Survey of Calving Rates, Calf Mortality and Cattle-Derived Livelihoods amongst Recipients of Female Cattle from the CLP's ATP Phases 1.2-1.4

Background

The cornerstone of the CLP's work to reduce extreme poverty on the *chars* of north western Bangladesh is the asset transfer project (ATP). Under the project, households receive an income-generating asset of their choice (95% choose cattle) which is intended to assist in generating a sustainable livelihood. During the first phase of the CLP (CLP-1, 2004-2010), 55,000 households received assets through ATP. CLP-2 (2010-2016) will transfer assets to a further 67,000 households.

Following the conclusion of CLP-1, DFID commissioned HTSPE and Verulam Associates (funded by AusAid) to conduct an independent impact assessment (IIA) of the CLP in order to identify achievements and lessons that could improve the second phase of the programme.

The findings of the impact assessment in relation to calf birth and mortality rates, milk productivity, decision-making and the sustainability of cattle herds were met with some concern within the CLP. Broadly, the IIA concluded that dairy herds were unsustainable and would disappear as a result of poor ability or interest amongst participants in managing herds to produce milk or calves. The IIA suggested that high calf mortality rates (35%) and low birth rates (33%), coupled with very low milk productivity (0.25 l/cow/day) were key factors in driving households out of milk production. These findings raised concern within the CLP because they suggested major problems within the implementation of ATP, and were considerably different to the field observations of CLP staff.

Given the importance of ATP, the CLP decided to commission an independent survey on a larger scale, in order to validate findings of the IIA. The contract to conduct the survey was won by an independent company which had contracted Dr Abu Hadi Khan from Bangladesh Agricultural University to lead a team of livestock experts from the pathology department of the same university. The team surveyed more than 400 households, and focused on

- calf birth and mortality rates
- milk production (per household per day and per cow per day)
- the value of milk sales and perceptions of milk as a livelihood
- management and sustainability of cattle herds

- intra-household decision-making related to large investments

This brief summarises the study and the key findings. Full findings for all the research questions and more detailed analyses can be found in the main report at www.clp-bangladesh.org .

Key Findings

- Birth rate was 43% on average, across the period 2006-2012 (52% for CLP-transferred cattle).
- Calf mortality (both sexes) was 7% on average across the same period.
- Milk production is 2.1 L/hh/day or 1.9 L/cow/day on average.
- Milk sales are worth Tk. 1,600 per month on average, but milk is sold for less than 5 months per year.
- Most households do not view milk as a significant contributor to livelihoods.
- The value of female cattle is primarily their sale value, and households are successfully managing small herds to produce a sustainable stream of calves for sale.

Methodology

This study was conducted during January and February 2012 with 439 households on island *chars* in the CLP-1 working areas of Bogra, Kurigram, Giabandha, Jamalpur and Sirajganj districts. This sample size was based on FAO methodology, which suggests that a sample of between 336 and 384 animals would be suitable to investigate mortality and birth rates of between 30-40% (as found by the IIA), with a standard error of no more than 2.5%.[1] A slightly larger sample size than required was chosen in order to allow for some households having migrated or being otherwise unavailable for interview. The distibution of households by phase was 115 ATP 1.2, 137 ATP 1.3 and 187 ATP 1.4. ATP phase 1.1 was not considered, as that phase was not investigated by the IIA team.

The households surveyed had received 70 cross-breed and 369 local cows from CLP-1. Households were classified into various strata according to phases of ATP and breed of cattle received (cross-breed or local). The sample of households that received cross-breed cattle was drawn exclusively from Sirajganj, as Sirajganj households received 87% of all cross-breed animals transferred under CLP-1, while the other districts received only around 300 cross-breed cattle between them. The sample of households that received local breed cattle was larger (369), reflecting the much larger number of local breed cattle transferred, and was drawn from across all CLP-1 districts. All the households surveyed had received female cattle under the ATP, in common with the sample used in the IIA.

[1] Putt, S., Shaw, A., Woods, A., Tyler, L. and James, A. (1987) *Veterinary epidemiology and economics in Africa - A manual for use in the design and appraisal of livestock health policy*

Data collection was through questionnaire interview, which was based on the original Impact Assessment questionnaire, but with minor modifications and some additional questions included. A calf was considered to be an animal of 12 months or younger.

Calf Mortality

The IIA concluded that: *Technical efficiency in the remaining herds was very low, with calving rates averaging only 33% per year and very high mortality (35%) amongst young stock (IIA page 34).* Details in the Annexes reveal that this rate applies to female calves only.

The total calf mortality rate across phases 1.2-1.4 (both sexes) was found to be 7% over the period 2006 – 2012, reflecting an annual average mortality rate of 6%, which although low, has been rising year on year since 2009. Principal causes of death during the period were reported as calf scours (22%), others (pneumonia, injury etc 18%) and Black Quarter (BQ - 16%). Although overall mortality is low, some alarmingly high mortality rates were recorded within phases – households that received ATP 1.2 crossbred cattle at 14%, for example. The rise in annual death rates after 2009 (when CLP support ended) and the fact that diseases for which the CLP provides vaccines (HS, BQ, FMD and anthrax[2]) accounted for 41% of all deaths between 2006 and 2012 indicate that more work may need to be done regarding vaccine availability and use.

Fig. 1: Mean Calf Mortality by Year (%, both sexes), ATP Phases 1.2-1.4
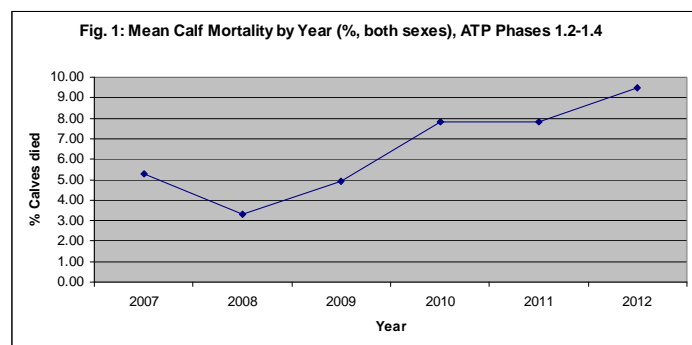
Calving rates

The IIA found that *calving rates [average] only 33% per year (page 34)*

Calving rates recorded by this study were much higher than the Impact Assessment findings. This study found that average calving rate of cows owned by ATP 1.2 households across the period 2006 - 2012 was 42% (0.42 calves born per year, or 1 calf in roughly 2.5 years – see Table 1). Furthermore, the average birth rate among cattle transferred by the CLP is well above average, at 52% (or one calf in just under two years).

[2] HS: haemorrhagic septicaemia, BQ: black quarter, FMD: foot and mouth disease

Table 1: Birth rates by breed and phase

	Average Birth Rate (%)	Months between births (equivalent)
Recipients of ATP 1.2	44.3	27
Recipients of ATP 1.3	42.3	28
Recipients of ATP 1.4	46.0	26
Cross Recipients (ATP 1.2-1.4)	47	26
Local Recipients (ATP 1.2-1.4)	42	29
CLP provided cattle	52	23
Non-CLP provided cattle	19	63
Both Breeds, ATP1.2 -1.4	43	28
IIA Findings	33	36

Milk Production, Value and Contribution to Livelihoods

The IIA concluded that: *38% of interviewed beneficiaries had dropped out of milk production entirely, in the sense that they no longer had either milking cows or young females to bring forward. [M]ilk production is very low at 0.25 litres/cow/day, and mean production per household was 0.56 litres/day. 34% of interviewed households were selling milk, at an average of 0.86 litres/day, worth Tk.582/month (IIA page 34).*

This study found that 34% of participants had dropped out of milk production in the sense defined by the impact assessment. Of the 66% of households that remained in milk production, 100% had at least one heifer to bring forward and 30% had pregnant cows, suggesting that participants are managing herds successfully.

At the time of survey, milk production was found to be 1.9 litres/cow/day on average, and mean production per household was 2.1 litres/day – considerably higher than the IIA findings. There were significant differences between productivity of cross-breed and local cattle, as can be seen in figure 2.


Fig. 2: Mean Milk Production at Time of Survey
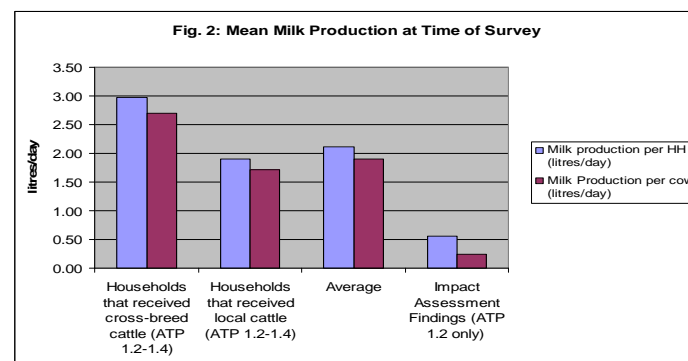
49% of all households (65% of those households with dairy cattle) reported producing and selling milk during the previous 12 months. The average milk production period was 4.8 months, during which households reported producing 2.9 litres/household/day and selling 1.6
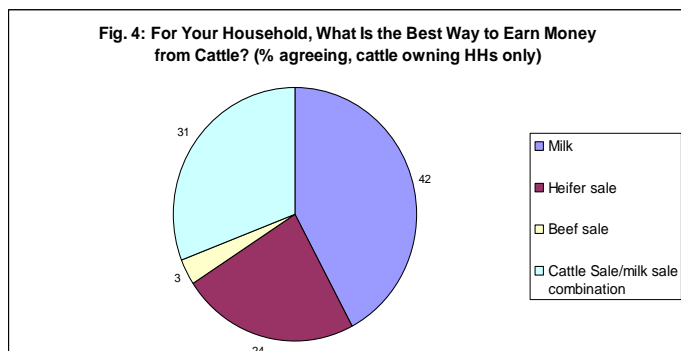
litres/household/day on average. Based on the average reported price of Tk. 34/litre, this would generate an income of Tk. 1,600 per month during the milking period – almost three times the Tk. 582 income per month reported by the Impact Assessment.

A milk production period of 4.8 months per year is slightly lower than could be expected for cattle on the *chars* (5-6 would be considered very good), which may indicate that improvements could be made in cattle management training. Nevertheless, based on the reported sales figures, a milk production period of 4.8 months would still equate to an income of Tk. 7,680 per year (Figure 3). Despite these figures, in this study 68% of households indicated that milk made either no contribution or a minor contribution to their livelihood – probably a result of the short production period.

Fig. 3: Value of Milk Sales
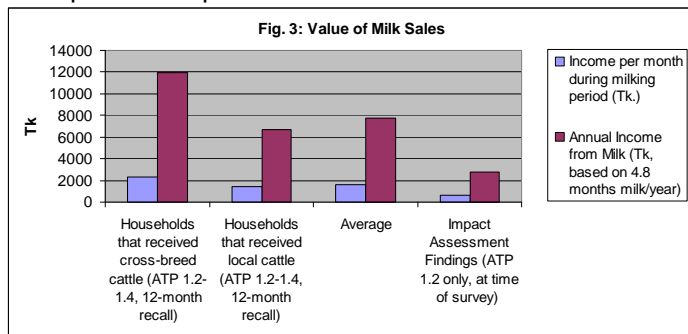
Sustainability of Dairy Herds
The IIA concluded that: *the low calving performance of … stock must indicate an extremely low level of interest in managing female stock for either milk or calf production… Female animals are being valued for one-off sale income [not] for their potential to generate a sustainable income stream… the remaining [dairy] herds are technically unsustainable [and] most of the remaining milk producers will, whether voluntarily or involuntarily, quite soon cease to operate (IIA page 34 and Annex IX-173-174)*

Fig. 4: For Your Household, What Is the Best Way to Earn Money from Cattle? (% agreeing, cattle owning HHs only)

Almost three quarters of households with cattle indicated that heifer sales or a cattle/milk sale combination was the best way to earn money from cattle - indicating a strong interest in herd management focused towards production of calves for sale (Figure 4). It seems that households are indeed selling the majority of young female animals, as suggested by the Impact Assessment. But this is most likely because herd sizes are small (2.2 cattle per household on average) and so replacement requirements

are low – not because households lack interest or the ability to manage herds. Small herd sizes probably reflect households' limited access to labour and space.

Given that 100% of households with dairy cattle have at least one heifer to bring forward, it does not seem likely that "most milk producers will… soon cease to operate", as was suggested by the Impact Assessment (page 34).

Conclusions
This study has found that calf mortality was 7% across the period 2006-2012 - one fifth of the 35% rate reported by the IIA. However, mortality is rising, mainly due to preventable diseases such as calf scours and FMD. The study also recorded birth rates that are considerably higher (43% overall and 52% for CLP-transferred cattle) than the 33% recorded by the IIA. Increasing the quality of cattle purchased post-CLP would help to improve the overall birth rates further.

Both studies agreed that milk is not a major contributor to household income. This may be because although milk production per cow and per household was significantly higher in this study than in the IIA (particularly for cross-breed cattle), there is still much scope for this to improve, based on other data from the CLP-1 working area[3]. Nevertheless, in contrast to the IIA suggestion that households seek to move out of cattle-based livelihoods towards land and other assets, this study found that most households seek a diverse portfolio of assets that includes cattle rearing as a central component. It appears that households are both willing and able to manage herds successfully in order to generate a steady stream of calves for sale. 100% of dairy herds contained at least one heifer, indicating that existing dairy herds appear to be sustainable and are unlikely to cease to operate soon, in contrast to what the IIA had concluded.

In light of the findings, it is recommended that the CLP review its livelihoods training in relation to the ATP project. Participants need to be convinced of the need to manage disease risks (especially vaccinations) after CLP support has ended if mortality rates are not to continue to rise. Similarly, there seems to be a need to improve participant knowledge of cattle to ensure that they select cattle that are productive.

Given that the preferred livelihood appears to be focused on cattle sales, there may be cause to re-focus livelihoods training to reflect this, or to improve the attractiveness of milk production – perhaps by improving market linkages, accompanied by better management to improve the volume and period of milk production. Furthermore, the greater relative productivity of cross-breed cattle suggests that the CLP should consider expanding the cross-breed promotion project.

[3] Hall, D., Alam, G.S., and Raha, S. (2012) *Improving Dairy Production in Bangladesh: Application of integrated agriculture and ecohealth concepts* International Journal of Livestock Production Vol. 3(3), pp. 29-35,