

Milk Sector Outcome Report

January 2016

Innovation, Monitoring, Learning and Communications Division



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Acronyms

BGM	Business Group Member
CLP-2 (or CLP)	Chars Livelihoods Programme, Phase 2
IMLC	Innovation, Monitoring, Learning and Communications Division of CLP
LSP	Livestock Service Provider
M&E	Monitoring and Evaluation
M4P	Making markets work for the poor approach
MoU	Memorandum of Understanding

Executive Summary

Background

The market development component of CLP applies the Making Markets Work for the Poor (M4P) approach to facilitate change in livestock-related market sectors. These are the milk sector and integrated meat and fodder sector.

The market development projects in the livestock sector have been operational since September 2012, with the milk sector having been implemented since February 2013. The Innovation, Monitoring, Learning and Communications (IMLC) Division of CLP carries out regular monitoring of performance against outcome indicators in milk sector.

The first survey in this (milk) sector was carried out in December 2013 and acts as a baseline except for profit indicators which is drawn from the baseline study of December 2012. The data presented in this report has been drawn from five surveys conducted throughout the project, which used a panel sample and include data for a survey period of 24 months (December 2013 to November 2015). Additionally, results for four control group surveys are presented alongside to demonstrate the impacts more clearly.

Due to several challenges faced in monitoring of dairy farming, a qualitative survey has also been conducted to complement December '15 survey. This helps explain many seasonal pattern in results found from the surveys.

This report summarises progress against outcome indicators in the milk sector from data collected through all outcome surveys and a qualitative survey in December 2015. The results are divided in three categories: input purchasing and production practices, production and productivity and sales and profits.

Achievements

Input purchasing and production practices

- About 40% of all Business Group Members (BGM) with lactating cattle are currently providing improved fodder to their lactating cattle which was only 29% at the baseline. Almost all of them cultivate the fodder themselves. On the contrary, very few control group participants cultivate or purchase fodder (2.4% in December 2015).
- The % of BGMs purchasing ready feed more than doubled over the last 2 years with a subsequent increase in the mean amount of ready feed provided per cattle which has increased from 385 grams per day to about 600 grams per day.
- The % of currently lactating cattle which are cross breed reached between 20% and 30% (only 7.9% at baseline).
- About one-third of all cattle are currently inseminated artificially with semen from cross breed ensuring a larger stock of cross breed cattle in the future which was only 8% at baseline.
- The purchase of de-worming tablets by BGMs with lactating cattle varies seasonally and no significant difference from baseline was observed.
- The % of BGMs purchasing vaccinations for currently lactating cattle in the last 12 months increased up to 71% in June '15 compared to 48% at the baseline.

Production and productivity

- Milk yield per cow per month has increased by between 25% and 44% over baseline depending on seasons.

Sales and profit

- A steep rise in mean price of milk (Tk 39.2 per litre) was observed in December '15.
- The mean litres of milk sold per BGM per month shows significant increase from 33.5 litres to between 42 and 55.6 litres in 2015 subject to seasonal variation.
- About 80% of all BGMs sold milk in each seasons compared to less than 70% at the baseline.
- The mean profit per cow per month from dairy farming increased to Tk. 712 per cattle per month which is below the expected overall mean profit of Tk. 1047 per cattle per month. However, an in-depth analysis shows that BGMs' profit actually increased over time. The mean profit is dragged down by the BGMs who did not sold milk (about 20%) during the survey period. Moreover, a higher level of household consumption of milk by the BGMs selling it also lowered the profit level.
- CLP has exceeded its logframe target for profits: 35% of all BGMs have made a 30% profit increase over baseline against the January 2016 milestone of 30% BGMs reaching that ceiling.

The following table summarises the key finding of the surveys.

Table 1: Summary of performance against key indicators

INDICATOR	Dec '13 (baseline)	Mar '14	Jun '14	Dec '14	Jun '15	Dec '15
% BGMs with lactating cattle either purchasing or cultivating Napier or Jumbo grass	29%	30%	35%	33%	43%	41%
% BGMs with lactating cattle purchasing ready feed	25%	41%	37%	50%	61%	52%
Mean quantity (g) of ready feed provided per lactating cow per day	385	400	384	419	591	599
% of currently lactating cattle which are cross-breed	7.9%	5.0%	6.3%	8.3%	28.8%	19.7%
% BGMs purchasing Artificial Insemination	8%	11%	6%	12%	22%	31%
% BGMs purchasing de-worming tablets for currently lactating cattle during the last 12 months	75%	59%	74%	55%	73%	61%
% BGMs purchasing any vaccination for currently lactating cattle during the last 12 months	48%	43%	69%	36%	71%	56%

Mean number of litres of milk produced per cow per day	1.3	1.57	1.6	1.57	1.88	1.60
% of BGMs with lactating cattle who sold milk	69%	80%	74%	84%	80%	79%
Mean litres of milk sold per BGMs per month	33.5	44.1	42.6	47.4	55.6	42.0
Mean sales price per litre of milk	40.4	33.9	34.7	36.3	34.0	39.2
Mean profit per cow per month	698*	639	493	870	788	712
Mean profit per cow per month for BGMs who sold milk	NA	844	735	1083	1029	969

* It is the December 2012 figure for mean profit per cow per month which is considered the baseline for all profit indicators. In December 2013, mean profit per cattle per month was TK 501.

1. Background

The market development component of CLP applies the Making Markets Work for the Poor (M4P) approach to facilitate change in livestock-related market sectors. These are the milk sector and the integrated meat and fodder sector.

The market development project in the meat sector has been operational since September 2012, with the milk sector having been implemented since February 2013. The Innovation, Monitoring, Learning and Communications (IMLC) Division of CLP carries out regular monitoring of performance against outcome indicators in milk sector.

The Milk Market Development Project and Its Monitoring

CLP's Market Assessment Report 2010¹ identified many supply side problems as well as price volatility as the main challenges of milk market in the chars. Therefore, the milk market development project aimed to increase productivity in dairy farming through improved production practices and to strengthen the supply side by creating or organizing actors at different levels of value chain. Monitoring of the project, hence, includes tracking changes in production practices by the dairy farmers, in productivity and as an outcome, in their sales and profitability.

A baseline study was conducted in December 2012 and outcome-monitoring surveys began in December 2013. The methodology used during the baseline survey caused difficulties in the measurement of certain indicators at later points. In response, the first survey in December 2013 has been used as the baseline except for the profit indicators. The surveys were carried out quarterly until June 2014. Later, it has been recognised that half yearly data suffices for the outcome monitoring requirements. The surveys are conducted twice every year (in June and December) since then. These surveys allow measuring outcomes of the milk sector market development project against the baseline.

In the milk sector, from a total of 3,092 Milk Business Group members (BGMs), 872 are sampled. A cluster sampling process was used. This ensures the sample represents the different districts in which the project is implemented in proportion to the number of Milk BGMs they contain.² In addition, control group surveys are also conducted on 175 participants to demonstrate the impact of the project.

This report presents a summary of results from the data collected through five surveys carried out throughout the project (March '14, June '14, December '14, June '15 and December '15) and includes data for January 2014 to December 2015. Baseline (December 2013) and control group survey data (December '13, December '14, June '15 and December '15) are presented as well to help understand the impact of the project over time.

Like many agricultural production, dairy farming poses two inherent challenges in monitoring its performance. First, dairy farming follows a cyclical production – a cattle is inseminated, follows a pregnancy period and a lactation cycle after giving birth and the cycle repeats. Since the surveys are conducted at two distinct periods of the year, the cyclical production system affects data availability and pattern. Therefore, given specific pattern on pregnancy (about 9 months) and lactation period (6-8 months) followed by the dairy farmers in the chars, the number of both lactating

¹ Rob, Abdur (2010), CLP Market Assessment: Market system for milk and dairy products – Bogra / Sirajgonj chars

² For a full description of the methodology, please refer to the full Market Development M&E plan, July 2013.

cattle and BGMs rearing them differ significantly between June and December surveys (Figure 1). This alludes to the second challenge. From procurement of inputs and production practices to production, marketing and profitability, all stages in dairy farming are affected by seasonality. To deal with these challenges, the outcome survey Dec '15 was complemented by a qualitative survey to better explain the results.

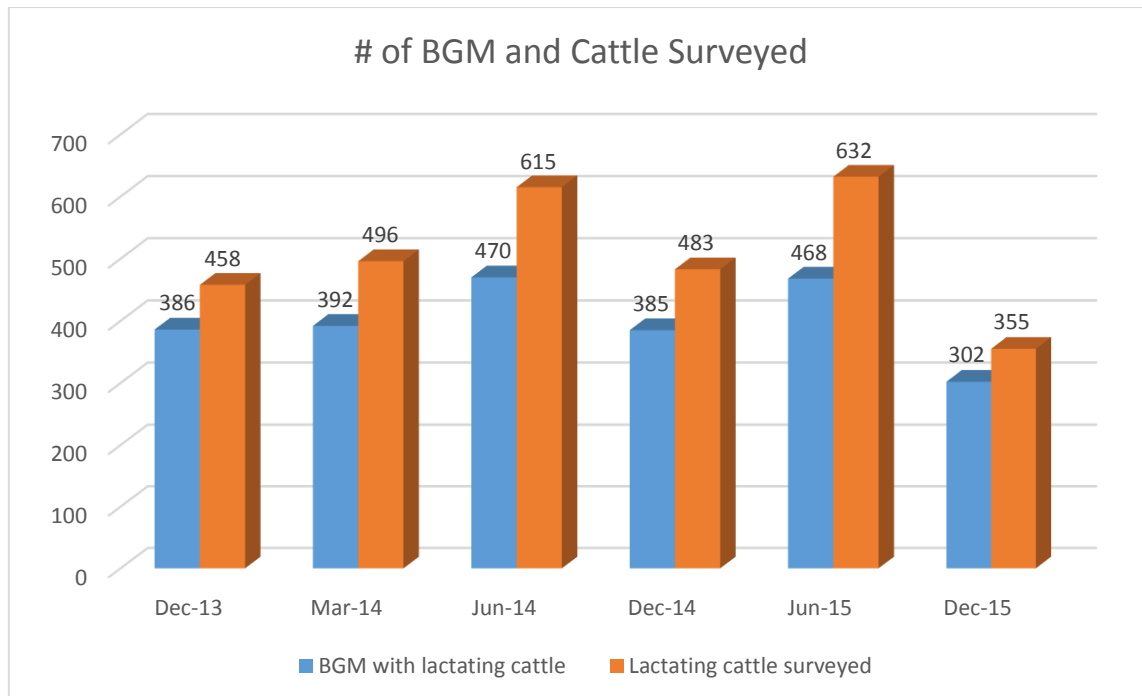


Figure 1: Number of BGMs and lactating cattle surveyed

An additional difficulty peculiar to monitoring the outcomes of this project is the unit of analysis. Due to both seasonality and cyclical pattern of production, adopting a definition of dairy farmer poses complexity. Although almost all BGMs rear female cattle throughout the year, only a fraction of them rear lactating cattle during any given survey period. Moreover, at the very beginning or end of the lactation cycle, cattle are not milked to provide for the calves. Additionally, some produced milk is consumed by the households rather than sold and thus generates no monetary income. Given these complexities, the outcome survey collects data on the BGMs whose cattle were lactating during the surveys. Therefore, BGMs with lactating cattle are taken as unit of analysis for all BGM level variables reported except for sales and profit data (for these, BGMs milking their cattle are taken as the unit of analysis).

On par with the project objectives, this report presents a summary of progress against outcome indicators in the milk sector in three categories:

1. Input purchasing and production practices,
2. Production and productivity,
3. Sales and profits.

2. Input purchasing and production practices

2.1 Purchasing and cultivation of improved fodder varieties

Feeding dairy cattle high quality fodder is crucial to increase milk yields. The project has placed significant emphasis on achieving this goal, by promoting the use of two types of grass- Jumbo and Napier grass- which have significant potential on the chars. BGMs could access these types of fodder through two routes. The first is cultivating fodder and the second is purchasing it. The tables below summarise progress to date for these two channels.

Table 2: % BGMS cultivating and purchasing Jumbo or Napier grass

INDICATOR	December 2013 (baseline)	March 2014	June 2014	December 2014	June 2015	December 2015
% BGMS cultivating Jumbo or Napier grass	29%	28%	30%	31%	41%	39%
% BGMS purchasing Jumbo or Napier grass	5%	2%	6%	3%	3%	2%
% BGMS either cultivating or purchasing Jumbo or Napier grass	29%	30%	35%	33%	43%	41%

The results so far show that there has been a large increase from the baseline in the number of BGMS either cultivating or purchasing improved fodder (41%). It also shows that, of these BGMS, a high percentage of BGMS (39%) are cultivating the fodder themselves rather than purchasing it (Table 2). To be noted that December surveys include post-flooding season reflecting a slight reduction in use of improved fodder compared to June surveys. Most of the chars are flooded during the rainy season (June to September) each year and crops (including fodder) are destroyed. As a result, BGMS have to follow a fodder cropping pattern which only lasts for about 6-8 months. This affects the availability of fodder to provide for the cattle

Table 3: % BGMS cultivating and purchasing Jumbo or Napier grass (Control)

INDICATOR	Control group survey (December 2013)	Control group survey (December 2014)	Control group survey (June 2015)	Control group survey (December 2015)
% BGMS cultivating Jumbo or Napier grass	1.4%	0.0%	5.7%	2.4%
% BGMS purchasing Jumbo or Napier grass	0%	0%	0%	0%

% BGMs either cultivating or purchasing Jumbo or Napier grass	1.4%	0.0%	5.7%	2.4%
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On the contrary, the control group has very low use of improved fodder in their dairy farming. Only 2.4% have cultivated fodder whereas no cattle rearer has purchased them in Dec '15 (Table 3).

2.2 Ready feed purchasing and usage

The project has also promoted the use of ready feed³, which is fed to dairy cattle in the commercial farming sector as a 'nutrient top-up' to the dairy cows' main feed / diet of fodder to increase and optimise the cow's milk yields. Table 4 shows that the number of BGMs purchasing ready feed has more than doubled in the last 24 months, which is a significant achievement.

Table 4: % BGMs purchasing ready feed

INDICATOR	December 2013 (baseline)	March 2014	June 2014	December 2014	June 2015	December 2015
% BGMs purchasing ready feed	25%	41%	37%	50%	61%	52%

More than half of the dairy farmers now provide ready feed to their cattle regularly. The increase suggests that there has been both an increase in demand for ready feed and an increase in supply on the chars. This is a positive indication that inputs market development (a complementary project run by CLP) on the chars is progressing as well. The effect seems to extend beyond the project participants. About 2%-4% of the dairy farmers from the control group reports initiation of providing ready feed to the lactating cattle which was absolutely zero at the baseline.

Table 5: % BGMs purchasing ready feed (Control)

INDICATOR	Control group survey (December 2013)	Control group survey (December 2014)	Control group survey (June 2015)	Control group survey (December 2015)
% BGMs purchasing ready feed	0.0%	3.8%	3.4%	2.4%

However, any amount of purchase qualifies the BGMs for inclusion in the statistics above. As such, it is important to qualify the above results by analysing whether the amounts purchased and fed to cattle are meaningful. Table 6 presents the mean quantity of ready feed (g) provided to each lactating cow per day.

The results (Table 6) show that mean quantity of ready feed provided per dairy cow per day has increased from the baseline. Taken alone, these results do not permit interpretation about whether

³ **Ready feed:** feed pellets manufactured from various crop residues and cereal by-products, as well as tree leaves, grasses and aquatic plants. Mixtures are formulated to provide appropriate rations of specific nutrient groups required for optimal beef or milk production.

each lactating cow is consuming the optimal quantity of ready feed for dairy production, because this must be analysed at the level of the individual cow and requires detailed information about other feeds provided particularly the quantity and quality of the fodder in the diet, stage of the lactation cycle, and other production factors. However, broadly speaking, these figures certainly indicate that the amounts fed to cattle are increasing due to BGMs' understanding of its direct relation to production.

Table 6: Mean quantity of ready feed (g) provided per lactating cow per day

INDICATOR	December 2013 (baseline)	March 2014	June 2014	December 2014	June 2015	December 2015
Mean quantity (g) of ready feed provided per lactating cow per day	385	400	384	419	519	599

The control group dairy farmers provide a very low amount of ready feed per cattle per day compared to the practice of BGMs in milk sector. However, it shows a large increase from the baseline and occasional escalation is observed as in June 2015.

Table 7: Mean quantity of ready feed (g) provided per lactating cow per day (Control)

INDICATOR	Control group survey (December 2013)	Control group survey (December 2014)	Control group survey (June 2015)	Control group survey (December 2015)
Mean quantity (g) of ready feed provided per lactating cow per day	0	219	520	200

Difference in the practice of ready feed usage shows an important success of the project. A recent interview with the BGMs revealed that cattle requires more feed and special care for body maintenance during winter although production is lower in this season, which they learned in trainings by CLP. On the contrary, control group producers associate feeding to the production level ignoring cattle's seasonal requirement.

Furthermore, a very large percentage of BGMs places a high importance in using improved fodder and ready feed, and recognizes the complementarity of both inputs in increasing milk production – a message that is directly promoted through the project.

2.3 Cattle breed and artificial insemination

Table 8: % of cross-breed cattle

INDICATOR	December 2013 (baseline)	June 2015	December 2015

% of cattle that are cross-breed	7.9%	28.8%	19.7%
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Improving cattle breed is another key route to increasing productivity and profits from dairy farming. This can be achieved by either purchasing cattle of improved breed or by inseminating current stock with semen of improved breed cattle.

Although individual cows may be made up of varying percentage of each component breed and although different breeds vary significantly in their characteristics, broadly speaking, an increase in the percentage of cross breed cattle would signify improvements in breed. With this in mind, the M&E system collects data on the breeds of cattle reared by Milk BGMs. Table 8 shows that about 20% - 30%⁴ of all currently lactating cattle reared by BGMs are cross-breed⁵. It is important to note that contrary to the meat sector project, a female cattle in dairy farming is a fixed asset. It has longer productive period and costs higher than a male cattle. It makes replacement of previously owned local breed cattle with cross-breed difficult. Therefore, while a wholesale transformation in cattle breed has been observed in meat sector (about 50%), replacing about one-third of cattle by cross-breed in milk sector is a significant achievement considering a very low baseline (7.9%). This success is more explicit while compared to the percentage of cross breed cattle among the control group dairy farmers which is between 2% and 12% only (Table 9).

Table 9: % of cross-breed cattle (Control)

INDICATOR	December 2013 (baseline)	June 2015	December 2015
% of cattle that are cross-breed	1.9%	11.8%	1.9%

The market development projects of CLP have worked toward increasing insemination facilities internally by creating livestock service providers (LSPs) in the chars and providing training and equipment as well as by continuing partnership activities to increase public livestock services to the char dwellers. This combined approach has resulted in a high adoption of AI among the BGMs and a positive externality by availing more public and private livestock facilities among the char dwellers in general.

Table 10: % BGMS purchasing Artificial Insemination

INDICATOR	December 2013 (baseline)	March 2014	June 2014	December 2014	June 2015	December 2015

⁴ Due to 6-8 months of lactation period, a lactating cattle surveyed once is most likely to stop lactating in the next survey and thus, not being included in that survey. This bars from providing an exact statistics of current stock of cross-breed cattle reared by BGMs unless each cattle is identified with distinct IDs which is done in meat sector outcome monitoring. However, considering complexity of the process and its trivial impact in milk sector monitoring, tracking each cattle by IDs was not done.

⁵ Based on experience from meat sector market development surveys, it was revealed that there were errors in identifying cattle breed by the enumerators due to limited knowledge. They have been provided with a refresher training during June '15 and thus, non-comparable results have been omitted from the report.

% BGMs purchasing Artificial Insemination	8%	11%	6%	12%	22%	31%
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The number of BGMs purchasing artificial insemination (AI) shows a large increase (Table 10). It ensures a greater availability of cross breed cattle in the future. Additionally, a recent increase in purchase of AI by the control group producers reflects the CLP's success in char-wide change in livestock services (Table 11).

Table 11: % BGMs purchasing Artificial Insemination (Control)

INDICATOR	Control group survey (December 2013)	Control group survey (December 2014)	Control group survey (June 2015)	Control group survey (December 2015)
% BGMs purchasing Artificial Insemination	2%	5%	5%	19%

2.4 De-worming and vaccination purchasing and practice

Correct de-worming and vaccination practice are important to improving cattle health and increasing milk yields. The table below presents the key results in relation to de-worming practices.

Table 12: % of deworming of lactating cattle

INDICATOR	December 2013 (baseline)	March 2014	June 2014	December 2014	June 2015	December 2015
% of currently lactating cattle de-wormed in the last 6 months	58%	49%	66%	43%	66%	46%
% BGMs purchasing de-worming for currently lactating cattle during the last 12 months	75%	59%	74%	55%	73%	61%

Correct deworming practice involves de-worming cattle every 6 months. However, some other factors related to production practices also affect this decision. In general, female cattle are dewormed before insemination and producers avoid providing deworming tablets on the eve of giving birth and beginning of lactation cycle. As Table 12 shows, there is a specific seasonal pattern in purchase of deworming tablets.

Recent interviews with the BGMs revealed that March to May, and August to September are two most preferable periods for insemination. Coupled with the fact that more lactating cattle are reared in the first 6 months of the year, this explains increases and drops in deworming rate in every June and December surveys respectively.

The table demonstrates that the majority of cattle were de-wormed within the appropriate interval. In addition, results show that the percentage of BGMs purchasing de-worming tablets at least once in the last 12 months is quite high throughout the year.

In control group, only one-third of all dairy farmers purchase deworming tablets and only one-third of all lactating cattle are dewormed in appropriate interval.

Table 13: % of deworming of lactating cattle (Control)

INDICATOR	Control group survey (December 2013)	Control group survey (December 2014)	Control group survey (June 2015)	Control group survey (December 2015)
% of currently lactating cattle de-wormed in the last 6 months	34%	29%	33%	31%
% BGMs purchasing de-worming for currently lactating cattle during the last 12 months	39%	34%	34%	31%

The table below presents purchasing and practices data relating to the key vaccinations for lactating cattle on the chars. Correct practice involves vaccinating lactating cattle against Black Quarter and Foot and Mouth Disease every 6 months, and against Haemorrhagic Septicaemia and Anthrax every 12 months. The table demonstrates that the % of BGM purchasing at least one vaccine during the last 12 months has also increased significantly in 2015 compared to 2014. The purchase of vaccines in appropriate intervals follows a similar seasonal pattern as in the case of deworming. Although the rate of vaccination shows seasonal increase, there is scope for further improvement.

Table 14: % BGMs purchasing any vaccination for lactating cattle during the last 12 months

INDICATOR	Dec '13 (baseline)	Mar '14	Jun '14	Dec '14	Jun '15	Dec '15
% of currently lactating cattle vaccinated against foot and mouth disease in the last 6 months	22%	21%	38%	12%	36%	23%
% of currently lactating cattle vaccinated against anthrax in the last 12 months	21%	18%	38%	15%	39%	29%
% of currently lactating cattle vaccinated against black quarter in the last 6 months	11%	11%	20%	14%	23%	19%
% of currently lactating cattle vaccinated against hemorrhagic septicemia in the last 12 months	6%	8%	13%	3%	12%	8%

% BGMs purchasing any vaccination for currently lactating cattle during the last 12 months	48%	43%	69%	36%	71%	56%
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The results in Table 15 shows that vaccination practice among the control group is still far below the BGMs' level.

Table 15: % BGMs purchasing any vaccination for currently lactating cattle during the last 12 months (Control)

INDICATOR	Control group survey (December 2013)	Control group survey (December 2014)	Control group survey (June 2015)	Control group survey (December 2015)
% of currently lactating cattle vaccinated against foot and mouth disease in the last 6 months	13%	3%	3%	13%
% of currently lactating cattle vaccinated against anthrax in the last 12 months	4%	2%	3%	2%
% of currently lactating cattle vaccinated against black quarter in the last 6 months	4%	1%	10%	0%
% of currently lactating cattle vaccinated against haemorrhagic septicaemia in the last 12 months	3%	4%	3%	0%
% BGMs purchasing any vaccination for currently lactating cattle during the last 12 months	23%	5%	18%	14%

3. Production and productivity

Milk production suffers from seasonality. BGMs reported that a warmer season and availability of fodder increases productivity during the first-half of the year while the end of the year marks a drop in productivity due to winter and scarcity of fodder at the post-flooding season. This explains the longitudinal pattern in changes in productivity over the project period. The table below summarises changes in litres of milk produced per cow per day by Milk BGMs. The results indicate that milk productivity for dairy cattle reared by Milk BGMs has increased significantly over baseline.

Apart from a seasonal variation, overall productivity shows an increasing trend as explained by a comparison of productivity in 2014 and 2015.

Table 16: Mean number of litres of milk produced per cow per day

INDICATOR	December 2013 (baseline)	March 2014	June 2014	December 2014	June 2015	December 2015
Mean number of litres of milk produced per cow per day	1.3	1.57	1.60	1.57	1.88	1.60
% increase in mean number of litres produced per cow per day	-	21%	23%	21%	44%	23%

As in all other indicators, mean productivity per cattle for the control group dairy farmers is lower than that of treatment group. However, seasonal variation is evident in the control group as well.

Table 17: Mean number of litres of milk produced per cow per day (Control)

INDICATOR	Control group survey (December 2013)	Control group survey (December 2014)	Control group survey (June 2015)	Control group survey (December 2015)
Mean number of litres of milk produced per cow per day	1.01	1.12	1.4	1.27
% increase in mean number of litres produced per cow per day	-	11%	39%	26%

4. Sales and profit

4.1 Milk sales

Increasing productivity is an important step if BGMs want to increase their profits from milk production. It is also crucial to find buyers for the milk. The tables below present changes in key indicators relating to milk sales.

Table 16 below shows that there has been a significant increase in the mean price of milk received by the BGMs in Dec'15 which has coincided with a decrease in % of BGMs with lactating cattle selling their milk. According to the BGMs, seasonality of production explains change in unit price and volume of milk sold. During the first-half of the year, production increases which takes the price down whereas lower production at the end of the year induces higher price.

Another factor affecting the price is the marketing channel. BGMs face a trade-off between taking on the sales themselves for a higher price and a risk-free convenient sales through local goalas (milk collectors) at a lower price. In general, selling to mainland buyers and large processors incur higher prices.

It is important to note that notwithstanding the seasonal variation, milk price was quite low over the last two years compared to the price at baseline. CLP's continuous effort to create partnerships with large private companies⁶ has resulted in installing of a few chilling plants near the chars which greatly contributed to an increased demand and higher price for the milk produced in the chars. Both BGMs and local goalas have recognised that except seasonal price volatility, they do not suffer from any demand side problems and there is enough opportunity to sell as much as they produce.

Table 18: Milk market and sales of milk by BGMs

INDICATOR	Dec '13 (baseline)	Mar '14	Jun '14	Dec '14	Jun '15	Dec '15
% of BGMs with lactating cattle who sold milk	69%	80%	74%	84%	80%	79%
Mean litres of milk sold per BGMs per month	33.5	44.1	42.6	47.4	55.6	42.0
% increase over baseline	-	32%	27%	41%	66%	25%
Sale of milk as % of total production	73%	74%	68%	81%	74%	76%
Mean sales price per litre of milk	40.4	33.9	34.7	36.3	34.0	39.2

A similar trend is observed in the control group except for the fact that low productivity resulted in lower amount of milk sold per month for the control group.

⁶ CLP has managed to sign MoUs with Pran Dairy, Brac Dairy and Food Enterprise, Grameen Danone and many other large private companies to improve supply chains and strengthen milk market on the chars. For details, visit www.clp-bangladesh.org.

Table 19: Milk market and sales of milk by dairy farmers (Control)

INDICATOR	Control group survey (December 2013)	Control group survey (December 2014)	Control group survey (June 2015)	Control group survey (December 2015)
% of BGMs with lactating cattle who sold milk	47%	62%	65%	71%
Mean litres of milk sold per BGMs per month	17.7	28.2	38.5	34.2
Sale of milk as % of total production	54%	71%	67%	71%
Mean sales price per litre of milk	40.2	34.5	33.0	38.7

4.2 Profits from dairy farming

Profitability in dairy farming is directly tied with productivity and market price. In addition, amount of milk sold by the BGMs per month also affects their profit. The table below presents mean profit per cow per month for the business group members. According to December 2015 survey data, BGMs are making a mean profit per cattle per month of BDT 712, a small increase over baseline. As shown in Table 18, it is lower than December 2014 mean profit and also considerably below the expected level (BDT 1047).

Table 20: Mean profit per cow per month

INDICATOR	December 2012 (baseline)	March 2014	June 2014	December 2014	June 2015	December 2015
Mean profit per cow per month	698*	639	493	870	788	712
Mean profit per cow per month for BGMs who sold milk	NA	844	735	1083	1029	969

* It is the December 2012 figure for mean profit per cow per month which is considered the baseline for all profit indicators. In December 2013, mean profit per cattle per month was TK 501

However, some in-depth analysis into the profit data demonstrates that BGMs are indeed performing better than before. For instance, 72% of all BGM with lactating cattle are making any amount of profit from their dairy farming business with a mean profit of about BDT 1,129 per cow per month, which is higher than the expected level (BDT 1047). Among the rest 28% BGMs, 20% did not engage in any market transaction i.e. they did not sell any milk. The reasons behind this are low productivity and household consumption. Thus, only 8% BGM are making any loss in real terms in the dairy farming business. Excluding the 20% BGMs who did not participate in market transaction, the mean profit per cow per month reaches BDT 969, which very close to the targeted level. Table 21 provides a distribution of mean profit per cow per month in December '15.

Table 21: Distribution of mean profit per cow per month December 2015

Range	Count	%	Cumulative %
Min - 0	82	28%	28%
1 - 200	18	6%	35%
201 - 400	21	7%	42%
401 - 600	33	11%	53%
601 - 800	29	10%	64%
801 - 1000	28	10%	73%
1001 - 1200	20	7%	80%
1201 - 1400	17	6%	86%
1401 - Max	40	14%	100%
Total	288	100%	100%

On a different account, the amount of cost incurred to produce each litre of milk is BDT 15 in December 2015 which was only BDT 10 in June 2015 implying the higher cost of producing milk during this season. However, the price marked an increase during the same season. Therefore, neither cost nor price explains the reduced profit.

However, household consumption of milk by the BGMs who sold milk shows an unprecedented increase. Over the last 2 years, BGMs (who sold milk) sold between 93% and 97% of their produced milk whereas in December '15 it decreased to 85% (10 percentage point lower than historical average). This explains the low level of mean profit for the BGMs. An estimate of mean profit at different levels of household consumption by BGMs selling milk are provided in the following table.

Table 22: Estimated mean profit based on different levels of HH consumption by BGMs

INDICATOR	With 85% of milk sold (Actual)	With 95% of milk sold (Estimated by historical average)	With 100% of milk sold
Mean profit per cow per month	712	908	1057
% of expected level of profit (1047)	68%	87%	101%

The mean profit among the control group shows a sharp increase. However, considering the fact that all dairy farmers in the control group engaged in transaction, their profit is still far below that of treatment group (BDT 969 for BGMs engaged in transaction).

Table 23: Mean profit per cow per month (Control)

INDICATOR	Control group survey (December 2013)	Control group survey (December 2014)	Control group survey (June 2015)	Control group survey (December 2015)
Mean profit per cow per month	299	456	554	696

As per the milestone 6 of the outcome 5 in CLP logframe, 30% BGM have to make a 30% profit increase over baseline. Of all BGMs selling milk up to December 2015 this year, 35% have achieved the targeted profit increase over the baseline (December 2012). Table 25 provides a detailed distribution of mean profit per month made by BGMs in 2015. This reflects the actual improvement in the performance of the Milk BGMs in the year 2015 while the mean profit suffers from a bias caused by the BGMs not engaging in market transaction.

Table 24: Milk market development survey project outcome against the milestone

INDICATOR	Baseline December 2012	Milestone for January 2016	Achievement as of December 2015	Progress toward milestone (%)
Mean profit per head of cattle per month	698	1047	712	68%
% of BGMs achieving a 30% profit increase over the year	NA	30%	35%	117%

Table 25: Distribution of mean profit per BGM in 2015

Range	Count	%	Cumulative %
Min - 0	138	23%	23%
1 - 200	28	5%	28%
201 - 400	43	7%	35%
401 - 600	68	12%	47%
601 - 800	71	12%	59%
801 - 1000	55	9%	68%
1001 - 1200	41	7%	75%
1201 - 1400	35	6%	81%

1401 - 1600	23	4%	85%
1601 – 1800	14	2%	88%
1801 – 2000	13	2%	90%
2001 - Max	60	10%	100%
Total	589	100%	100%

5. Conclusion

The milk market development project of CLP has achieved its objectives of improving production practices and increasing productivity by December 2015. It has made an overall transformation in production practices in dairy farming in the chars. Wide-spread usage of ready feed and improved fodder has been achieved and a large amount of local breed cattle have been replaced by high-yielding cross breed cattle. These transformations have enabled increase in productivity in dairy farming.

Although an overall mean profit per cattle seems lower than the expected level (as per logframe), an in-depth analysis shows that performance by BGMs has actually improved and a large share of producers are making handsome profits. The producers are receiving higher price and more marketing channels have been made available to the producers. A strong link between the actors at different levels of supply chain indicates a sustainable milk market in the chars.