**ECONOMIC ANALYSIS OF SMALL SCALE DAIRY BUFFALO ENTERPRISES AT SOME SELECTED COASTAL AREAS IN BHOLA DISTRICT**



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**CHITTAGONG VETERINARY AND ANIMAL**

**SCIENCES UNIVERSITY**

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A Production report Submitted as per approved style and contents

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**LIST OF ABBREVIATION**

AOAC Association of Official Analytical Chemists BAU Bangladesh Agricultural University

BBS Bangladesh bureau of Statistics

BDT Bangladeshi Taka

DLS Department of Livestock Services

GDP Gross Domestic Products

BCR Benefit Cost Ratio

BQ Black Quarter

HS Haemorrhagic Septicemia

FMD Foot and Mouth Disease

FAO Food and Agriculture Organization

AI Artificial Insemination

HYV High Yielding Variety

GM Gross Margin

TR Total Return

TC Total Cost

**ABSTRACT**

The study was carried out to investigate current socio-economic profiles of buffalo farm owners, traditional coastal buffalo production, feeding & management practices with system assessing of productive and reproductive performances of the dairy buffaloes identified few emergence problems of buffalo dairying and possible suggestive measures for solution to overcome the problems. This study was also analyzed the costs, returns and profitability of two categories of farms. The study was conducted in to two villages of Char Fasson upazila, namely Aslampur and Char Manika, from Bhola district. Data were collected from January to March 2015 using a structured questionnaire through personal interview during period of UVH internship training placement. The study revealed that buffalo rearing was mostly practiced by middle (30-45yrs) and old (>45yrs) aged farmers than young farmers (<30yrs). Majority 45.71% of the buffalo farmers were educated but only 11.42% farmers had only primary education. About 37.14% farmers supervised his farm with help of family members and labours than himself alone. The farmers fed their buffalos with locally available roughages and tree leaves but they did not practice concentrate feeding and no organized housing facilities for sheltering. The study also revealed that average lactation length was found 228 days, average milk yield per buffalo per day was 2.1 litres. The major diseases of buffaloes found in the studied areas were HS, followed by FMD, Mastitis than BQ, deworming, vaccination and treatments were practiced by most of the farmers. The study revealed that, there had no significant costs for rearing dairy buffaloes at coastal fellow land/bathan areas. Most of the cost accounted for labour and home supplied feed item as non-cash items. The Gross Margin and Net farm profitability per dairy buffalo per lactation year over cash cost and non-cash cost were stood at Tk.55866.65, Tk. 51127.89 and Tk.44954.65, Tk. 40435.39, for Herd size 1 and Herd size-2, respectively. The result revealed that, rearing of small- scale dairy buffaloes is highly profitable at coastal belt areas in Bhola District. The average Benefit Cost Ratio (BCR) was accounted for **1:7.51** and **1:3.11** respectively were found over cash and total cost basis considering both herds. Finally, the study identified some crucial problems of raising cows at coastal areas as lack of grazing lands, insufficient veterinary services, natural hazards etc. If those problems could be reduced justifiably the small scale dairy buffalo farming enterprises at coastal areas be possible to raise income and livelihood status of coastal belt areas with creating facilities for owners and youth group of people those who would be interested in dairy buffalo practices commercially specially in coastal areas.

|  |
| --- |
| **Key words:** Buffaloes, Socio-economic status, Productive and reproductive traits, BCR |

**CHAPTER I**

**INTRODUCTION**

Livestock is one of the most prospective sub-sectors of agriculture in Bangladesh which plays a fundamental role in promoting human health and national economy of the country. Livestock not only assists to upgrade the financial condition but also makes a substantial contribution to human nutrition. Large ruminants (Cattle and Buffalo) and small ruminants (sheep and goat) constitute the major portion of livestock (Alim *et al.,* 2012). The present population of livestock in Bangladesh is 23.1 million cattle, 1.21 million Buffalo, 20.75 million goat and 2.68 million sheep (DLS, 2008).

Two types of domestic buffalo *(Bubalus bubalis)* are known as riverine type and swamp type. The important breeds of the riverine type are Murrah and Nili-Ravi representing geographically in India and Pakistan. This type is classified as a milking type and is characterized by a forehead, swirled horns, and black skin. The swamp type which has grey skin, a flat forehead and widely curved horns is found in Southeast Asian countries from China to Indonesia. This type is kept for draught and meat purpose (Cockrill, 1974). Buffaloes in Bangladesh may be classified into 3 categories: (i) Riverine types found in the sugarcane belt of the country and mainly migrated from India, (ii) Swamp types found in the coastal areas and marshy land of the country and mainly indigenous in nature though a small number might have migrated from Burma, (iii) Crossbred type (swamp x river type) found in the coastal area of the country (Amano *et al.,* 1987)

Buffaloes hold a crucial place in overall livestock economy of Bangladesh (Sarker *et* *al.,* 2013). Buffaloes are called triplet animals as they serve three important purposes such as milk, meat and drought power supply (Ghaffar *et al.,* 1991). Buffalo is contributing 12.1% to the world, 38.0% in Asia, 66.6% in Pakistan, 55.0% in India’s total milk production (FAO, STAT, 2007). In addition to the milk buffalo is also used as an important source of beef production. People adopt buffaloes because of larger body size than the indigenous cattle, outstanding draught capacity, long working life and docile temperament (Sarker *et al.,* 2013). They have better capacity to utilize low quality roughages to produce more protein and to gain more body weight (Singh *et al.,* 1973*),* more disease resistance power than our native cattle. Indigenous buffalo cows produce 2 times more milk than cows, with more milk fat and total solid, proteins and vitamins compared to cow’s milk. Buffalo milk also contains less cholesterol and more tocopherol, which is a natural antioxidant. The peroxides activity is two to four times higher in buffalo milk than in cow’s milk, which means that buffalo milk has better natural keeping qualities (Chantalakhana and Falvey, 1999). Buffalo milk is used for manufacturing a variety of different milk products such as butter, butter oil (clarified butter or ghee), soft and hard cheeses, condensed or evaporated milks, ice cream, yoghurt and buttermilk.

They are more versatile and hence popular among rural farmers. Buffalo is economically suited for the poor people. Buffalo requires less feed, care and attention than cattle. They are usual depend on tree leaves, shrubs and bushes in the rural condition. They graze on available land, marginal or uncultivated, and invariably walk long distances to achieve dry matter intake (Devendra, 1980). Intensive feeding involves zero grazing or intensive grazing of cultivated pastures fertilized with inorganic fertilizers. Previously the system was justified principally by the presence of abundant quantities of agro-industrial by-product feeds, availability of grazing land and an assured market which is relatively close (Castillo *et al.,* 1982, Wanapat *et al.,* 1984). The farmers raise buffaloes mostly in free grazing system but stall feeding is practically very rare in Bangladesh, although in adverse climatic conditions buffaloes are housed and provided stall feeding with tree leaves and natural grasses. They prefer to wallow in the rivers or canals as this is essential for their thermal regulation (Tulloch, 1974).

Buffaloes are said to be seasonal breeder. However, this is not entirely true as buffaloes are polyoestral animals and may breed all year round. But they usually show silent heat. Age at puberty: 36 to 42 months, Length of oestrus cycle: 21 days, Duration of heat: 12 to 24 hours, Time of ovulation: 10 to 14 hours after end of oestrus, Period of maximum fertility: last 8 hrs of oestrus, Gestation period: 310 days. Period of involution of uterus: 25 to 35 days (Thomas, 2008). However productive or reproductive traits in dairy buffaloes are influenced by several genetic and environmental factors (Khan *et al.,* 2008).

Buffalo has some potential importance on livelihoods improvement. There are several published reports regarding management system and reproductive and productive parameters of buffalo cows throughout the world (Hadi., 1965; EI-Kirabi., 1995 and Suhail *et al.,* 2009) but there is very limited information of this issue in contest of Bangladesh especially in coastal areas (Faruque *et al.,* 1990, 1995). As Bhola is the largest island of Bangladesh as well as buffalo concentrated belt and no study yet done on socio-economic status of the buffalo farmers and the management practices of buffalos on Bhola district, my present study was conducted to investigate the following specific objectives:

1. To describe the socio-economic characteristic profiles and livelihood status of dairy buffalo farm enterprises in some selected areas of Char Fasson Upazila in Bhola district.
2. To assess the supervision, management, housing and feeding practices of the dairy buffalo enterprises.
3. To evaluate the productive and reproductive performances of dairy buffaloes.
4. To find out the profitability of rural buffalo farming practices under the study areas.
5. To identify the problems and make remedial suggestive measures of rural buffalo farming practices enterprises.

**CHAPTER II**

**Methods and Materials**

**2.1. The selection of study area:**

The study was conducted at two villages of one union of Char Fasson upazila in Bhola district of Bangladesh (Table 1).Char Fasson upazilla is located at 75 km north of Bhola district town (Eid Gah). Char Fasson is located at [22.1847°N 90.7625°E](https://tools.wmflabs.org/geohack/geohack.php?pagename=Char_Fasson_Upazila&params=22.1847_N_90.7625_E_) . It has 63,740 households and a total area of 1106.31 km². It is a land of rivers where plenty of pasture land is available. Therefore, this area is very much suitable for buffalo rearing and at the same time to improve livelihoods of the poor farmers.

**Table 1: Name of the District, upazila, union and number of respondents in the experimental areas**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| District | Upazila | Union | Village | Respondent |
| Bhola | Char Fasson | Aycha | Aslampur | 18 |
| Charmanika | 17 |
| 01 | 01 | 01 | 02 | 35 |

**2.2. Selection of respondent:**

In total, 35 respondents were randomly chosen from two villages. Therefore, from one village 18 respondents and from another village 17 respondents were selected for collecting data to satisfy the objectives.

**2.3. Data collection procedure**

The information was collected by personal interview from the individual farmer present in his or her own house/ bathan land at coastal belt areas. An introductory visit was made to the study areas before setting the objectives of the study. Some data were collected from upazila veterinary hospital, Char Fasson when owner came to hospital with treatment purpose. Data were collected adopted by interviewing method and techniques by me and ULO of Char Fasson. Moderate cooperation was received from all respondents at the time of data collection during the period January to March, 2015.

**2.4. Data Collection and Analysis:**

After completion of field survey the entire interview schedules were set for its data tabulation after coding and reduction. All the individual variables of the interview schedules were transferred to master sheet to facilitate tabulation. Tabulation and data analysis have completed by using descriptive statistical tools and methods.

**2.5. Measurement of variables:**

The selection of variables and their measurements constitute an important task in research. The selected variables in this study were socio-economic profiles of buffalo owners, feeding, housing and management system, traits of productive and reproductive values of dairy buffaloes, costs, returns and profitability of dairy buffalo enterprises, benefit cost ratio, farmer’s suggestions against crucial farming problems to increase buffalo production.

**2.6. Measurement of farm profitability:**

**2.6.1. Annual farm income:**

Income from annual farming operations was obtained by summing up the returns/receipts from annual sale of animal products (milk sales), annual sale of live calf (animal sales) as by product.

**2.6.2. Annual farm cost/expenses:**

The total annual cost of farm operation was based on both annual variable costs and overhead costs (home supplied). The components used to calculate annual variable cost includes feed cost, cost of hired/contract/daily labour and imputed family labour, medicine, vaccination and therapeutic and preventive care cost, annual breeding cost etc. Annual overhead or fixed cost calculation comprised of opportunity cost of family supplied labour and permanent arm cowboy/employees, housing costs and miscellaneous expenses (production losses due to animal sickness).

**2.6.3. Annual Farm profitability:**

Profitability of that farm was examined by adopting as the following formulas: Net Profitability, **π= TR- TC**

Where, TR= Total milk produced per dairy buffalo per lactation multiplied by per liter buffalo milk price of the study area and TC equals to summing up all needed costs of inputs for buffalo rearing.

**CHAPTER III**

**Results**

The aim and objectives of this section is to describe the observed results and findings of the study. The findings regarding socio economics status, production, management, marketing and profitability of small scale dairy farms in the study areas are discussed simultaneously as under section of this chapter

**3.1. Socio-economic profiles of Buffalo Farm owners:**

Socio-economic profiles of Buffalo farm owners in relation to different category of farms are summarized in Table-2. The observed highest number farm owners 42.85% age limits lies in between30-45 years and 2nd highest 37.14% lies in between 30-45 years and then 20% farm owners age lies in below 30 years of age level. Majority of buffalo farm owners reported to be comparatively literate primary to higher secondary was 85.71%, higher secondary was 42.85% and graduate and above was 42.85%. Dairying from buffalo considered to be the main sources of income about 17.14 % of farm owners while the majority of owners had buffalo farming and cropping was found in 25.71%, both buffalo arming and fishing was found in 45.71%, and buffalo farming and small business was found in 11.42% farm owners. The difference in educational status, main profession and purpose of farming of the owners was however not significant association with farm sizes. Almost 42.85% of the observed farm owner’s yearly average income level above Tk. 10 lakh, in between Tk. 5-10 lack 37.14% and below Tk. 5 lakh 14.20% income level. The maximum farm owner’s about 80 % occupation was found buffalo with other services. Most of the farm owners about 20.00% took the buffalo farming as additional sources of income with regular job. Length of farming experience of owner was found highest 40% among 10-15 years, 17.14 % above (>15) years and below 10 years about 14.28 % farm owners. Highest numbers of farm owners about 54.28% reported that the farm ownership belongs to owned and 20 % owners rented space for farming and 25.71% owners sheared in. Almost 45.71% farm business

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Types of Data** | **Number of owners with categories Buffalo enterprise by herd Sizes** | | | |
| **Herd Size-1**  **(< 30 Buffalos)**  **N=20** | **Herd Size-2**  **(> 30 Buffalos)**  **N=15** | **ALL**  **N=35** | |
| **Farm Owners age:** |
| * Below 30 Yrs | 3 (15.00) | 4 (26.67) | 7 (20.00) | |
| * 30- 45 Yrs | 10(35.00) | 5(40.00) | 15(42.85) | |
| * Above 45 Yrs. | 7(50.00) | 6(33.33) | 13 (37.14) | |
| **Farm owners literacy level:** |  |  |  | |
| * Primary to Secondary | 2 (10.00) | 2 (20.00) | 4 (11.42) | |
| * Higher Secondary | 8(40.00) | 7(46.67) | 15 (42.85) | |
| * Graduate and above | 10(50.00) | 6 (40.00) | 16 (45.71) | |
| **Sources of Farm owners income:** |  |  |
| * Buffalo farming only | 3 (15.00) | 3 (20.00) | 6 (17.14) | |
| * Both buffalo farming & Cropping | 5(25.00) | 4(26.67) | 9(25.71) | |
| * Both buffalo farming & Fishing | 10(50.00) | 6(40.00) | 16 (45.71) | |
| * Both buffalo farming & Small business | 2 (10.00) | 2 (13.33) | 4(11.42) | |
| **Farm Owners level of Income:** |  |  |
| * Below Tk. 500,000 | 3 (15.00) | 4 (26.67) | 7 (20.00) | |
| * Tk. 500,001-Tk.10,00,000 | 7(35.00) | 6(40.00) | 13 (37.14) | |
| * Above Tk.10,00,000 | 10(50.00) | 5(33.33) | 15 (42.85) | |
| **Occupation Status:** |  |  |
| * Buffalo faring only | 3(15.00) | 3 (20.00) | 6 (17.14) |
| * Buffalo faring & Crop cultivation | 10(50.00) | 4(26.67) | 14(40.00) |
| * Buffalo farming & Small Business | 5(25.00) | 6(40.00) | 11 (31.42) |
| * Buffalo farming & Fishing | 2(10.00) | 2 (13.33) | 4(11.42) |
| **Farming Type:** |  |  |  |
| * Buffalo farming as a main business | 4 (2.000) | 3 (20.00) | 7(20.00) |
| * Buffalo farming as subsidiary income | 16 (80.00) | 12 (80.00) | 28 (80.00) |
| **Duration of buffalo rearing life:** |  |  |  |
| * Below 10 Yrs | 3(15.00) | 2 (13.33) | 5(14.28) |
| * 10 - 15 Yrs | 8(40.00) | 6 (40.00) | 14(40.00) |
| * Above 15 Yrs | 4(20.00) | 2 (13.33) | 6 (17.14) |
| **Ownership Pattern of Buffalo Farms:** |  |  |  |
| * Owned | 11(55.00) | 8(53.33) | 19(54.28) |
| * Rented in | 3 (15.00) | 4(26.67) | 7(20.00) |
| * Shared in | 6(30.00) | 3(20.00) | 9(25.71) |
| **Financing for maintaining buffalo enterprises:** |  |
| * Fully Own Financed | 3 (15.00) | 3 (20.00) | 6(17.14) |
| * Both own and Bank Financed | 5(25.00) | 4(26.67) | 9(25.71) |
| * Fully Bank Financed | 10(50.00) | 6(40.00) | 16 (45.71) |
| * Borrowed from Relatives etc. | 2 (10.00) | 2 (13.33) | 4 (11.42) |

**Table-2: Socioeconomic Profiles of Buffalo Enterprise owners by categories of Herd sizes**.

|  |  |  |  |
| --- | --- | --- | --- |
| **Training status of the buffalo enterprises owners:** |  |  |  |
| * Experienced earned hierarchically | 3 (20.00) | 2 (20.00) | 10 (20.00) |
| * Obtained govt. training from DLS | 7(46.67) | 5 (50.00) | 22 (44.00) |
| * No training | 7(46.67) | 5 (50.00) | 22 (44.00) |
| **Distribution of Buffalo herds of 35 enterprises:** |  |  |  |
| * Number of Milking Buffalo | 160 | 155 | 315 |
| * Bullock | 35 | 45 | 80 |
| * Pregnant buffalo (1st time) | 49 | 32 | 81 |
| * Calves | 160 | 210 | 370 |
| * Heifers | 75 | 89 | 164 |

**Source: Field Survey, 2015**  **(Figures in the parentheses indicates percentage)**

was financed by bank, 25.71% farmers were financed by both their own effort and bank, 35% farmers were fully financed by themselves and 11.42% farmers were borrowed money from relatives. Most of the farm owners 17.14% operated the farm business financed by bank with their own efforts (Table-2)

**3.2. Supervision and management practices of for Small Scale Dairying:**

Farm supervision level and resource management features are presented in (Table 3). Although farm owner with family members with casual labour reported to be involved in overall farm supervision in majority of farm (37.14%) but only 31.42 % of farm owner himself involved with regular farm supervision, while 31.42 % farmers were involved with family head causal labours. 40% farm owner were involved with decision making 28.57% farmers were involved with family members and labours about decision making and 31.52% farmers were not involved with any of the processes.

**3.3. Housing Practices of buffalos:**

The summary of housing management practices relative to farm sizes of small scale commercial buffalo dairying is analyzed in (Table-3).48.57% farmers had no house for their buffalos where as 31.42% farmers had traditional buffalo shed without fencing and 20% farmers had fencing housing system for buffaloes (Table 3)

**3.4. Feeds and Feeding systems of Small Scale Dairying:**

The data regarding feeds and feeding systems of buffalo practices two different farm categories is shown in (Table 3). In case of 54.28% farm the buffalos were depend on natural grazing. 37.14% buffalos fed on open grazing with paddy straw and 8.57% buffalos fed on dry roughage and green grass.

**Table-3: Supervision, feeding, housing and Management system of Buffalo enterprises by herd sizes:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Types of Data** | **Number of owners with categories Buffalo enterprise by herd Sizes** | | | |
| **Herd Size-1**  **(< 30 Buffalos)**  **N=20** | **Herd Size-2**  **(> 30 Buffalos)**  **N=15** | **ALL Farm**  **(N=35)** | |
| **A. Supervision and management of buffalo enterprises:** |
| **Nature of supervising:** |  |  |  | |
| * Farm owner himself | 7(35.00) | 4 (26.67) | 11 (31.42) | |
| * Farm family members with casual labours | 7(35.00) | 6(40.00) | 13 (37.14) | |
| * Family head with casual labours | 6(30.00) | 5(33.33) | 11 (31.42) | |
| **Level of decision making on farming:** |  |  |  | |
| * Mostly decided by owner himself | 3 (15.00) | 11 (73.33) | 14(40.00) | |
| * Partly being briefed with other family members and labour | 7(35.00) | 3(20.00) | 10 (28.57) | |
| * Not at all | 10(50.00) | 11(6.67) | 11 (31.52) | |
| **B. Housing system of Buffalo enterprises:** |  |  |  | |
| **Type of Housing facilities:** |  |  |
| * Traditional Buffalo shed without fencing | 3 (15.00) | 8 (53.33) | 11(31.42) | |
| * Fencing housing system | 5(25.00) | 2(13.33) | 7(20.00) | |
| * No arrangement of housing | 12(60.00) | 5(33.33) | 17(48.57) | |
| **Nature of house for buffalo enterprises:** |  |  |  | | |
| * Shawn’s/ Leaf’s made house | 3 (15.00) | 0 (00.00) | 3(8.57) | |
| * Tin’s made house | 17 (85.00) | 11(73.33) | 28(80.00) | |
|  |  |  |  | |
| **C. Feeding practices of Buffalo enterprises:** |  |  |
| **Nature of feeding practices:** |  |  |  |
| * Open grazing at open field | 8(40.00) | 11(73.33) | 19(54.28) |
| * Open grazing with paddy straw feeding | 10(50.00) | 3(20.00) | 13 (37.14) |
| * Dry roughages and green grasses | 2(10.00) | 1(6.67) | 3(8.57) |

**Source: Field Survey, 2015**  **(Figures in the parentheses indicates percentage)**

**Table-4: Productive and reproductive parameter of buffalo’s under milking by herd sizes.**

**Source: Field Survey, 2015 (Figures in the parentheses indicates percentage)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Types of Data** | | **Number of Buffalo with categories of Enterprise by herd Sizes** | | | |
| **Herd Size-1**  **(< 30 Buffalos)**  **N=20 (160)** | | **Herd Size-2**  **(> 30 Buffalos)**  **N=15 (155)** | **ALL Farm**  **(N=315)** |
| **Ave. lactation length of per buffalo:** | |  | |  |
| 180-220 days | | 48(30.00) | | 19(12.25) | 67 (30.79) |
| 220-260 days | | 112(7.00) | | 136 (87.74) | 248(78.73) |
| **Ave. Milk yield per Buffalo per day:** | |  | |  |  |
| 1-2 liters | | 63(39.37) | | 17(10.62) | 110(140) |
| 2-4liters | | 97(60.62) | | 108(69.76) | 205(79.33) |
|  | |  | |  |  |
| **Ave. Length of calving interval:** | |  | |  |  |
| 350-450 days | | 50 (31.25) | | 72(46.45) | 124(39.36) |
| 450-550 days | | 110(68.75) | | 83(53.54) | 193(59.38) |
|  | |  | |  |  |
| **Ave. age of puberty:** | |  | |  |  |
| 3-4 yrs  4-5 yrs | | 60(37.50)  100(62.50) | | 90(58.06)  65(41.93) | 150(96.77)  165(50.76) |
|  |  | |
|  | |  | |  |  |
| **Ave. dry period:**  5-6month  6-7 month | |  | |  |  |
| 30(18.75)  130(81.25) | | 55(35.48)  100(64.51) | 85(26.98)  230(73.01) |
|  | |  | |  |  |
| **Ave. Conception rate:** | |  | |  |  |
| Single time | | 0(0.00) | | 0(0.00) | 0(0.00) |
| 2 to 3 times | | 30(80) | | 40(83.79) | 70(21.53) |
| Above 3 times | | 130(20) | | 115(10.61) | 245(75.38) |

**3.5 Productive and Reproductive traits of Buffalo Dairying cows**

Productive and reproductive traits of observed dairy buffaloes are shown in (Table-4)**.** Results from above table it was found the most of the farms 78.73% reported that,the average length of lactation of the observed buffaloes under two categories of dairy were found between 220 to 260 days. In case of (Herd 1) and (Herd 2) average milk yield per day per buffalo was 2 to 4 liters and it was reported highest number farms 79.33 % in case of Herd 2. The average length of calving interval was found 450 to 550 days level considering all farms and the dry period of cows was found highest as per reported by farm owners (73.01%) under 6 to 7 months.

**3.6. Disease and health care management of buffaloes**

**3.6.1. Major diseases of buffaloes**

Major diseases of buffaloes in experimental area are presented in (Table 5). In the experimental areas, four major diseases of buffaloes were found. Those were: Hemorrhagic Septicemia (H.S.), Mastitis, Foot and Mouth Disease (FMD), Black Quarter (BQ), Mastitis. Almost 16.50% buffalo farmers claimed about the occurrence of HS. More than 18% buffalo farmers claimed about Black Quarter (BQ). Almost 8.8% buffalo farmers claimed about FMD, 9.84% buffalo claimed for mastitis and 2.53% buffalo claimed for BQ. This indicates that the buffaloes of experimental area were more susceptible to HS. Because of the buffalo farmers of the experimental area had little knowledge on the causes of these diseases. This was due to lack of proper training of farmers on buffalo rearing.

**3.6.2. Practices of vaccination, deworming and AI**

The vaccination practice vaccination, deworming and AIare presented in (Table 6). In the study areas 74.28% farmers performed vaccination in their buffaloes, though 25.71% farmers did not perform any vaccination. Almost 77.14% farmers conscious about deworming while 22.85% farmers were not interested to give any anthelmentics to their buffaloes. AI has not established in our country. Many farmers do not know about it. So, only 25.71% farmers did AI for oestrous synchronization.

**Table-05: Disease occurrence of buffalo cows in small scale dairy farms at different categories of farm:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Types of Data** | **Number of Buffalo with categories of Enterprise by herd Size** | | | | | |
| **Herd Size-1**  **(< 30 Buffalos)**  **N=20 (160)** | | **Herd Size-2**  **(> 30 Buffalos)**  **N=15 (155)** | | **ALL**  **N=35** | |
| **Diseases available in the study areas:** | **No. of cases** | **Percent** | **No. of cases** | **Percent** | **No of cases** | **Percent** |
| HS | 25 | 15.62 | 27 | 1.74 | 52 | 16.50 |
| FMD | 15 | 4.76 | 13 | 8.38 | 28 | 8.88 |
| BQ | 5.0 | 1.58 | 3 | 1.93 | 8 | 2.53 |
| Mastitis | 16 | 5.07 | 15 | 9.67 | 31 | 9.84 |

**Source: Field Survey, 2015 (Figures in the parentheses indicates percentage)**

**Table-06: Practices of vaccination, deworming and AI of buffalo cows in small scale dairy farms at different categories of farm**

|  |  |  |  |
| --- | --- | --- | --- |
| **Types of Data** | **Number of Buffalo with categories of Enterprise by herd Size** | | |
| **Herd Size-1**  **(< 30 Buffalos)**  **N=20** | **Herd Size-2**  **(> 30 Buffalos)**  **N=15** | **ALL**  **N=35** |
| **Perform vaccination** |  |  |  |
| **Yes** | 14(70.00) | 12(80.00) | 26(74.28) |
| **No** | 06(30.00 | 03(20.00) | 09(25.71) |
| **Perform deworming** |  |  |  |
| **Yes** | 13(65.00) | 14(93.33) | 27(77.14) |
| **No** | 07(35.00) | 01(6.66) | 08(22.85) |
| **Performing AI** |  |  |  |
| **Yes** | 05(25.00) | 04(26.67) | 09(25.71) |
| **No** | 15(75.00) | 11(73.33) | 26(74.28) |

**Source: Field Survey, 2015 (Figures in the parentheses indicates percentage)**

**3.7. Assessing of cost, Returns and farm profitability of small-scale buffalo dairy farming.**

The purpose of this section is to assess the costs, returns and farm profitability of small scale commercial buffalo dairying practices under different categories of farms.The items of costs included in this study were feeds, labour, veterinary, deworming, medicine and treatment, breeding cost, housing, production losses due to diseases and sickness and interest on capital. The total costs per cow per lactation were classified into cash and non-cash costs. Cash costs were those cost which the dairy cow owners had to pay out of their pocket to acquire the inputs. On the other hand, non-cash costs were estimated for home supplied feeds, family labour, interests on the value of a dairy buffalo cows, interest on housing value, interest on operating capital and depreciations of hosing cots etc. On the returns side, gross returns, net returns above total costs and net returns above cash costs were determined and analyzed in this study.

**3.8 Costs of small scale dairying at different categories of farms:**

The required costs per cow per year in small scale buffalo dairying are presented in table-9. The total costs per buffalo cow per year were estimated at Tk.20345.35, Tk.and Tk.17003.70 for herd size 1 and herd size 2 respectively. It was found that the cash expenses shared the major part of the total costs and accounted for Tk. 9433.35 Tk.6311.20. The non-cash expenses per lactation year per dairy buffalo stood at Tk. 10910, Tk. and Tk. 10692.50 for herd size 1 and herd size 2, respectively. The item wise costs of rearing per dairy cows per year were estimated and analyzed as below:

**3.8.1 Feed cost of rearing dairy Buffaloes:**

Feed Cost was not one of the major cost item of rearing buffalo cows, They grazed freely and mostly took naturally occurring grasses, only at the time of natural calamities they were supplied with few mixed bona paddy and green grass or kalai leaves which cost only Tk. 6425 and Tk. 6395 in both herd respectively which was accounted for 74% of the total cost. The total feed cost in both farm were almost similar.

**Table-7: Yearly costs per dairy buffalo by categories of buffalo enterprises**

**and herd sizes**.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Types of Data** | **Number of Buffalo with categories of Enterprise by herd Sizes** | | | | | | | | | |
| **Herd Size-1**  **(< 30 Buffalos)**  **N=20 (150)** | | | **Herd Size-2**  **(> 30 Buffalos)**  **N=15 (179)** | | | **ALL**  **(N=35) (329)** | | | **% in Total**  **Cost** |
| **Non-cash** | **Cash** | **Total** | **Non cash** | **Cash** | **Total** | **Non cash** | **Cash** | **Total** |
| Mixed bona paddy and green grass grazing | **4275.00** | **2150.0** | **6425.00** | **5345.00** | **1050.0** | **6395.00** | **4810.00** | **1600.00** | **6410.00** | **34.88** |
| Green Grass/Kalai grazing | **2105.00** | **750.00** | **2855.00** | **1850.00** | **625.00** | **2475.00** | **1977.50** | **687.50** | **2665.00** | **14.50** |
| Labour Cost | **2150.00** | **3565.10** | **5715.10** | **1275.00** | **2125.00** | **3400.00** | **1712.50** | **2845.05** | **4557.55** | **24.80** |
| Veterinary care with  Deworming Medicine and treatment | **-** | **1050.00** | **1050.00** | **-** | **875.00** | **875.00** | **-** | **962.50** | **962.50** | **5.24** |
| Breeding Cost(A.I) | **-** | **250.00** | **250.00** | **-** | **210.00** | **210.00** | **-** | **230.00** | **230.00** | **1.25** |
| Production losses due to  Disease Infection and  sickness | **-** | **657.50** | **657.50** | **-** | **750.00** | **750.00** | **-** | **407.75** | **407.75** | **2.22** |
| Interest on operating cost  (Accounted @12 rate of interest) | **-** | **1010.75** | **1010.75** | **-** | **676.20** | **676.20** | **-** | **843.48** | **843.48** | **4.59** |
| **Sub-total (V.C)** | **8530.00** | **9433.35** | **17963.35** | **8470.00** | **6311.20** | **14781.20** | **8500.00** | **7576.28** | **16076.28** | **87.48** |
| Cost of Housing | **1355.00** | **-** | **1355.00** | **1177.00** | **-** | **1177.00** | **1266.00** | **-** | **1266.00** | **6.89** |
| Land rent | **1025.00** | **-** | **1025.00** | **1045.50** |  | **1045.50** | **1035.00** | **-** | **1035.00** | **5.63** |
| **Total Cost (T.C)** | **10910.00** | **9433.35** | **20345.35** | **10692.50** | **6311.20** | **17003.70** | **10801.00** | **7576.28** | **18377.28** | **100.00** |

**Source: Field Survey, 2015**  **(Figures in the parentheses indicates percentage)**

**3.8.2 Labour Cost** **of rearing buffaloes**

In order of importance, the labour cost came first to feed cost shown in (Tables 9). It showed that the total labour costs per lactation year per cow were estimated at Tk.5715.10, Tk.3400 which shared in respective to total cost was found 24.80%. The labour cost of Herd 2 was higher than Herd 1. The labour was required for providing services for housing, grazing, milking and management of buffalo cows of farmers.

**3.8.3 Cost for Housing and Renting Land**:

Buffalos are mainly reared on char where plenty of water available for their wallowing for their thermoregulation. Most of the farmers kept them in ‘Bhatan’. So, it costs a little for their housing. For housing of all buffalos of each herd per every year it took Tk.13500 and Tk.11700 respectively which was 6.89% of the total cost. Sometimes some people rent Char or canal for their buffalo. Land is rented on year wise. For renting purpose the farmers spent Tk.1035 and Tk. 1025 respectively per year.

**3.8.4. Veterinary charges of rearing buffaloes**

The costs of veterinary charges were calculated by taking into account the actual cost, incurred by the farm owners for a milch cow per lactation year. Doctor’s fees and medicines were the two major components of the total veterinary charges. The total veterinary charges per lactation per cow were amounted to be Tk. 1050 and Tk.92.50 in both herds, respectively. The veterinary charges were covered about 5.24% of the total cost.

**3.8.5. Artificial insemination charge of Rearing dairy buffaloes**

Though AI is common for dairy cattle but it’s a rare scenario for buffalo in Bangladesh. But recently a project name “Buffalo Unnonyn Prokolpo” under DLS has been lunched in Bhola district for the development of the genetic potential of the buffalo. For AI Government does not take any money but AI technician takes some money from owner when they go to Bhatan/home for AI. AI is done through frozen semen and it is imported from Italy. The average artificial insemination cost per cow was found Tk.250 and Tk.230 for Herd 1 and Herd 2 respectively. Thus, the above estimated results indicated that, the total costs per cow per lactation year were found higher in case of Herd1 than Herd 2.

**3.8.6. Cost of capital of Rearing Dairy buffalo Cows**

The interest on the operating capital was also charged at the rate 12 percent per annum. Interest on operating capital was computed by the following formula: **Interest = Operating Cost × rate of interest /2.** The average costs of operation capital per year per buffalo cow were estimated Tk. 1010.75 and Tk.843.80and Tk.2030 for both herds respectively.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table-8: Yearly per milch buffalo’s returns by categories of buffalo enterprises and herd Size.**   |  |  |  |  | | --- | --- | --- | --- | | **Types of Data** | **Number of Buffalo with categories of Enterprise by herd Sizes** | | | | **Herd Size-1**  **(< 30 Buffalos)**  **N=20 (160)** | **Herd Size-2**  **(>30 Buffalos)**  **N=15 (155)** | **ALL**  **(N=35) (315)** |  |  |  |  |  | | --- | --- | --- | --- | | * Income earned from selling of milk | **47800.00**  **(73.53)** | **42439.09**  **( 73.19)** | **45119.55**  **(72.74)** | | * Ave. Value of calves of buffalo | **17500.00**  **( 27.47)** | **15000.00**  **( 26.98)** | **16250.00**  **(27.26)** | | * Gross Return (in BDT) | **65300.00**  **(100.00 )** | **57439.09**  **(100.)** | **61369.55**  **(100.00)** | | * Gross Margin per dairy buffalo per year (in BDT) | **55866.65** | **51127.89** | **53497.27** | | * Net Return per dairy buffalo per year * (in BDT) | **44954.65** | **40435.39** | **42695.02** | | * BCR over gross cost (un-discounted) | **1:6.91** | **1: 8.10** | **1:7.51** | | * BCR over total cost (un-discounted) | **1:3.21** | **1:3.01** | **1:3.11** | |

**Source: Field Survey, 2015 (Figures in the parentheses indicates percentage)**

**4. Returns from Dairy Enterprise of Rearing Dairy Cows:**

The purpose of this section is to determine the gross and net returns of small scale commercial buffalo dairying practices of different categories of farms per buffalo per year over estimated cash and total costs. The returns from dairy buffalo consisted of selling of milk and selling calves. The average sale proceeds of milk were calculated on the basis of the average lactation period (228days), average quantity of milk produced per day per cow (2.1 litres) and the average price received by farm owners per litre of milk directly (Tk.100). It was assumed that the buffalo calves were sold out just after lactation period. The average value of calf was estimated on the basis of the farmer’s expectation (Tk. 17000). (Table-8) showed that, the gross return per lactation year per dairy buffalo stood at Tk.65300 and Tk.57439.09 for both Herd size1 and Herd size 2, respectively. The average returns from selling milk per lactation year were found Tk. 47800 and Tk. 42439 respectively which was accounted for 73.43%, 73.19 percent of respective gross returns for Herd 1 and Herd 2. The average returns of produced calf were found Tk. 17000 for all categories of farms. The Gross margin per cow per lactation year over cash were estimated at Tk.55866.65 and 51127.89 and net return over total costs were also estimated in Tk.44954.65, Tk.,40435.39 respectively for small, medium and large farms. The Benefit Cost Ratio (BCR) was accounted for **1:7:51** **and 1:3.11** respectively for both herds.

**Fig:-1 Farm profitability**

The results regarding returns of small scale commercial dairy buffaloes enterprises were indicated that, the net profit per buffalo per lactation per year resulted higher in case of herd size-1 than that Herd size-2 of presented in table-8 & Fig-1 in the study areas.

**Table-9: Average milk selling price by categories of buffalo enterprises and herd Size.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Particulars** | **Response to owners with ca Buffalo by herd Sizes** | | |  |
| **Herd Size-1**  **< 30 Buffalos (N=20)** | **Herd Size-2**  **> 30 Buffalos (N=15)** | **ALL (N=35)** | |
| Direct Channel (Farm point to nearest market consumers) | 95.00 | 90.00 | 92.50 | |
| Indirect Channels (Farm point to other traders) | 110.00 | 105.00 | 107.50 | |
| All | 102.50 | 97.50 | 100.00 | |

**Source: Field Survey, 2015.** **(Figures in the parentheses indicates percentage)**

**Table-10: Problems of rearing dairy buffalo by categories of buffalo enterprises and herd Size.**

**Response to owners with categories Buffalo by herd Sizes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Particulars** | **Herd Size-1**  **(< 30 Buffalos)**  **N=20** | **Herd Size-2**  **(> 30 Buffalos)**  **N=15** | **ALL**  **N=35** |
| Lack of natural grazing land | 18(90.00) | 15 (100.00) | 35(94.28) |
| Problem of natural calamities e.g. Flood | 20(100.0) | 15 (100.00) | 35 (100.0) |
| Low prices and variation in demand of milk. | 07(35.00) | 08 (53.33) | 15(42.85) |
| Scarcity of quality medicine | 18(90.00) | 13(86.67) | 31 (88.57) |
| Low conception rate and silent heat | 15(75.00) | 12 (80.00) | 27(77.14) |
| Insufficient Vet. Care/services | 19(95.00) | 14 (93.33) | 33(94.28) |
| Occurrences of Animal Diseases | 16(80.00) | 8(53.33) | 24(68.57) |
| Lack of proper training & extension Services | 14(70.00) | 5 (33.33) | 19(48.57) |
| High labour cost | 15(75.00) | 8 (53.33) | 31 (65.71) |
| Lack of credit facilities and high interest rate of credit | 10(50.00) | 2 (13.33) | 20 (40.00) |
| High price of feeds and fodder | 16(80.00) | 11 (73.33) | 23(46.00) |

**Source: Field survey, 2015** **(Figures in the parentheses indicates percentage)**

**4.1. Problem Faced by the Small scale Buffalo Dairy farm owners**

The problems of buffalo dairying practices under different categories of small scale commercial dairy farms as reported by the farm owners are presented in (Table 10). Brief description of the reported problems by different categories of small scale dairy farm owners regarding milk production and marketing of milk by the dairy are mentioned as under:

Floods cause an extensive loss to the economy of the buffalo farmers. As Bhola is a land of rivers. Every year floods loss a lot to the buffalo farmers. Almost 100% farmers are the victim of the natural calamities. About 94.28% farm owners reported insufficient veterinary care and service was one of the major problems. The grazing facilities or pasture land are very limited especially during cropping season, rainy season and dry period in coastal areas in Bangladesh. Almost 94.28% farmers faced the same problem at the study area. Animal health and production of milk depend on quality feeds, proper rationing and regular standard feeding practices timely. About 46% buffalo farmers claimed high price of feed.About 77.14% farm owners had no knowledge about reproductive physiology of buffalo so they could not diagnose properly sign of heat. It was also a crucial problem. It was found that 68.57% animals were suffered with different types of endemic diseases (Table 10) due to insufficient veterinary service.

**Table-11: Suggested measures to improve rearing system of buffalo by categories of buffalo Enterprises and herd Size.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Particulars of Suggestive Measures** | **Response to owners with categories Buffalo by herd Sizes** | | |
| **Herd Size-1**  **(< 30 Buffalos)**  **N=20** | **Herd Size-2**  **(> 30 Buffalos)**  **N=15** | **ALL**  **N=35** |
| Providing incentives in price with supply of quality feeds and fodder. | 20(100.00) | 15(100.00) | 35(100.00) |
| Preventive measures against natural calamities | 18 (88.0 | 12(80%) | 30 (85.71) |
| Supply of quality semen and skilled AI personnel. | 12(48.00) | 14(93.33) | 26(74.28) |
| Provides adequate Veterinary services and health care Facilities. | 20 (80.00) | 15 (100.00) | 35(100.00) |
| Ensure proper feeding, housing and management practices | 12 (68.00) | 13 (86.67) | 28(71.42) |
| Provides proper training & Extension services | 14 (70.00) | 15 (100.00) | 29 (82.85) |
| Supply of low/free interest credit facilities | 20(100) | 15(100.00) | 35(100.00) |

**Source: Field survey, 2015.** **(Figures in the parentheses indicates percentage)**

**4.2. Probable measures to be taken to solve the Problems**

In order to overcome the problems of small scale buffalo commercial dairying practices at coastal areas and making the such dairying practices more profitable, the dairy buffalo farm owners of the study area were asked to suggest how to overcome the identified problems. Following suggestions were put forward by the buffalo farm owners for overall development of small scale dairying practices as a sustainable level by the different sizes of dairy farm according to herd sizes. (Table-11) showed the solutions as conceived the dairy farm owners.

Natural available green grasses and fodder production may be decreased due to the fellow land came under cultivation and built in housing infrastructures rapidly in Bangladesh. The cropping intensity of land also increased for meet up expanding demand of food stuffs of the people in our country. So for introducing sustainable and commercial dairy farming practices by livestock entrepreneurs HYV fodder production should be extended throughout the country by providing technological knowledge of the dairy buffalo farm owners in fellow land and low-lying lands and local road sides. Quality bull and semen will give birth of healthy calves of the conceived buffalo cows under different categories of commercial buffalo dairy farms. But the AI facilities not yet developed adjacent of the study area and AI technicians should train up to recover these problem and about 74.28% farmers reported to ensure quality semen. Diseases hardly affect the herd productivity of the dairy farms and reduced the economic profitability of the farms. Thus to make sustainable the opportunities of veterinary services and health care facilities should be available by Govt. and private level simultaneously and almost 100% farmers reported to ensure veterinary services, low or interest credit facilities.

**CHAPTER IV**

**DISCUSSION**

In my present study it was revealed that farmers of middle aged (42.85%), education with primary to higher secondary (85.71%) were strongly involved with buffalo farming than aged or young people and education with primary or graduation which was supported by the earlier report of the Sarker *et al*., (2013).In my present investigation it was demonstrated that for 80% farmers buffalo dairying was subsidiary income than main occupation.74.28% farmers performed vaccination and 77.14% farmers performed deworming program in their herd which was consistent with the finding of Sarker *et al.,* (2013). In the current study it was seen that buffaloes were mostly (16.50%) affected by HS which was similar with the finding of Ali *et al.,* (2012) who found 16.25% buffaloes were affected with HS. Amin *et al.,* (2012) reported that buffaloes were mainly reared on extensive housing system with free grazing which was alike to my present study. According to Karim *et al.,* (2013) the average lactation length of indigenous buffalo cows were 286.12 ± 11.27, average of calving interval 547.92 ± 10, average daily milk yield 3.33 ± 0.68 liters in Mathbaria upazila in pirojpur district, which was partially consistent with my present study where average lactation length was 228 days, average daily milk production 2.1 litre. The variation might be due to random sampling, variation in geo-climatic condition, feeding and nutitritional status, managemental status, of buffaloes of two regions. The study also showed that the price of buffalo milk was comparatively higher in indirect channel than the direct channel. My present also described that buffalo farming was profitable which was fully resembled with the publication of Karim *et al.,* (2012) and Sarker *et al.,* (2013).From my present study it was also observed that the problems of buffalo rearing in my study area were lack of natural grazing land, high price of feeds and fodder, low conception rate and silent heat, Insufficient Vet. Care/service which supported the report of Saadullah *et* *al.,* (2009).

**CONCLUSION**

Buffalo is not only a source of draught power for agriculture and transport but also provide milk and meat in the diet of Bangladeshi people. It also plays an important role in the economy of Bangladesh. Plenty of surface (river) water available for seasonal fodder cultivation on common lands; extensive waterways available for cheap transportation and their excellent capacity to thrive in extreme environmental condition make them more concentrated in the coastal belts of Bangladesh. Though buffaloes are small tractor” for farmers, and its milk and meat are nutritionally rich and it is a potential resource for our economic development, they are not so established in our country. My present study it revealed that buffalo rearing was highly profitable and a crucial pathway for poverty alleviation. It could be concluded that the owners of buffaloes of the coastal areas of Bangladesh do not rear their buffaloes in a scientific way rather than following traditional ways. The research showed that the re-productivity and productivity of the buffaloes were almost regular comparing with other published reports. Proper feeding, housing, veterinary services, the sound breeding programmes are necessary to improve genotype of these indigenous buffaloes. However, as the research was fresh of its type in these areas, a well planed widespread investigation should be made for identifying the existing problems and possible solutions of buffalo rearing for further development by the initiatives of Government and respective NGOs in the study areas.

**LIMITATION OF THE STUDY**

* **Duration of the Study:** The time period of the study was very limited as the data were collected at my internship placement at UVH in Bhola Sadar. Single survey was done for collection of data only due to time shortage.
* **Fewer co-operations by Farm personnel:** At the period of data collection the farm personnel/owners did not found well cooperative to collect the data, so it took multiple visits for a single survey. Sometimes the owners were not present, so data were collected from farm labours. Their tendency was always to hide the information regarding farm income and other personal profiles.

**CHAPTER V**

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***BIOGRAPHY***

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*Huddling into the exuberant verdure the beautiful Bhola Island is like a sight of paradise. The journey of my life started from there and the beauty of incredible emerging of colors of the nature , the bonding with my family, flying seagulls make me more softer, more patient and more confident to cherish my desire.*

*The desire of my life is to construct a world where human and animal will live happily together in the nature. So I am proud of my journey through CVASU to prostrate my desire of being a veterinarian. I have interests in Molecular biology, Animal and Poultry Nutrition. I want to work on developing Buffalo gemone with excellent genetic merit of livestock in Bangladesh.*

*I like Reading books and travelling. I hope by the bless of GOD, my parents and my respected teachers journey of my life will be longer with all of my interest.*