

CHAPTER- I

INTRODUCTION

Most of the cattle of Bangladesh are non descriptive types, which do not belong to any specific breed and termed as indigenous breed. The dairy farm of Bangladesh generally consists of indigenous cattle and crossbreds of Holstein-Friesian, Jersey, Sahiwal and Red-shindhi. The indigenous cattle are smaller in size and their milk production capacity is lower than exotic breeds. The crossbred cattle produce 5-10 liters milk per day (Nahar *et al.* 1992; Majid *et al.* 1998 and Hossain *et al.* 2002). The average milk production of zebu type cattle is 0.5-2.5 liters per day (Hossain *et al.* 2002). The purpose of dairy farming in Bangladesh is to make profit from milk production. The farm profitability depends on the number of cows reared, breeds of cow, type and level of supplementary feeding, availability of fodder, the amount of feed to be conserved to meet up the period of feed shortage and planned breeding program. The farm contains temperate crossbreds showed a higher profit than tropical crosses and indigenous cows. Studies on the economics of small holder dairy farming under the government support programs in Bangladesh have shown that dairying is a profitable business and the profitability is greater with crossbred than local cattle (Khan *et al.* 2005).

Recently, farmers have shown growing interest in rearing cattle exclusively for the milk production. Mini-dairy farms have been developed mostly in urban and semi-urban areas where farmers prefer crossbred cows for producing milk (Shamsuddin *et al.* 2006). Most of the produced milk in Bangladesh handled as a liquid. The small scale producers sell their milk direct to the end consumers and some are selling their milk to the sweetmeat shops. However, middlemen (Farias or Paikers) collect milk from some commercial farmers and some small-scale producers and sell it to the retailers or sweetmeat shops who sell it to the consumers. Milk has always been valued and often is referred to as nature's most nearly perfect food because it has a remarkable combination of nutrients (Norman and Powell. 1999). Milk constitutes the most important source of nourishment for both vegetarians and non-vegetarians, for young and old alike.

Dairy farming has been increasingly viewed as a means of alleviating poverty in Bangladesh and is believed to improve the livelihoods of landless and small households. Many non-governmental organizations (NGOs); such as Proshika Manobik Unnayan Kendra

(PROSHIKA), Bangladesh Rural Advancement Committee (BRAC), Grameen Bank and Aftab Dairy are involved in the promotion of micro-credit for small livestock enterprises including dairy cattle. However, there is insufficient literature about the profitability of the smallholder village dairy farming in Bangladesh. Considering the above fact the present study was conducted with aim to achieve the following objectives-

1. To assess the profitability of smallholder dairy farms in selected areas.
2. To know the rearing and management practices in smallholder dairy farming system.
3. To determine the constraints in the smallholder dairy farming.

CHAPTER- II

MATERIALS AND METHOD

This study was carried out at Upazilla Veterinary Hospital, Ghatail, Tangail, during March, 2017 to September, 2017. A total of 7 dairy farms were studied. The herd size ranged from 7 to 9 milking cows. The owners of the dairy farms were interviewed personally and data were collected. The study population consisted of 64 crossbreds (Holstein-Friesian, Sahiwal, Red-shindhi) and 9 local cows.

Study Area

All data were collected from Ghatail Upazilla, Tangail. A number of 7 farms were selected in that area for studying.

Data collection

A structured questionnaire (APPENDIX-1) was designed and used for the study of the farm size, types of animal, types of housing, length of lactation, milk yield per day per cow, types of fodder used, items and quality of supplying food stuffs, selling price of milk, feed cost, labor cost, and other costs for estimate the net profit of farms was collected. The average daily milk yield per cow was calculated by the total quantity of milk per day divided by the total number of cows for each farm for both indigenous and crossbred cows.

Method of data collection

The data were collected through direct interviewing method of farm owners and workers.

Preparation of the interview schedule

The interview schedule was developed in purposefully with the objectives of the research. A survey schedule was prepared to record the desired information from the dairy cow owners. Before preparing the final schedule a preliminary survey schedule was designed for recording the desired information in conformity with the objectives of the study. After preparing a draft schedule it was however pretested in the areas. The survey schedule then changed, modified and rearranged according to the experience gathered in the preliminary field survey. Finally a set of interview schedules was prepared for recording the necessary information for the study.

The survey of dairy farm includes

- a. Total asset value: It includes mainly fixed cost: possession of land, land for housing, pasture land, farm building, equipments, current animal value, interest of bank loan, depreciation cost of building and farm equipment.
- b. Variable cost: It includes feed cost per month, labor cost, medication, vaccination, artificial insemination, treatment cost, transportation cost, electricity cost, other maintenance cost.
- c. Income from farm output: It includes- milk sale (total income per month), live animal sale (replacement stock sale, culled cow/bull) and animal byproducts sale.

The farm profit was calculated by deduction of all variable cost from gross returns. Deducting all costs from gross returns arrived at a net return from the farm (Hossain *et al.*, 2005). The following equation used for estimating net return from the farm,

$$\text{Net profit} = \text{TI} - \text{TC}$$

Where, TI=Total Income and

TC=Total cost

CHAPTER- III

RESULTS AND DISCUSSION

The results obtained from the study are presented below with table, suitable illustration and discussion.

Feeding System

The studied farmers followed stall feeding system. They fed the cattle according to the breed of cows and state of the cows. Farmers supply feed to them regularly. Both roughage (rice straw, green grass, water hyacinth etc.) and concentrate (rice polish, wheat bran, soybean meal, molasses etc) are fed to the milch cows. Including these feed they also fed some unconventional feed such as jaba (local name), which is finished product during alcohol preparation from rice, kitchen wastage etc. On an average 3-4 kg rice straw/day/cow were provided to the indigenous cows and 4-6 kg rice straw /day/cow to the crossbreds. Farm-1, farm-2 and farm-3 farmers provided ad-libitum rice straw due to availability. Furthermore, about 8-10 kg and 15-20 kg green grasses were fed to the indigenous and crossbred cows in those farms. Farm-5, farm-6, farm-7 farmer were unable to provide green grass to their cattle due to unavailability of green grass and sufficient land area. The crossbreds were provided with more concentrate than indigenous cows because they produced higher milk than indigenous cows. In addition to normal drinking water, rice gruel and pulse washed water were supplied to the cows. All calves were fed milk by suckling.

Housing Condition

The studied farmers used tin shed and straw shed with paved and concrete floor for housing. For boundary wall, they used bamboo and brick. The floor space per animal varied farm to farm. Farm-1, farm-2, farm-3 farmers provided floor spaces for a cow about 20 to 30 sq.ft., whereas in farm-4, farm-5, farm-6, farm-7 provided floor space were 15 to 20 sq.ft., which was not satisfactory. In farm-3 and farm-7 animals were kept in unhygienic condition such as moist floor and a floor filled with dung and urine. There was no drainage facility in those farms. Overall housing management was in average condition in most of the studied farm.

Studied farms and breeds

Types and number of cows reared in the studied farms are presented in Table 1.

Table 1: Number of cattle reared in the studied farms

Name of Farms	Crossbred	Indigenous breed	Total
Farm-1	10	01	11
Farm -2	11	02	13
Farm -3	8	01	09
Farm -4	12	02	15
Farm -5	9	01	08
Farm -6	6	01	07
Farm -7	8	01	08

From the above table, it is clear that the no. of crossbred cows were more than indigenous cows in studying farm. The milk yield and different expenditure were higher in crossbreds than indigenous cows. The temperate breeds and their crossbreds produce more milk were reported by Khan *et al.* 2005. That's why farmers were interested in rearing more crossbred cows than indigenous.

Different categories of the cows reared in the studied farm are presented in Table 2

Table 2: Different categories of the cattle in the studied farms

Types of animal	Farm-1	Farm -2	Farm -3	Farm -4	Farm-5	Farm -6	Farm -7
Lactating cows	06	06	05	08	07	04	06
Dry cows	02	03	02	03	01	02	01
Heifer calf	01	02	01	01	-	-	02
Bull calf	02	02	01	02	02	01	-
Total	11	13	09	14	10	07	09

Average milk yield and lactation length of different breeds are presented in Table 3.

Table 3: Average per day milk yield and lactation length of the cows in the studied farms

Farms	Milk yield (liter per cow)		Lactation length	
	Crossbred	Indigenous breed	Crossbred	Indigenous breed
Farm -1	10.0	2.5	280	160
Farm -2	8.5	2.0	280	160
Farm -3	7.5	1.0	265	150
Farm -4	10	2.5	280	160
Farm -5	9.0	1.5	275	150
Farm -6	8.5	Data not found	270	Data not found
Farm-7	7.5	1.5	270	150

From the above table, it can be seen that the crossbred cows produce 7.5 to 10 liters milk, whereas the indigenous cows produce 1 to 2.5 liters milk per day. The crossbred cows

produce more milk than indigenous cows in studying farm. This finding is congruous with the finding of Alam *et al.* 1995, who reported that farm with crossbred more profitable than indigenous cattle.

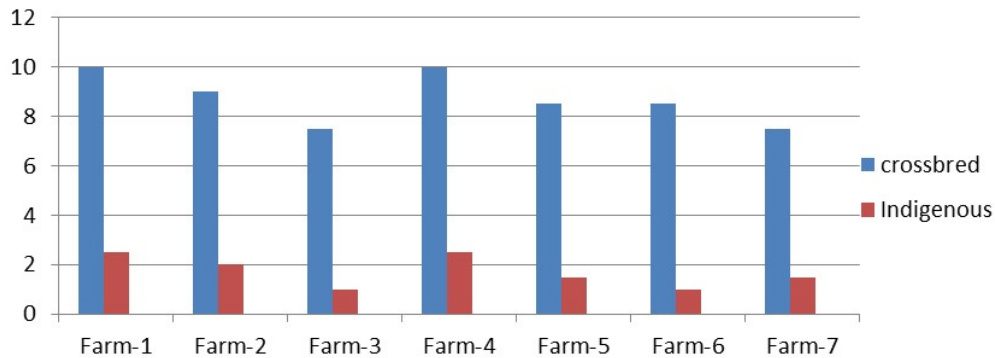


Fig 1: Average milk production of crossbred and indigenous cow.

From the figure above it is clear that farm with crossbred cow were higher in milk production. Farm 1 and farm 4 had the highest average production of milk (10 litres) compared to others.

Average price of milk, calf and the cost of labor in the studied farm are presented in table-4.

Table 4: Average price of milk, calf, the labor cost

Price of milk per liter	60 taka
Price of calf	8,000-15,000 taka
Labor cost per person per day	150-170taka

Annual net profit of the farms was calculated by deducing total variable cost from total income, which is presented in table 5.

Table 5: Annual net income of selected dairy farms

Items	Farm -1	Farm-2	Farm -3	Farm -4	Farm -5	Farm-6	Farm-7
Income							
Milk sale(tk)	1200000	1038000	724500	1560000	1053000	826200	742500
Animal &by product(tk)	38000	38600	29000	51600	27600	21000	35000
Total income(Tk)	1238000	1076600	753500	1611600	1080600	847200	777500
Cost							
Feed cost(tk)	628855	759200	108450	1095000	617580	423875	494940
Labor cost(tk)	109500	110400	100800	158775	108000	98550	104025
Treatment +AI cost (tk)	23700	29400	35000	36400	25800	23450	35450
Electricity cost	12670	13480	10500	14400	8640	7150	8570
Transport cost+Others (tk)	11000	13000	15000	18760	11570	10210	16500
Total variable cost(tk)	785725	925480	269750	1323335	771590	563235	659485
Net profit (tk/year)	452275	151120	483750	288265	309010	283965	118015

It is clear from the table 5 that there was variation in annual net profit between farms. This variation might be due to variation in milk yield, the management practices of the farms and breed differences. Table-5 indicated that the annual income from dairy farm was ranging from BDT 118000 to BDT 490000. The variable cost included feed cost, labor cost, treatment cost, artificial insemination cost, electric cost, transportation cost and others. The fixed cost of the farm was more or less similar so that the fixed cost of the farm was not included in this table. Small amount of purchase green roughage was fed to cows and the amount of maximum green roughage comes from roadside, crop field, river side. The income from dairy farm includes annual milk sale, live animal sale (heifer /bull calf, culled cow) and selling of byproducts (dung). The profitability of each farm was calculated by dividing the total farm income with total number of animals of the farm.

Farm 1 and farm 2 which had similar housing, feeding management and operational cost differed in profitability due to crossbred variety. Temperate crossbred showed higher

profitability than tropical crossbred. Similar findings were encountered by Khan *et al.* 2005, who showed that crossbred Sahiwal x Pabna and Holstein-Friesian x Local showed higher profitability than Sahiwal and Red-Sindhi cross. In farm 3, farm 4, farm 5 and farm 6 farm 7 crossbred were similar in type but their profitability varied which might be due to management practices and operational cost.

Housing and feeding cost was high and management was poor in farm 3, which could be the reason for less profitability of this farm than farm 1 and farm 2, although farm 2 reared low yielding crossbred. Despite having the same crossbred reared in farm 5, farm 6, and farm 7 profitability varied among those farms due to the variation in management practices. Feeding and housing management were good in farm 5 and the production and profit were higher. But in farm 7 management were poor which resulted in lower production and profit. Better management of and care for livestock can improve productivity and food quality. Higher animal welfare standards are also seen to be a prerequisite to enhancing business efficiency and business profitability (Animal welfare in livestock operation, 2006).

The differences in operational cost in different farms were due to location of the farm. Availability of feed like green grass, rice straw, rice polish, safe drinking water and land area, low transport cost makes lower operational cost and more profitable. As farm 1, farm 2 and farm 3 were in the same places the market value of all ingredients were similar. But the operational cost of the farm 2 was greater than the other two farms due to poor management. Farm 5, farm 6 and farm 7 were located at the same place. But in farm 7 due to poor feeding and housing management operational cost were higher than other three farms. So the profitability of farm 2 and farm 7 were less than others. This finding was in accordance with the findings of Hemme *et al.* 2004 who reported that the profitability depends on the lower operational cost. David B. Fischer, 1998 stated that farms with high production level will usually generate greater profit especially when cost control measures are the part of the total management.

Constraints to smallholder dairy production

Feed resources

Dairy farms face problems with the availability of feeds and fodder; there are problems with both quality and quantity and a lack of economical technology for optimum utilization of local feed resources.

Breeds of cattle

Cattle breeds available are mostly indigenous. Efforts are being made to improve milk production through crossbreeding with exotic breeds.

Artificial insemination (AI) and reproductive performance

Presently, AI activities are carried out by the Bangladeshi Government's Department of Livestock Services (DLS) from 22 centres, 423 sub centres and 554 AI points. The total number of AIs carried out each year is about 1.5 million (DLS 2000). In order to extend AI activities, a massive development project focusing on AI is being undertaken for the development of cattle for milk and meat production.

Climate and disease

Diseases present a major constraint to cattle production in Bangladesh; the extent of losses due to disease is very high. The country's climate, along with the poor nutritional status of cattle, contributes to a high incidence of cattle diseases, especially in the calves. The major diseases are anthrax, haemorrhagic septicemia (HS), foot-and-mouth disease (FMD), black quarter (BQ), diseases caused by infestation with liver flukes and calf diarrhoea (Ahmed 2000).

Government policy and activities for dairy development

Recent livestock development activities of the Bangladeshi Government's DLS have attracted the attention of development partners, international organizations and NGOs. The livestock subsector has emerged as an important source of gainful employment and income for the vast majority of the rural poor for their poverty alleviation. Important features of government policies towards the livestock subsector include-

- (i) The non-involvement of the government in production, processing and marketing activities.
- (ii) Support of the private sector and NGOs in dairy development activities through research, extension, training, credit and the development of appropriate infrastructure.
- (iii) Reduction of import tariffs on equipment, animals, raw materials and other inputs.
- (iv) Reduction and eventual elimination of subsidies on inputs, including veterinary drugs, vaccines and AI services.

The major activities of the DLS

The major activities of the DLS include

- (i) Conservation of livestock (by providing veterinary health care/ensuring veterinary coverage),
- (ii) Development of livestock (development of breeds, productivity and appropriate technology),
- (iii) Provision of extension services (training, entrepreneur development, assistance to establish farms, feeds and fodder production, and technology transfer), and
- (iv) Employment generation (assistance for credit, input supply and technical support to NGOs working with livestock development).

The Bangladesh Milk Producers' Co-operative Union Ltd is the oldest and only dairy venture in the country providing feeds, vaccines and AI facilities for a large number of participants in selected milk pocket areas. However, this co-operative is incapable of providing feed, marketing and veterinary health care services to dispersed dairy farmers all over the country; therefore, milk collection, distribution, processing and marketing services in non-supported areas of Bangladesh are less organized.

Recommendations

- Farmers training on the rearing of cattle and calves.
- Feed resources of cattle are one of the major constraints prevailing in the existing production system. Cattle production should appropriately be integrated with agricultural operation to meet the challenge of feeding the cattle. A 3- tier system involving production of surface vegetation through reseeding with perennial and

nutritious grasses and legumes creating middle level vegetation through fodder shrubs and top level through trees to meet the serious seasonal variation in feed availability. It is essential that the feed availability during season of higher production is harvested and conserved to be utilized during scarcity period. It will also be desirable to face animal feed security utilizing chemically treated and densely baled crop residues forest grasses and tree leaves etc.

- Establishment of specialized diagnostic facilities laboratories to extend reliable diagnostic facilities to the farmer's.
- Improvement of the economic and other traits of cattle through selective breeding and conservation of superior breeds through establishing a national breeding herd.
- Farmer's motivation to change traditional attitudes for cattle rearing through leaflets, booklets, radio & television programmes etc.
- Strengthening of veterinary health and extension service at farmers' level.
- Introduction of micro credit facilities.
- Involvement of NGOs and private sectors with the dairy production activities.
- A proper extension service similar to that for crop production should be established to create awareness of the rural farmers regarding the importance of dairy production and to make available the improved technologies to the flock owners.
- The Directorate of Livestock Services (DLS) should undertake animal nutrition development programme (ANDP) and suitable training programmes for the cattle rearers.
- Increasing the availability of superior breeding bulls.
- Development of marketing system / channel through the involvement of milk marketizers and maintain stable market facilities.
- Establishment of modern processing units.
- National Dairy improvement Board should be established with priority basis.
- Proper coordination with the NGOs, the dairy development program could be strengthened.
- An extended research for sustainable dairy development from the standpoint of nutrition, farming system, genotypic development, health management and preventative care is urgently required.

- Policy and regulation must be adopted considering the economic and social importance of dairy cattle for their improvement and conservation in the country.

Limitations of the Research:

- Sometimes could not approach and convince the farmers satisfactorily to collect the required information.
- Time available for conducting study and preparation of report were not sufficient.
- All farmers were not equally cooperative and friendly.
- The research sample was very small.

CHAPTER- IV

CONCLUSION

It can be concluded that the small holder dairy farming might be profitable in spite of remaining constraints, if the breed selection, management system and operational cost can be maintain properly. Poor management required high operational cost that leads to less profit on the farm. Farms with less profitability should maintain proper or standard management which leads decrease operational cost and improve productivity.

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APPENDIX-1

Questionnaire

Date:

1. Name of the farmer.....
2. Address of the farmer.....
3. Occupation of the farmer.....
4. Total no. of cattle's.....
 - (i) Milch cow
 - (ii) Heifer calf.....
 - (iii) Bull calf
5. Total milk production/per cow/day.....
6. Lactation length of cow.....
7. Feed ingredients supplied to the animal.....
8. Cost for management :
 - (i) Housing cost.....
 - (ii) Feeding cost.....
 - (iii) Vaccine and medicine cost.....
 - (iv) Artificial insemination cost.....
 - (v) Electricity cost.....
 - (vi) Labor cost.....
 - (vii) Others
9. Source of income:
 - (i) Milk selling.....
 - (ii) Calf selling.....
 - (iii) Culled cow selling.....
 - (iv) Manure selling
10. Problems facing by small holder dairy farmer.....
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Signature of reviewer

BIOGRAPHY

Myself MD. ZAHIDUL ISLAM, the author of this production report would like to introduce as Intern. DR of Chittagong Veterinary and Animal Sciences University (CVASU) have passed four years academic career in faculty of veterinary medicine and attended several clinical training programs on Veterinary Medicine in Bangladesh and India. As a student of Veterinary science, the main mission and vision of my life is to do something better and creative job by dint of my academic knowledge and experience, for the development of livestock as well as development of the economic condition of our country. I strongly assure that I have done all the works furnished here, in this report information given here which are collected from different books, journal and websites.