:
3. How many families have cattle?
4. What will be the average number of cattle/family?
5. How much milk a cow produces here in an average?
6. How many cross-bred cattle are there in the village you assume?
7. Is there any fodder production practice in this village?
8. What types of fodder?
9. Do you think of cooperative for milk sale?
10. Who provides you the veterinary services? (Treatment, AI, advice etc.?) LSP, VFA, or NGO
11. Are you satisfied with the services?
12. How do you feel about currently level of productivity?
13. What do you think can increase milk yields?
14. Do you know about better technologies/feed practices?
15. Why can't you adopt those?
16. What is your attitude towards the middlemen?
17. Do you think there can be alternative?
18. How do you think they can increase their milk related incomes? What is stopping them?
19. Do you know about farmer groups and cooperatives?
20. If given a chance will you be part of it? Will you take risk in taking loan as group? Will you be part of management of MCC?
21. Do you need credit for anything?
22. How do you access credit? If given credit, how they'll spend it on improving dairy productivity and trade etc. etc.

FGD guideline for Female Members

Number of participants:

GPS Coordinates:

Land Mark:

District:

Upazila:

Union:

Village:

Details of the participants:

S/N	Name	Village	Union	Upazila	Mobile
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Check list

1. Common issues regarding maintenance of the herd
2. Common issues regarding access to vet services
3. Common issues regarding access to inputs
4. Common issues regarding access to credit
5. Common issues regarding selling the milk and getting the payments
 - i. How they select the channel to sell the milk. Who leads the selection process?
 - ii. How satisfied they are with present channels – advantages/disadvantages
 - iii. What will make them to switch to collection center approach
6. Training needs and barriers to attending trainings (e.g. travel, approval by male/mother-in-law etc.) and what can work instead (to inform our outreach strategy)
7. Barriers to travel (related to training) and how they can be overcome
8. Who do the families (male or female members) consult before making the decisions related to dairy business (can be a community leader, knowledge person, relatives etc.) What can they influence?
9. With increased income, do women feel they'll get more income at their disposal?
10. Attitude about joining the farmer groups (would they want to? Why? Why not? What value they are seeking? Any previous experiences)

Household Survey Questionnaire

Bangladesh Dairy Enhancement Project
Baseline Study Questionnaire-2014

Respondent Identification		
Question Number	Question	Answer
1	Interviewer Name	
2	Interviewer Code	
3	Interview Date	
4	Name of Respondent	
5	Mobile	
6	Respondent Code	
7	Father/Husband's Name	
8	Head of Household	
9	Relation with Head of Household	
10	Sex of Respondent	
11	Occupation of Respondent	
12	Occupation of Head of Household	
13	Village	
14	Union	
15	Upazila	
16	District	
17	Division	
18	Household Type (Treatment of Control)	
Household Demographic and Socio-economic Information		
Household Members		
Question Number	Question	Answer
1	Total Male	
2	Total Female	
3	Children under 5 years old	
4	Children under 2 years old	
5	Children 10-18 years old	

6	Member over 50 years old		
7	Members who are disabled		
8	Children eligible of school		
9	Children going to school		
10	Members who earn an income		
11	Member who are dependent		
Education level of Household members		Males	Females
1	Illiterate		
2	Can sign only		
3	Not primary school passed		
4	Primary passed		
5	High school passed		
6	Secondary School certificate		
7	Higher secondary passed		
8	Graduate/bachelor and above		
Occupation of Household Members		Males	Females
1	Housewife		
2	Crop Farmer		
3	Livestock Rearing		
4	Aquaculture		
5	Day Labor		
6	Public Service		
7	Private Service		
8	Rickshaw / Van pulling		
9	Driving		
10	Student		
11	Dependent		
12	Other		

Asset Ownership		
Question Number	Question	Answer

1	What is your homestead size?	
2	How much cultivated land do you have?	
3	How much cultivatable land do you have?	
4	How much fallow land do you have?	
5	Total land under possession	
6	Total own land?	
Income and Expenditure		
What is the monthly average household expenditure on the following items?		
Question Number	Item	Answer
1	Food	
2	Clothes	
3	Education	
4	Travel	
5	Medical	
6	Loan Repayment	
7	Savings	
8	Other	
Dairy Farm Management		
What breeds of livestock do you have?		Number
1	Native / Local	
2	Jersey / Crossed	
3	Holstein-Frisian / Crossed	
4	Pabna Haryana Crossed	
5	Sindhi / Crossed	
6	Shahiwaal / Crossed	
7	Red Chittagong	
8	Other Crossed	
How many of the following types of livestock do you have?		Number
1	Milch Cow	
2	Dry Cow	
3	Pregnant Cow	
4	Milking and Pregnant	

5	Heifer	
6	Bull	
7	Has this quantity increased, decreased or stayed the same from last year?	
8	If increased, was it by breeding, purchasing or leasing?	
9	If decreased, was it by death, selling, or other?	
10	If the same was it because you had death and were breeding simultaneously, because you sold and bred or purchased again, or other?	
Breeding of Livestock		Answer
1	How do you breed your animals?	a. Artificial Insemination (AI) b. Natural with local breed c. Natural with cross breed
2	If with AI, how do you do AI?	a. Self practice b. Private/NGO service provider c. Government AI center
3	If not with AI, why?	a. Costly b. Distant from my home c. Unavailability of semen at AI Center d. Do not know about AI Center e. Frequent unsuccessful past AI f. Not Interested g. Misbehavior of service provider h. Other (specify)
4	What do you do for breeding?	- a. b. Focus on heat detection c. Purchase d. Mating with healthy bull e. Improved management & care f. Other (specify)
5	Which problems do you feel to breed cows?	a. Cost of AI b. Missing heat detection c. Lack of AI facility d. Failure of conception

		e. No oestrus f. Sick/weak animals g. Lack of knowledge h. Other (specify)
6	Do you know at what age a heifer shows first heat?	a. Yes b. No
7	If yes, can you please tell the age?	a. 1 year b. 1.5 years.2 years c. 2.5 years d. 3 years and above
8	Do you know how many days a cow requires to show heat again after parturition?	a. 30 days b. 45 days c. 60 days d. 90 days e. 100 days
Animal Shed Management		Answer
1	What materials were used for roof?	a. Tin b. Brick/cement c. Leaf/straw d. Wood
2	What materials were used for floor?	a. Earthen b. Brick/cement
3	What materials were used for wall?	a. No wall b. Wood c. Leaf d. Brick
4	Has feed trough?	a. Yes b. No
5	How many times do you clean the shed?	a. Once a day b. Twice or more a day c. Never
6	What is the area of the animal shed?	
7	How many livestock are kept in the shed?	
Feeding Management		Answer

1	What feeds do you give to animals?	a. Grass b. Straw - c. d. Pulse leaf - e. f. Rice Bran g. Wheat Bran h. Mustard oil cake i. Soybean oil Cake - j. k. Salt l. Vitamins m. Concentrates n. Urea Treated straw o. Urea molasses straw p. Leaves q. Water hyacinth r. Other (specify)
2	How do you feed your animals	a. Grazing only b. Feeding in shed only c. Feeding in shed and grazing d. Give water separately e. Feeds with water - f. g. Mix vitamins with feeds h. Provide urea molasses block i. Other (specify)
3	When fed in shed, how do you do it?	a. Give feeds without chopping b. Give chopped feed always c. Both chopped and without chopping
4	How many times do you give feed?	a. Once a day b. Twice a day c. Thrice a day d. Four times a day

		e. Always keep feeds available f. Other (specify)
5	How do you collect feed for animals?	a. Own source of fodder/grass b. Purchase fodder/grass c. Own source of bran d. Purchase bran e. Own source of oil cake f. Purchase oil cake g. Gift/donation h. Collect from Khas/Govt. land i. Purchase vitamins j. Self-prepared concentrates k. Purchase concentrates l. Other (specify)
Water Management		Answer
1	How do you give water to animals?	a. In pond b. In small water pots c. In water trough
2	Do you mix water with feed?	a. Yes b. No
3	How much water do you give to your milking cows per day?	
4	How often do you give water to your milking cows?	
5	From where do you collect water?	a. Own tube-well b. Own well c. Own pond d. Other's tube well e. Other's well f. Other's pond g. River h. Rain water
6	What is the quality of water (observe)	a. Clean b. Dirty c. Muddy

		d. Mixed rotten leaves
Feed Processing		Answer
1	Do you process your animal feed?	a. Yes b. No
2	If yes, how?	a. Chop fodder/grass b. Mix vitamins c. Treat with urea d. Treat with urea and molasses e. Mix water f. Mix salt g. Keep in silage h. Prepare urea molasses block i. Others (specify)
Disease Management		Answer
1	What do you do for treatment of sick cattle?	a. Call in veterinarian b. Take to animal hospital c. Go to local paravets d. Try myself at home e. Do nothing f. Take preventative measures g. Consult with neighbors h. Sell i. Slaughter j. Other (including traditional remedies – specify)
2	What is the cost of treatment?	a. Medicine b. Vaccine c. Doctor's fee d. Other (specify)
3	What preventative measures do you take?	a. Timely vaccination b. Maintain safe cow shed c. Provide enough & nutritious feed d. Provide adequate water e. Isolate disease infected animal

		f. Purchase healthy livestock g. De-worming h. Sell sick & weak animals i. Other (specify)
Milk Production		Answer
1	How many livestock are producing milk?	Cow: Buffalo:
2	How many calves do you have?	
3	What is the age of these calves?	
4	Are they still feeding from the cow?	a. Yes b. No
5	Who milks your cows?	a. Yourself b. Family member c. Goala d. Others
6	What is the average milk production per animal per day? (in liters)	Cow: Buffalo:
7	What is the average milk production days per animal per year? (in days)	Cow: Buffalo:
8	Usual frequency of milk collection in a day?	Cow: Buffalo:
9	Do you think this milk production is satisfactory?	
10	If yes, why do you think so?	
11	If no, why do you think so?	
12	How is milk production compared to last year?	a. Increased b. Decreased c. Same d. Do not know e. First year farmer
13	If increased, then how?	a. Increased water provision b. Increased nutritious feeds c. More lactating livestock d. Early weaning e. Disease prevention/treatment

		f. Do not know g. Other (specify)
14	If decreased, why?	a. Death of animals b. Lack of feed stuffs c. Inbreeding d. Lack of knowledge e. Inadequate water feeding f. Lack of training g. Do not know h. Other (specify)
15	If same, why?	i. A. do not know j. Other (specify)
Milk Marketing		Answer
1	Do you sell milk?	a. Yes b. No
2	How many liters per day?	
3	Where or to whom do you sell milk?	a. Neighbors/relatives b. Local open market c. Middleman/goala d. Processor e. Sweetshops f. Tea store g. Other (specify)
4	What is the present price per liter of milk?	Cow: Buffalo:
5	What was the lowest price over the last year?	
6	What was the highest price over the last year?	
7	If do not sell, then why not?	a. Less production b. No purchaser c. Low price d. Distant market place e. Difficulties in transportation - f. g. Family consumption

		h. Other (specify)
8	Do you have any formal agreement with buyer?	a. Yes b. No
9	If yes, then with whom?	a. Processor b. Middlemen c. Local leaders d. Sweetshop e. Other (specify)
10	What is the agreement?	a. To supply specific quantity of milk b. Guaranteed price c. Other (specify)
11	Why this agreement?	a. Guaranteed sale b. Guaranteed price c. Loan taken from buyer d. Other (specify)
12	Are you interested in increasing your milk production?	a. Yes b. No
13	Are there any milk collection hubs in your area?	a. Yes b. No c. Don't know

Training		
Training		
1	Was any household member trained on livestock rearing?	a. Yes b. No
2	If yes, who provided the training?	a. Government office b. Processor c. Local private experts d. Other NGO/project e. Other (specify)
3	Who received training?	a. Self b. Spouse

		c. Other male member d. Other female member e. Both husband and wife f. Other
4	What were some training topics?	a. Dairy farm management b. Feed preparation/feeding c. Vaccination d. Disease symptoms e. Breeding techniques f. Treatment g. Identifying quality animals h. Milk collection/quality i. Prevention j. Communication k. Heat detection l. Fodder cultivation m. Milk hygiene n. Disease control o. AI p. Business planning q. Fertility improvement r. Record keeping Other (specify)
5	If you were offered training, would you accept?	a. Yes b. No
6	Does any family member have training on other farming?	a. Yes b. No
7	If not, why?	
8	Are there any training groups for dairy farmers in your area?	a. Yes b. No c. Don't
Access to input and capital		Answer
Technical Support		Answer
1	What technical support do you receive?	a. Animals

		b. Feed c. Vitamins/medicine d. AI e. Money/capital f. Information training g. Training h. Other (Specify)
2	Have you received support from any dairy development organization?	a. Government office b. BDEP partner c. NGO/other project d. Company representative e. Relatives f. Private entrepreneur g. Other (specify)
Capital Management		Answer
1	Source of capital for dairy farming?	a. Money from savings b. Sell other assets c. Take loan d. Income from dairy activity e. Income from non-dairy activity f. Microfinance g. None h. Other (specify)
2	From where did you take a loan for dairy activities?	a. Relatives b. Neighbor c. Bank d. NGO e. Middleman/goala f. Other informal finance g. none
3	If loan was taken from a middleman, what obligation did this create? Did it affect the price of your milk?	
4	How much outstanding loan do you have now?	

5	Who received this loan?	a. Self b. Spouse c. Other male member d. Other female member e. Both husband and wife f. Other (Specify)
6	Who is responsible to repay this loan?	a. Self b. Spouse c. Other male member d. Other female member e. Both husband and wife f. Other (Specify)
7	Do you need to pay interest for his loan?	a. Yes b. No
8	What is the interest rate?	
9	Who takes decision for taking loans?	a. Self b. Spouse c. Other male member d. Other female member e. Both husband and wife f. Other (specify)

Gender Questions		
1	Does female member of household own any land?	a. Yes b. No
2	If yes, how much area does she own?	
3	Does female member of the household own any livestock?	a. Yes b. No
4	If yes, how many does she own?	
5	Can she sell her own asset without anybody's permission?	a. Yes b. No

6	If no, why?	
7	Can she sell milk without anybody's permission?	a. Yes b. No
8	If no, why?	
Who makes decisions regarding the following:		
1	Buying/selling animals (adults and calves)	a. All by male b. Mostly by male c. Female d. Mostly by female e. Jointly
2	Investing in shelter maintenance	a. All by male b. Mostly by male c. Female d. Mostly by female e. Jointly
3	Buying services	a. All by male b. Mostly by male c. Female d. Mostly by female e. Jointly
4	Buying inputs	a. All by male b. Mostly by male c. Female d. Mostly by female e. Jointly
5	Selling milk	a. All by male b. Mostly by male c. Female d. Mostly by female e. Jointly
6	Using income men earned from dairy	a. All by male b. Mostly by male c. Female d. Mostly by female

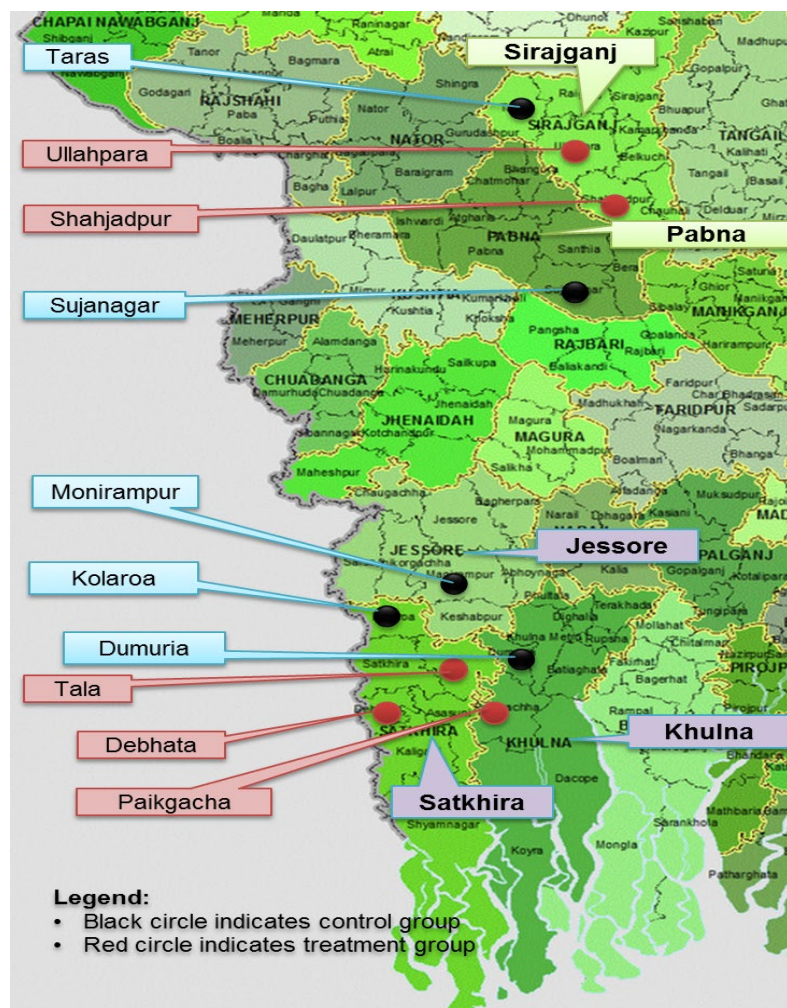
		e. Jointly
7	Using income women earned from dairy	a. All by male b. Mostly by male c. Female d. Mostly by female e. Jointly
8	Taking loans	a. All by male b. Mostly by male c. Female d. Mostly by female e. Jointly
9	Where to sell the milk	a. All by male b. Mostly by male c. Female d. Mostly by female e. Jointly
10	Spending money on breed improvement	a. All by male b. Mostly by male c. Female d. Mostly by female e. Jointly
11	Treatment of animals	a. All by male b. Mostly by male c. Female d. Mostly by female e. Jointly
To what extent do females do the following activities?		Answer
1	Shelter construction	a. Fully b. Partially c. Don't know
2	Shelter maintenance	a. Fully b. Partially c. Don't know
3	Feed collection	a. Fully

		b. Partially c. Don't know
4	Feed processing	a. Fully b. Partially c. Don't know
5	Feeding	a. Fully b. Partially c. Don't know
6	Insemination	a. Fully b. Partially c. Don't know
7	Treatment	a. Fully b. Partially c. Don't know
8	Selling milk	a. Fully b. Partially c. Don't know
9	Did they ever have the opportunity to attend training?	a. Yes b. No
10	Did they attend?	a. Yes b. no
11	Which training did they attend?	a. Homestead gardening b. Crop cultivation c. Livestock rearing d. Poultry raising e. Fish culture f. Milk processing g. Other (specify)
12	If attended, were the trainings useful?	a. Yes b. No
13	If yes, how?	
14	If no, why not?	
15	Who offered the training opportunity?	a. Government office b. BDEP partner

		c. NGO/ other project d. Private entrepreneur e. Other (Specify)
16	If didn't attend, why not?	
17	Did they have the opportunity to be part of a farmer group?	a. Yes b. No
18	Did the participant become a part of the group?	a. Yes b. No
19	If yes, how was the experience?	
20	If no, why not?	
21	Do females want to be a part of the group	a. Yes b. No
22	If no, why not?	
23	If the female sells milk, where does she sell?	a. From household b. To middlemen c. MCC
24	Do you think that milk selling channel will change if milk production increases?	a. Yes b. No
25	Does the female face any barrier to performing dairy activities?	a. Yes b. No
26	If yes, what are those barriers?	
27	Is there any barrier for females to participating in training?	a. Pressure of household work b. Lack of human support during absence in home c. Sickness during training d. Husband does not allow e. In-laws do not allow f. Training venue is far away form house g. Venue is not suitable for females h. Other (specify)
28	Are there any barriers for females to participate in dairy farm management?	a. Pressure of household work b. Lack of knowledge/training c. Sickness/ weak health d. Husband does not allow

		e. In-laws do not allow f. Don't like going outside g. Other (specify)
29	Are there any barriers for females to participate in selling milk?	a. Pressure of household work b. Lack of knowledge/training c. Sickness/ weak health d. Husband does not allow e. In-laws do not allow f. Don't like going outside g. Other (specify)

Annex 7: Maps of Geographic Location of the Survey



Annex 8: Respondent List

Redacted