CHARS LIVELIHOODS PROGRAMME

Chars Livelihoods Programme

Reducing Extreme Poverty on the Riverine Islands of North West Bangladesh

# Milk Sector Outcome Report

## December 2014

### Innovation, Monitoring, Learning and Communications Division

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MAXWELL STAMP PLC

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# Contents

# 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 |
| M4C | Making markets work for the chars |
| M4P | Making markets work for the poor approach |

# 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 the meat 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 outcomes indicators in each 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 three surveys conducted in March, June and December 2014, which used a panel sample and include data for a survey period of 11 months (January to November 2014). Additionally, results for two control group surveys conducted in December 2013 and December 2014 are presented alongside to demonstrate the impacts more clearly.

This report presents a summary of progress against outcomes indicators in the milk sector to date. These indicators are presented in three categories;

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

### *Key findings*

Table 1 provides a summary of performance against key indicators in the milk sector. The most important findings from the December 2014 survey are:

- The % of BGMs purchasing ready feed increased from the baseline of 25% to 50% in December 2014
- The mean amount of ready feed provided per cattle has increased from 385 grams per day to 419 grams per day
- The % of currently lactating cattle which are cross breed remained unchanged at 8%
- The purchase of de-worming tablets by BGMs with lactating cattle in the last 12 months is 55% compared to previous surveys and baseline (75%)
- The % of BGMs purchasing vaccinations for currently lactating cattle in the last 12 months decreased up to 36% compared to 48% in the baseline after it reached its peak at 69% in June ‘14
- Milk yield per cow per month has increased by more than 20% over baseline and reached 1.57 litres per cattle per day
- The mean litres of milk sold per BGM per month increased from 33.5 litres to 47.4 litres
- The amount of milk sold as % of total milk production has reached 81% compared to 73% in the baseline
- The mean profits per cow per month from dairy farming increased to Tk. 870 per cattle per month which is 25% higher than the baseline. However, it is still slightly below the expected overall profit increase of Tk. 942 per cattle per month

- 30% of BGMs have made a 25% profit increase over baseline against the January 2015 milestone of 15% BGMs reaching that ceiling.

### Table 1: Summary of performance against key indicators

| INDICATOR | December 2013 (baseline) | March 2014 | June 2014 | December 2014 |
|---|---|---|---|---|
| **% BGMs either purchasing or cultivating Napier or Jumbo grass** | 28% | 30% | 35% | 33% |
| **% BGMs purchasing ready feed** | 25% | 41% | 37% | 50% |
| **Mean quantity (g) of ready feed provided per lactating cow per day** | 385 | 400 | 384 | 419 |
| **% of currently lactating cattle which are cross-breed** | 7.9% | 5.0% | 6.3% | 8.3% |
| **% BGMs purchasing Artificial Insemination** | 8% | 11% | 6% | 12% |
| **% BGMs purchasing de-worming tablets for currently lactating cattle during the last 12 months** | 75% | 59% | 74% | 55% |
| **% BGMs purchasing any vaccination for currently lactating cattle during the last 12 months** | 48% | 43% | 69% | 36% |
| **Mean number of litres of milk produced per cow per day** | 1.3 | 1.57 | 1.6 | 1.57 |
| **% of BGMs with lactating cattle who sold milk** | 69% | 80% | 74% | 84% |
| **Mean litres of milk sold per BGMs per month** | 33.5 | 44.1 | 42.6 | 47.4 |
| **Mean profit per cow per month** | 698* | 639 | 493 | 843 |

* 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 meat 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 outcomes indicators in each sector.

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 outcomes monitoring requirements of the IMLC. 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 surveyed. 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. (For a full description of the methodology, please refer to the full Market Development M&E plan, July 2013.) In addition, control group surveys are also conducted on 175 participants to demonstrate the impact of the project.

This report presents the data collected through the three surveys carried out in March, June and December 2014 and includes data for January to November 2014. Baseline (December 2013) and control group survey (December 2013 and December 2014) data are presented as well to help understand the impact of the project over time.

This report presents a summary of progress against outcome indicators in the milk sector to date. These indicators are presented 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 |
|---|---|---|---|---|
| **% BGMs cultivating Jumbo or Napier grass** | 29% | 28% | 30% | 31% |
| **% BGMs purchasing Jumbo or Napier grass** | 5% | 2% | 6% | 3% |
| **% BGMs either cultivating or purchasing Jumbo or Napier grass** | 29% | 30% | 35% | 33% |

The results so far show that there has been a small increase (4 percentage point) in the number of BGMs either cultivating or purchasing improved fodder. It also shows that, of these BGMs, the majority (31%) are cultivating the fodder themselves rather than purchasing it.

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

| INDICATOR | Control group survey (December 2013) | Control group survey (December 2014) |
|---|---|---|
| **% BGMs cultivating Jumbo or Napier grass** | 1.4% | 0.0% |
| **% BGMs purchasing Jumbo or Napier grass** | 0% | 0% |
| **% BGMs either cultivating or purchasing Jumbo or Napier grass** | 1.4% | 0.0% |

On the contrary, the control group has very insignificant or no use of improved fodder in their dairy farming. Only 2 out of 146 BGMs with lactating cattle cultivated fodder last year, and even they did not continue this year.

## 2.2 Ready feed purchasing and usage

The project has also promoted the use of ready feed[1], 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 in able to increase and optimise the cow's milk yields. Table 3 shows that the number of BGMs purchasing ready feed has doubled in the last 12 months, which is a significant achievement.

[1] **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

### Table 4: % BGMs purchasing ready feed

| INDICATOR | December 2013 (baseline) | March 2014 | June 2014 | December 2014 |
|---|---|---|---|---|
| **% BGMs purchasing ready feed** | 25% | 41% | 37% | 50% |

The above 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 input market development on the chars is progressing well. The effect seems to extend beyond the project participants. About 4% of the dairy farmers from the control group report initiation of providing ready feed to the lactating cattle which was absolutely zero last year.

### Table 5: % BGMs purchasing ready feed (Control)

| INDICATOR | Control group survey (December 2013) | Control group survey (December 2014) |
|---|---|---|
| **% BGMs purchasing ready feed** | 0.0% | 3.8% |

However, it is important to note that BGMs are counted towards the above percentages if they purchase any quantity of ready feed. 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.

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

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

The results 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 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 meaningful, because they are large enough to have a positive impact on milk yields.

### 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) |
|---|---|---|
| **Mean quantity (g) of ready feed provided per lactating cow per day** | 0 | 219 |

The control group dairy farmers provide only 219 grams of ready feed per cattle per day which is about half of what BGMs in milk sector provide. As mentioned above, though there is no way to conclude on yields based on this result alone, there is a significant relation between the two that is obvious in the difference in yield per cattle (mentioned in a later section) between these two groups.

## 2.3 Cattle breed and artificial insemination

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.

### Table 8: % of currently lactating cattle which are cross-breed

| INDICATOR | December 2013 (baseline) | March 2014 | June 2014 | December 2014 |
|---|---|---|---|---|
| **% of currently lactating cattle which are cross-breed** | 7.9% | 5.0% | 6.3% | 8.3% |

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 the number of currently lactating cattle which are cross-breed has remained low and did not change from the baseline.

### Table 9: % of currently lactating cattle which are cross-breed (Control)

| INDICATOR | Control group survey (December 2013) | Control group survey (December 2014) |
|---|---|---|
| **% of currently lactating cattle which are cross-breed** | 1.9% | 2.0% |

The same applies to the control group as well. The percentage of cross breed cattle among the currently lactating cattle remained at 2% only.

### Table 10: % BGMS purchasing Artificial Insemination

| INDICATOR | December 2013 (baseline) | March 2014 | June 2014 | December 2014 |
|---|---|---|---|---|
| **% BGMs purchasing Artificial Insemination** | 8% | 11% | 6% | 12% |

The number of BGMS purchasing artificial insemination shows a small increase (Table 10). However, this suggests that there is still significant scope for improvement of dairy farming through improving cattle breed. The control group dairy farmers are also increasingly purchasing artificial insemination, though it remained even lower (Table 11).

### Table 11: % BGMs purchasing Artificial Insemination (Control)

| INDICATOR | Control group survey (December 2013) | Control group survey (December 2014) |
|---|---|---|
| **% of currently lactating cattle which are cross-breed** | 2% | 5% |

## 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.

Correct practice involves de-worming cattle every 6 months. The table below demonstrates that although the majority of cattle were de-wormed within the appropriate interval till June 2014, there is a sharp decrease in the purchasing of de-worming tablets in the last 6 months. A similar decrease is reported by the control group of dairy farmers as well (34% to 29%).

### Table 12: % of deworming of lactating cattle

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

In addition, results show that the percentage of BGMs purchasing de-worming tablets at least once in the last 12 months has decreased both in the treatment and control group. This calls for an investigation in the dairy farmers' level of awareness about ideal dairy farming practices. If the problem lies in lack of awareness, refresher training on this may be useful.

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

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

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 six months, and against Hemorrhagic Septicemia and Anthrax every 12 months. The table demonstrates that over the first half of the year, there had been significant increases in the percentage of cattle being vaccinated at the appropriate interval. However, it decreases within the last 6 months as in the case of de-worming. This suggests that further improvements are required if all cattle are to be vaccinated with sufficient frequency.

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

| INDICATOR | December 2013 (baseline) | March 2014 | June 2014 | December 2014 |
|---|---|---|---|---|
| **% of currently lactating cattle vaccinated against foot and mouth disease in the last 6 months** | 22% | 21% | 38% | 12% |
| **% of currently lactating cattle vaccinated against anthrax in the last 12 months** | 21% | 18% | 38% | 15% |
| **% of currently lactating cattle vaccinated against black quarter in the last 6 months** | 11% | 11% | 20% | 14% |
| **% of currently lactating cattle vaccinated against hemorrhagic septicemia in the last 12 months** | 6% | 8% | 13% | 3% |
| **% BGMs purchasing any vaccination for currently lactating cattle during the last 12 months** | 48% | 43% | 69% | 36% |

The results in Table 15 are no better in the control group either. Rather, they show further decreases which were very low in the first place.

**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) |
|---|---|---|
| **% of currently lactating cattle vaccinated against foot and mouth disease in the last 6 months** | 13% | 3% |
| **% of currently lactating cattle vaccinated against anthrax in the last 12 months** | 4% | 2% |
| **% of currently lactating cattle vaccinated against black quarter in the last 6 months** | 4% | 1% |
| **% of currently lactating cattle vaccinated against hemorrhagic septicemia in the last 12 months** | 3% | 4% |
| **% BGMs purchasing any vaccination for currently lactating cattle during the last 12 months** | 23% | 5% |

# 3. Production and productivity

The table below summarises changes in litres of milk produced per cow per day by cattle reared by Milk BGMs. The results indicate that milk productivity has increased for dairy cattle reared by Milk BGMs more than 20% over baseline. However, it also demonstrates that the increase in productivity has remained stagnant throughout the year after the initial growth. This suggests a need for exploring new avenues of productivity increases like improving cattle breed, and artificial insemination, where there is still large scope for improvement, but in particular in further improvements in optimising cow diet and nutrition linked to the various times / stages of the lactation cycle.

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

| INDICATOR | December 2013 (baseline) | March 2014 | June 2014 | December 2014 |
|---|---|---|---|---|
| **Mean number of litres of milk produced per cow per day** | 1.3 | 1.57 | 1.6 | 1.57 |
| **% increase in mean number of litres produced per cow per day** | - | 21% | 23% | 21% |

As in all other indicators, mean productivity per cattle for the control group dairy farmers is lower than that of treatment group. Even the rate of growth in productivity is half of what BGMs in the milk sector are currently experiencing.

**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) |
|---|---|---|
| **Mean number of litres of milk produced per cow per day** | 1.01 | 1.12 |
| **% increase in mean number of litres produced per cow per day** | - | 11% |

# 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.

The table below shows that there has been a significant increase (15 %) in the proportion of BGMs with lactating cattle who sold milk. This is a positive sign that these BGMs are finding markets for the extra milk they produced. Moreover, the mean amount of milk sold per BGM has also increased by about 40% over the baseline. Simultaneously, the ratio of sale to production shows an upward trend implying expansion of milk market in the chars both in frequency and volume.

BGMs in the milk sector are enjoying an increasing price for the produced milk as well. Except in the baseline, the mean price per litre shows an upward trend. The exceptionally high mean price of milk in the baseline figure may have been caused due to temporary market shock, since the same trend has been reported in the control group but did not last for long.

### Table 18: Milk market and sales of milk by BGMs

| INDICATOR | December 2013 (baseline) | March 2014 | June 2014 | December 2014 |
|---|---|---|---|---|
| **% of BGMs with lactating cattle who sold milk** | 69% | 80% | 74% | 84% |
| **Mean litres of milk sold per BGMs per month** | 33.5 | 44.1 | 42.6 | 47.4 |
| **% increase over baseline** | - | 32% | 27% | 41% |
| **Sale of milk as % of total production** | 73% | 74% | 68% | 81% |
| **Mean sales price per litre of milk** | 40.4 | 33.9 | 34.7 | 36.3 |

A positive trend in the milk market for the control group has been displayed as well. However, the level and rate of positive change for the control group still remain far behind that of treatment group.

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

| INDICATOR | Control group survey (December 2013) | Control group survey (December 2014) |
|---|---|---|
| **% of BGMs with lactating cattle who sold milk** | 47% | 62% |
| **Mean litres of milk sold per BGMs per month** | 17.7 | 28.2 |
| **Sale of milk as % of total production** | 54% | 71% |
| **Mean sales price per litre of milk** | 40.2 | 34.5 |

## 4.2 Profits from dairy farming

The table below presents mean profit per cow per month for the business group members. A net effect of the increase in number of BGMs selling milk, in productivity, in mean sale price and in percentage of milk sold altogether has been reflected in the net gain by the BGMs. BGMs achieved a 25% overall profit increase during 2014. The reason behind relatively low profits in June 2014 can be attributed to less percentage of milk being sold during this season.

### Table 20: Mean profit per cow per month

| INDICATOR | December 2012 (baseline) | March 2014 | June 2014 | December 2014 |
|---|---|---|---|---|
| **Mean profit per cow per month** | 698* | 639 | 493 | 870 |
| % change | - | -8% | -29% | 25% |

* 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

The mean profit among the control group also shows a sharp increase during this year. However, the level of profit is still far below that of treatment group.

### Table 21: Mean profit per cow per month (Control)

| INDICATOR | Control group survey (December 2013) | Control group survey (December 2014) |
|---|---|---|
| **Mean profit per cow per month** | 299 | 456 |
| % change | - | 53% |

On a different account, of all BGMs selling milk over the year, 30% have achieved a 15% profit increase over the baseline (December 2012) while it was targeted for 15% BGMs only. The following table briefly summarises the outcome of milk market development project as of December 2014.

### Table 22: Milk market development project outcome against the milestone

| INDICATOR | Baseline December 2012 | Milestone for January 2015 | Achievement as of December 2014 | Progress toward milestone (%) |
|---|---|---|---|---|
| **Mean profit per head of cattle per month** | 698 | 942 | 870 | 92% |
| **% of BGMs achieving a 25% profit increase over the year** | NA | 15% | 30% | 200% |