

**A Report on**  
**Economic analysis of crossbred dairy cattle farming at Anwara**  
**upazila in Chattogram district.**



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**Session: 2016-2017**

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**Khulshi, Chattogram-4225, Bangladesh**

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## List of Abbreviation

<b>Abbreviation</b>	<b>Elaboration</b>
AI	Artificial insemination
BCR	Benefit cost Ratio
BDT	Bangladeshi Taka
COVID-19	Corona virus disease 19
CVASU	Chattogram Veterinary and Animal Sciences University
DLS	Department of Livestock service
DVM	Doctor of Veterinary Medicine
Etc.	Et cetera
Et al.	et alia ( and others)
GDP	Gross Domestic product
Govt.	Government
HSC	Higher Secondary School Certificate
JSC	Junior School Certificate
PSC	Primary School Certificate
SSC	Secondary School Certificate
Tk	Taka
%	Percentage

## ABSTRACT

The study was undertaken to analyze the socio-economic status, profitability and existing problems of dairy cattle farming at Anwara upazila in Chattogram district, Bangladesh. A total of 20 farms were selected by random sampling methods from Anwara upazila. A pretested questionnaire was used to collect the data from the farmers during February to May, 2022. Both descriptive statistics and econometric analysis were used for analyzing the data. The study reveals that average milk production of crossbred dairy cattle was 13.125 liter and total return was Tk 202683.22 per year per cattle where milk selling contributed 89.36% of total return. 55% of total farmers had their primary schooling with an experience of 13.5 years of farming. About 55% of the farmer earned Tk 31000-50000 as monthly income. Feed cost comprise about 90.51% of total farming cost while gross margin was Tk 96657.49 and net return was Tk 96223.99. The BCR was 1.91 indicating that dairy farming is still profitable in the study area. The study also point out some major problems faced by the farmers such as lack of capital, negative effect of COVID-19 on dairy farming, high cost of concentrate feed, insufficient pasture land and green fodder. It is suggested that the Government should provide subsidy on concentrate feed and easy access to bank loan in order to solve those problems.

**Key words:** Socio-economic, Crossbred, BCR, Gross margin, Net return.

# CHAPTER 1

## INTRODUCTION

Bangladesh is a developing country where most of the population lives in rural and peri-urban areas. Bangladesh Investment Development Authority (BIDA, 2010) have found that 90% of the dairy farmers have 1-3 cattle's, 6% dairy farmers have 3-10 cattle's and 4% dairy farmers have more than 10 cattle's in the country. The farmers mostly depend on agriculture and livestock rearing for their livelihood. Livestock provides employment (direct- 20%, indirect- 50%) in Bangladesh (DLS, 2021) that helps in the economic development of the country.

Dairy farming plays a vital role in livestock as dairy farming is highly profitable and generate employment opportunities (Begum et al., 2017). In developing countries small scale dairy farming act as a great social contributor and an important way to eradicate poverty (Holloway et al., 2007; Somda et al., 2005).

Bangladesh has 245.45 lakh cattle population and average milk production is 119.85 lakh metric ton where the demand for milk is 154.94 lakh metric ton as a whole (DLS, 2021). In spite of having large cattle population the country can't fulfil per capita milk demand which is 250ml per day (DLS, 2021). About 85% of cattle in our country is native and non-descriptive with low productivity (Hamid et al., 2017). The number of available crossbred cattle is around 2.3 million throughout the country (Hamid and Hossain., 2014). Among the crossbred cattle Holstein Friesian (HF) is most common as it produce more milk than other crossbred cattle in Bangladesh (Islam et al., 2017). Average milk production of local breed (RCC) is 2.65 litter per cattle per day (Khan et al., 2000) where average milk production of crossbred cattle (HF) is 13.11 litter per cattle per day (Begum et al., 2017). Although indigenous cattle are more resistant to common disease and well adopted in our climatic condition but have several drawback such as late sexual maturity, long calving interval, poor milk yield and comparatively short lactation period (Majid et al., 1995). (Quddus, 2012) had discussed about the factors affecting dairy profitability and compared the performance of crossbred and indigenous cattle's.

Milk production in Bangladesh has increased from 34.60 lakh metric ton to 119.85 lakh metric ton in last decade (DLS, 2021) due to increase number of crossbred cattle throughout the country. In



order to increase the productivity of crossbred dairy cattle several factors needs to be improved such as management, reproduction, disease control etc. (Barua et al., 2018).

A number of studies have been conducted to evaluate the production, reproduction and profitability analysis of crossbred cattle at research centers and some government farms but no such studies have been conducted in the rural areas of Anwara upazila which is known as milk pocket of Chattogram city. Based on the above literature review, there are scope for socio-economic analysis along with economic analysis in Anwara upazila. So the present study was conducted to evaluate the following specific objectives:

- a) To find out the socio-economic status of crossbred dairy cattle farmers.
- b) To assess the profitability of crossbred dairy cattle farmers in the study area.
- c) To identify the problems faced by crossbred dairy farmers.

## CHAPTER 2

### MATERIALS AND METHODES

#### 2.1 Study area and duration

The study was conducted in 10 villages namely Chatteri, Halidhar, Boirag, Bottoli, Dumuria, Pir khain, Anwara, Burumchara, Singhora, Guapanchak of Anwara upazila between February 2022 to May 2022. The villages were selected on the basis of availability of crossbred dairy cattle.

#### 2.2 Selection of sample size

Twenty farms were randomly selected in the study area. Farm having at least one milk producing crossbred dairy cattle was selected for the study.

#### 2.3 Preparation of questionnaire

The questionnaire was prepared by open ended and close ended question than pre-tested. On the basis of practical experience some necessary questions were added and unnecessary question were omitted from the questionnaire.

#### 2.4 Collection of data

All related data were collected using pre-tested questionnaire by visiting the farms in the study area between February 2022 to April 2022. The farmers were interviewed face to face. Before interviewing a brief idea was given to the farmers about the purpose and impact of the study. Upazila veterinary surgeon played an important role to get the information easily.



**Figure 1: Collection of data from the farmers.**

## 2.5 Data coding, entry and cleaning

The questionnaire was checked for completeness, cleaned, organized and coded after data collection. Then the data was entered in MS-Excel spread sheet before being converted to STATA program (Stata,14,. Statistical Software) for analysis.

## 2.6 Statistical Analysis

Socio-economic characteristics and problems related to production were identified using descriptive method and farm profitability were analyzed by the following equations:

### 2.6.1 Estimation of costing

- i. Total Cost (TC) = (Total variable cost + Total fixed cost).
- ii. Total variable cost (TVC) = (Feed cost + Veterinary cost + Labor cost + Transportation cost + Miscellaneous cost).
- iii. Total fixed cost = (Depreciation of housing cost + Depreciation of equipment cost).

Where,

**1. Variable cost:** Variable cost includes the cost that are related to production such as feed cost, veterinary cost, labor cost, transportation cost and miscellaneous cost.

**Feed cost:** Feed cost includes the total amount of feed (concentrate +roughage) consumed by the cattle and multiplied by the market value of the feed.

**Veterinary cost:** It includes the cost related to animal health like vaccination, medication.

**Labor cost:** Both hired labor and family labor was considered for the study.

**Transportation cost:** It includes carrying cost of feed and marketing cost of milk for sale.

**Miscellaneous cost:** It includes electricity cost, AI cost, rope and bags cost.

**2. Fixed cost:** Fixed cost includes depreciation of housing cost and depreciation of equipment cost.

**Depreciation of housing and equipment:** It was calculated on the basis of straight line method (Shiyani et al., 1989). The formula is as follow:

$$\text{Depreciation} = \left[ \frac{\text{Original value} - \text{Salvage value}}{\text{Life of the house or equipment}} \right]$$

Here, life of housing was considered 15 years and life of equipment's was considered 5 years.

### 2.6.2 Estimation of return

Return in dairy cattle farming are generated from selling of milk, calf and cow dung.

**Milk sale:** Milk sale was calculated by total amount of milk produced by the cattle per day and multiplied by the market value of per liter milk.

**Calf sale:** In dairy business male calf are sold to the market as they can't produce milk.

**Cow dung sale:** Cow dung is a by-product in dairy cattle farming. Cow dung act as a fertilizer for agricultural crops and plants and has higher demand in the market.

### 2.6.3 Profitability analysis

For Profitability analysis following equations was used:

$$\text{i) } \pi = \text{TR} - \text{TC}$$

$$= \sum (Q_y P_y + Q_z P_z) - \sum P_{xi} . X_i - \text{TFC}$$

Where,

$\pi$ = Profit or net return from per dairy cattle per year (Tk).

TR= Total return.

TC= Total cost.

$Q_y$ = Total quantity of milk yield (liter).

$P_y$ = Per unit price of milk (Tk/ liter).

$Q_z$ =Total unit of calf selling.

$P_z$ =Per unit price of calf.

$X_i$  = Quantity of the concerned  $i$ th inputs.

$P_{xi}$  = Per unit price of the relevant  $i$ th inputs.

TFC = Total fixed cost involved in production.

$i = 1, 2, 3, \dots, n$  (number of inputs).

**ii)  $GM = TR - TVC$**

**iii) BCR (Full cost basis) =  $\frac{TR}{TC}$**

**iv) BCR (Cash cost basis) =  $\frac{TR}{TVC}$**

Where,

GM = Gross margin.

TR = Total return.

TVC = Total variable cost.

TC = Total cost.

BCR = Benefit cost Ratio.

## CHAPTER 3

### RESULTS AND DISCUSSION

The effect and impact of the study has been tabulated and discussed in this session.

#### 3.1 Socio-economic characteristics of the farmer

Several socio-economic status of the farmers such as age, education, occupation, experience, training, family size, monthly income etc. were calculated and presented below:

**Table 1. Socio-economic characteristics of the sample farmers.**

Parameter	Category	Frequency	Percentage	Mean
Age(Years)	40- 46	3	15	54
	47- 52	7	35	
	53- 58	5	25	
	59- 64	2	10	
	65- 70	3	15	
Family size	Up to 5(Small)	3	15	7.25
	6-8(Medium)	15	75	
	Above 8(Large)	2	10	
Monthly Income (BDT)	20000-30000	5	25	36250.00
	31000-50000	11	55	
	Above 50000	4	20	
Experience of Farming(Years)	0-7	3	15	13.5
	8-14	10	50	
	15-21	4	20	
	22-28	3	15	
Training	Yes	12	60	
	No	8	40	

Source: Field survey, 2022.

### **3.1.1 Age**

From Table 1 it is seen that majority of the farmers 35% were in between age group (47- 52) and only 10% of the farmers were in between age group (59- 64) where average age of the farmers were 54 years indicating that the farmers related to crossbred dairy cattle production are adults. (Quddus et al., 2012) also found similar results where most of the farmers 42% were above 45 years old and average age of the farmers were 49 years.

### **3.1.2 Family size**

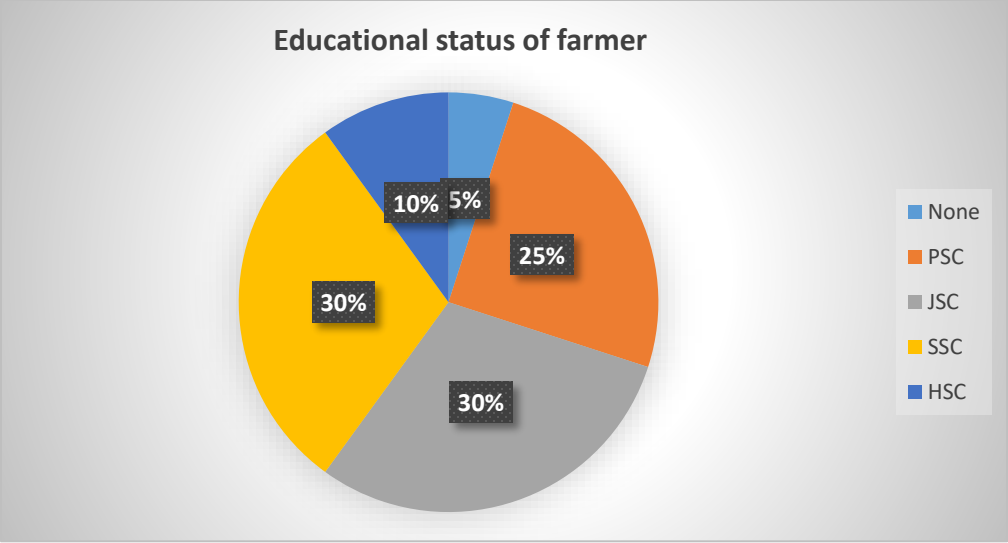
In rural areas majority of the farmers are illiterate and have no or minimum knowledge about birth control and family planning. The study shows that most of the farmers 75% had medium family size (6-8 members) where 15% of the farmers had small family size (up to 5 members) and 10% of the farmers had large family size (above 8 members). Average family size was 7.25. As a result most of the time they have to undergo hard labor to support their family financially.

### **3.1.3 Monthly income**

Most of the people in rural areas lives in poverty because of their poor economic condition and lack of job opportunity due to no schooling. From Table 1 it is observed that most of the farmers were middle class family as average monthly income was Tk 36250. Almost 55% of the farmers had their monthly income in between (Tk 31000-50000) where 25% farmers had their monthly income in between (Tk 20000-30000). Only 20% farmers had monthly income above Tk 50000. The study shows that farmers related to dairy cattle farming are generating more income and economy compared to other people in rural areas.

### **3.1.4 Educational status**

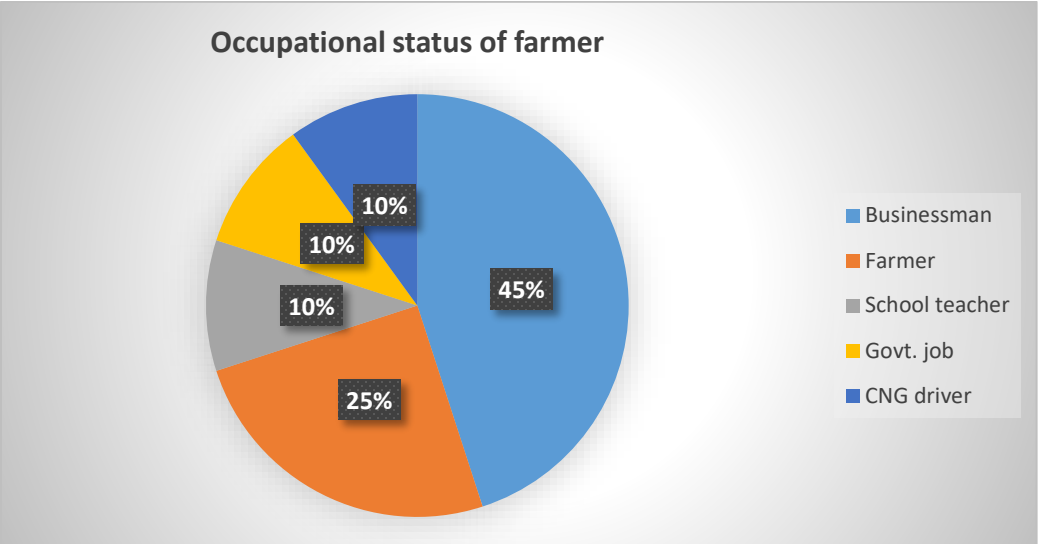
Most of the farmers in rural areas are illiterate and have no schooling. From Figure 2 it is seen that majority of the farmers were illiterate and 55% of them had primary schooling. 5% of the farmers had never attended to school where 30% of the farmers had completed secondary schooling and 10% farmers were HSC pass. (Quddus et al., 2012) had also found that 45.7% of the farmers had primary schooling and mainly illiterate.



**Figure 2. Educational status of sample farmers.**

**3.1.5 Occupational status**

According to (DLS, 2021) almost 70% of the people in Bangladesh directly 20% and indirectly 50% depends on livestock for their livelihood. Most people is rural and peri urban area depends on agriculture and livestock for their livelihood. From Figure 3 it is seen that 45% of the respondents were businessman and 25% were farmers who mostly depends on dairy farming for their livelihood. Although majority of the respondent were businessman but they mainly depends on dairy farming for their income generation.



**Figure 3. Occupational status of sample farmers.**



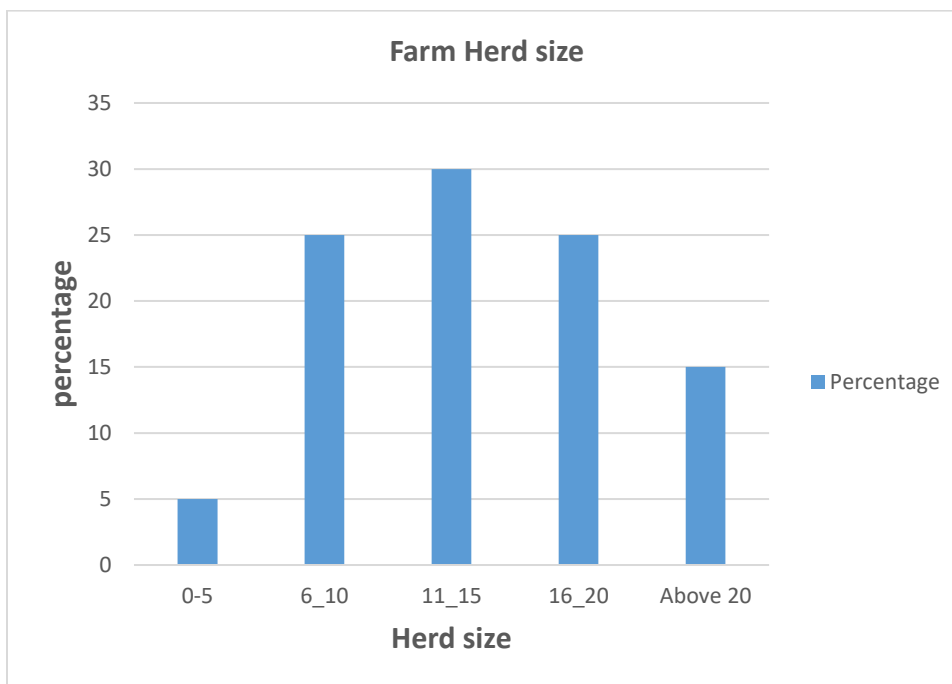
### 3.1.6 Experience of farming

Experience can be gathered through observing, encountering or doing things generally as they occur in the course of time. Experience plays a vital role in dairy cattle farming. From Table 1 it is seen that 50% of farmers had farming experience in between (8-14) years and average farming experience was 13.5 years. Almost 20% of the farmers had farming experience in between (15-21) years. (Quddus et al., 2012) had found that average farming experience of the dairy cattle farmers were 12 years.

### 3.1.7 Training

Training is teaching or developing in oneself or others, any skill and knowledge or fitness that relate to specific useful competence. Training is essential for scientific and economic management of a farm. Different government and nongovernment organization provides training to the farmers about livestock rearing and their management. Table 1 shows that 60% famers had received training related to livestock and their management and have better outcome compared to other 40% farms who didn't attend any training program.

### 3.1.8 Herd size of sample farmers



**Figure 4. Herd size of sample farmers.**

Dairy farming is a big industry but large scale dairy farming can not be found in rural areas due to economic condition of rural peoples. Majority of them has (6-10) cattles per farm. Figure 4 shows that 30% of the farmers had (11-15) cattles per farm where 25% of the farmers had herd size in between (6-10) cattles and (16-20) cattles respectively. Only 15% farmers had farm size above 20 cattles indicating low percentage of large scale dairy farming in rural areas.

### 3.2. Cost and Return analysis of cross bred dairy cattle

For profitability analysis both variable cost (feed cost, labor cost, transportation cost, AI cost, veterinary cost etc.) and fixed cost (depreciation of housing and equipment's) were calculated as total cost. Annual milk sale, calf sale and cow dung sale were calculated as total return. (Alam et al., 2020).

**Table 2. Cost and return of per dairy cattle per year.**

<b>Cost items</b>	<b>Amount (Tk)</b>	<b>Percentage</b>
Feed cost	96354.30	90.51
Labor cost	5613.69	5.81
Medication cost	2091.87	2.16
Transportation cost	1013.24	1.05
Others cost (Electricity+ AI)	980.04	1.01
Total variable cost (TVC)	104025.7	97.71
Depreciation of housing	2412.12	
Depreciation of equipment's	2021.38	
Total fixed cost (TFC)	2433.49	2.29
Total cost ( TVC+ TFC)	106459.228	100.00
<b>Total return</b>		
Milk selling	162870.98	89.36
Calf selling	20242	09.98
Cow dung selling	1570.24	0.77
Total return (TR)	202683.22	100.00

Source: Field survey, 2022.

Large scale crossbred dairy cattle farming is highly profitable business. In dairying farmers generate income either from sale of farm products and by-products also through the sale of surplus animals. Cost in dairy farm includes feed cost, labor cost, medication cost, transportation cost, and miscellaneous cost. Among the costs feed cost is the major cost and comprise about 91% of total cost in dairy farming as shown in Table 2. Dairy farming creates employment opportunities as it requires both family labor and hired labor where labor cost comprise about 5.81% of total costing and is ranked as second most cost in dairy farming. Family labor was considered as an opportunity cost for this study. Other cost in dairy farming are veterinary cost 2.16%, transportation cost 1.05% and miscellaneous cost 1.01%. Miscellaneous costs included electricity cost and AI cost. Veterinary cost includes vaccination cost and medication cost of different disease. Medication cost in crossbred dairy farming is comparatively high because crossbred cattle are more susceptible to variety of diseases than local breed (Barua et al., 2018).

Variable cost are those cost that are related to the production such as feed cost, labor cost, veterinary cost, transportation cost and others cost. Table 2 presents that total variable cost were Tk 104025.7 per cattle per year which is almost 97.71% of total cost and total farming cost per cattle per year was Tk 106459.228. (Datta et al., 2019) also found similar type of results where feed cost comprise about 83.7% of total cost in crossbred dairy cattle.

Fixed cost in dairy farming comprise of depreciation on housing cost and equipment's cost. Table 2 presents that depreciation of housing and equipment's were Tk 2412.12 and Tk 2021.38, respectively. Total fixed cost were Tk 2433.49 per cattle per year which is 2.29% of total cost.

Return in dairy farming is mainly generated from selling of milk. The cattle that produce more milk results in higher return and makes the farm more economic. From Table 2 it is seen that total return from the farm was Tk 202683.22 while milk selling contribute almost 89.36% of total return. Other source of income in dairy farming is calf selling and cow dung selling. Calf selling contributed 9.98% of total return and cow dung selling contributed 0.77% of total return. Average milk production per cattle per day was 13.125 liters. Similar result found in (Begum et al., 2017) where milk production performance of crossbred cattle was 13.11 liters per cattle per day in Bangladeshi climatic condition.

### 3.3 Profitability analysis

The profitability of crossbred dairy cattle farming in Anwara upizila has been determined by calculating gross margin, net return and benefit cost ratio.

**Table 3. Profitability of per crossbred dairy cattle.**

Parameters	Amount (Tk)
Total cost (TC)	106459.23
Total Return (TR)	202683.22
Gross Margin (GM)	96657.49
Net Return (Profit)	96223.99

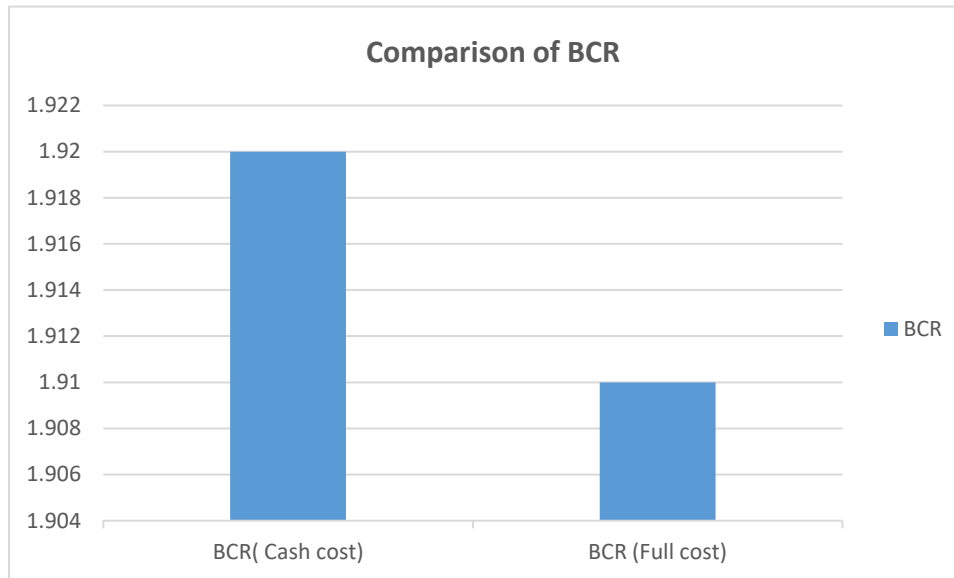
Source: Field survey, 2022.

Measuring farm profitability is very important for sustainability of the farm. Farm income depends on amount of milk production per cattle per day and amount of milk sale with a reasonable price. Decreased milk production has a direct effect on the profitability of a farm. Higher farm input (high feed cost, labor cost, transportation cost, medication cost) and decreased farm output (Less amount of milk production, low price of milk) results in reduced farm income and profit.

Profitability of a farm can be calculated by calculating gross margin, net return and BCR. From Table 3 it is observed that gross margin was Tk 96657.49 and net return was Tk 96223.99 indicating annual profit of the farm per cattle. Here total cost of farming per cattle per year was Tk 106459.23 and annual return from the farm was Tk 202683.22 per dairy cattle per year. As total return is higher than total annual cost the farmers can generate a healthy amount of income from dairy farming.

### 3.4 Benefit Cost Ratio Analysis (BCR)

BCR is the ratio of total return and total cost. Figure 5 represent BCR of cash cost and BCR of full cost basis for per dairy crossbred cattle per year.



**Figure 5: Comparison of Benefit cost Ratio.**

Benefit cost ratio (cash cost basis) and Benefit cost ratio (full cost basis) were 1.92 and 1.91, respectively. BCR 1.92 and 1.91 indicates if the farmer invest Tk 1.0 in dairy farming he will get return of Tk 1.92 and Tk 1.91 for cash cost and full cost basis, respectively. (Islam et al., 2019) also found that the BCR of crossbred dairy cattle was 1.85. The reduced BCR may be due to decrease in milk price and increased concentrate feed cost throughout the country because of the recent pandemics as mentioned by (Sahidur et al., 2021). However, BCR 1.92 indicates that dairy farming is still economically profitable and sustainable in the study area.

## CHAPTER 4

### PROBLEMS FACED BY FARMERS

The study was also aimed to find out the problems faced by the farmers along with their probable solutions. Several type of problems was faced by the farmer like lack of capital, shortage of pasture land, shortage of green grass, high price of concentrates etc. throughout the study duration.

**Table 4: Problems faced by the farmers in the study area.**

Problems	Frequency	Percentage
Lack of capital	18	90
Insufficient pasture land	19	95
Shortage of green grass	20	100
High cost of concentrate	20	100
Lack of veterinary service	02	10
Effect of COVID-19	20	100
Fall in milk price	14	70
High disease prevalence	11	55

Source: Field survey, 2022.

#### **Lack of capital**

Capital is the driving force in the farming business and most essential part among the factors of production. Bangladesh is a developing country where most of the farmers have financial drawback. Table 4 shows that 90% of the farmers have financial problems. (Hasan et al., 2015) found that in Bangladesh almost 85% of dairy farmers in rural areas have financial draw back. In

order to solve the problem the government should make easy access to bank loan for the rural farmers.

### **Insufficient pasture land and green grass**

Green grass and fodder plays a vital role in milk production of cattle. Green grass is an economic nutrient source for dairy industry. It also helps in maintaining good health and improving breeding efficiency of animals. But there is severe shortage of green grass and pasture land in the study area. As a result milk quality decreased along with milk production and makes the farm less profitable. According to (Mohammed et al., 2014) farmers have no knowledge or very poor knowledge about high quality fodder cultivation that results in insufficient fodder supply. Different types of training program about high quality fodder cultivation should be arranged to educate the farmers so that they can understand the importance of green grass in dairy cattle farming.

### **High cost of concentrate**

Concentrates are energy rich feed that is supplied to the cattle for higher milk production (Senbeta k. et al., 2019). In recent years the price of concentrate feed had increased severely and makes dairy farming unprofitable for a large number of small scale dairy farmers. From Table 4 it is noticed that 100% of the farmers had high price of concentrate feed. Global pandemics and shortage of supply is the main reason for price hike of cattle feed as mentioned by (Sahidur et al., 2021). In order to reduce feed price government should provide subsidy on concentrate feed and short term bank loan.

### **Effect of COVID-19**

COVID-19 is global pandemics that cause huge mortality to large number of people around the world. World economy has been shaken badly due to the pandemics along with agricultural sector (Barichello, 2020). The pandemics significantly increased the feed cost specially concentrate feed. From the study it was found that all farmers 100% in the study area had suffered duo to COVID-19. As a result dairy farming become less economical and less profitable then previous.

### **High disease prevalence**

Majority of the dairy farmer in our country rear crossbred dairy cattle for more milk production than indigenous cattle (Islam et al., 2017). Those crossbred cattle are more susceptible to disease than local breed cattle (Barua et al., 2018). From Table 4 it is seen that 55% of the farm had high disease prevalence. These diseases increase medication cost of the farm and makes farming less economic. Good management and strong biosecurity should be maintained to reduce disease prevalence in the farm.

### **Fall in milk price**

Milk is the main source of income in dairy farming. The more a farm produce milk the more profit it earns. In Bangladesh milk marketing system is very poor and under developed. As a result most of the time there is an unstable milk price in the market. Fall in milk price cause reduced farm income and profit. 70% farmers claimed fall in milk price in the study area. Organized and stable milk marketing system should be created in order to make milk price stable throughout the year.



## **CHAPTER 5**

### **CONCLUSION**

The study demonstrates the socio-economic characteristics, farm profitability and problems faced by the dairy cattle farmers in Anwara upazila of Chattogram district. From the study it is seen that most of the farmers are illiterate and middle class family with an average monthly income of Tk 36250. The economic analysis indicates that dairy farming in Anwara upazila is still profitable as BCR is 1.91. Dairy farming in those areas also created employment opportunities for large number of people. But the farmers couldn't get maximum profit due to the negative impact of recent pandemics on dairy farming. Lack of capital, shortage of green grass, insufficient pasture land and high cost of concentrate feed was major problems faced by the farmers. In order to make the farm more profitable it is recommended to increase the number of crossbred cattle per farm. Besides the government should provide subsidy on concentrate feed to reduce feed cost, easy access to bank-loan for financial support and technological support for high quality fodder cultivation. This will make the farm more economic as well as create employment opportunities and help alleviation of poverty in rural areas of Bangladesh.

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**Author, August 2022**

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