

**EVALUATION OF PRODUCTIVE AND REPRODUCTIVE
PERFORMANCE OF NON-DESCRIPT BUFFALOES OF BHOLA
DISTRICT IN BANGLADESH**

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**EVALUATION OF PRODUCTIVE AND REPRODUCTIVE
PERFORMANCE OF NON-DESCRIPT BUFFALOES OF BHOLA
DISTRICT IN BANGLADESH**

by

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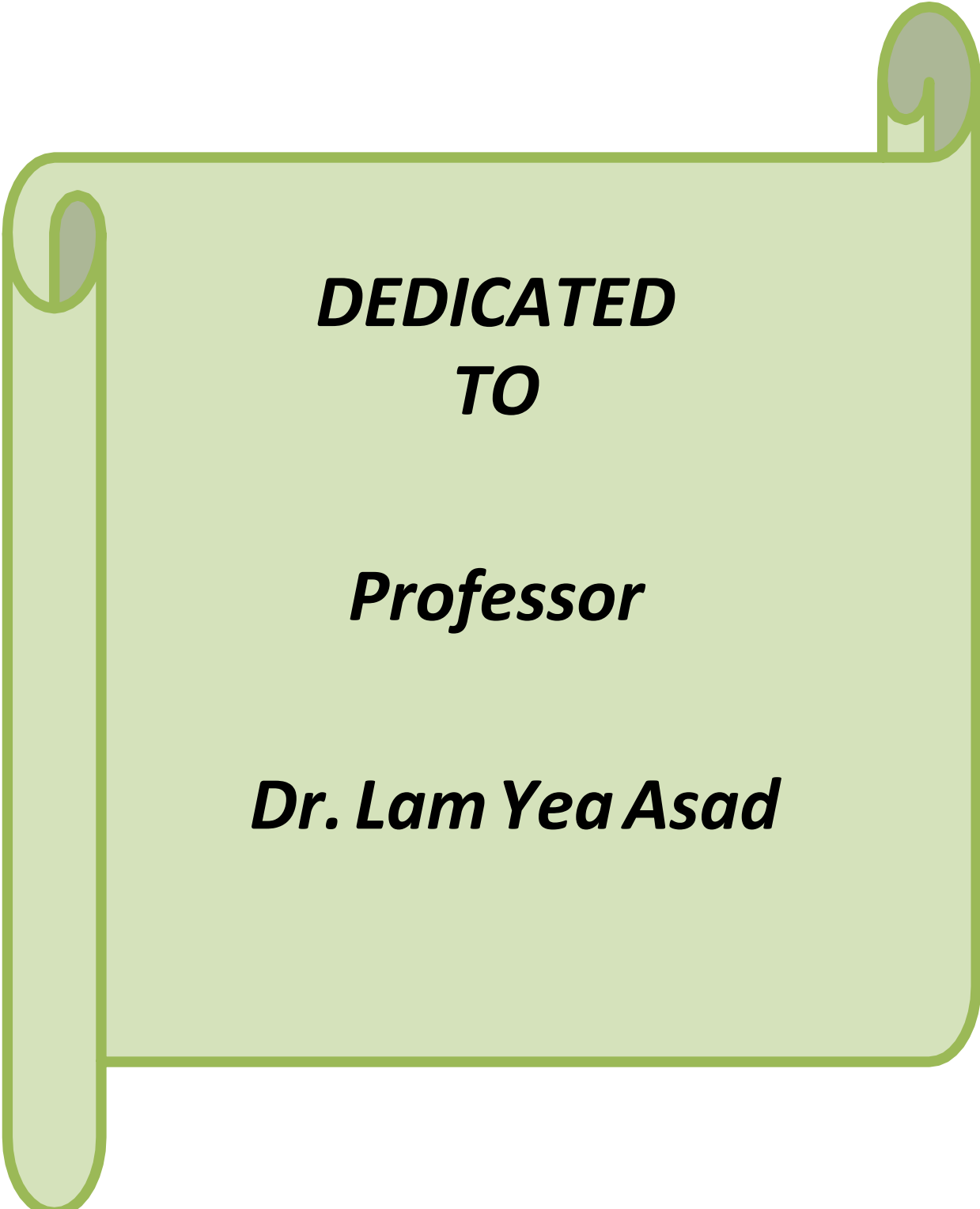
CERTIFICATE

*This is to certify that the thesis entitled, “Evaluation of Productive and Reproductive Performance of Non-Descript Buffaloes of Bhola District in Bangladesh.” Submitted to the Department of Animal Nutrition, Genetics and Breeding, Faculty of Animal science and veterinary medicine, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (MS) in Animal Breeding & Genetics** embodies the result of a piece of Bonafede research work carried out by Rokaiya Sultana Heera. Registration No.: 20-11126 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.*

I further certify that such help or source of information, as has been availed of during the course of this investigation has been duly acknowledged by her.

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LIST OF ABBREVIATIONS AND SYMBOLS

ABBREVIATION	FULL WORD
%	= Percentage
>	= Greater than
<	= Less than
±	= Plus minus
AI	= Artificial Insemination
ANOVA	= Analysis of Variance
BAU	= Bangladesh Agricultural University
B.C	= Before Christ
BLRI	= Bangladesh Livestock Research Institute
DF	= Degree of Freedom
DLS	= Department of Livestock Services
<i>et al.</i>	= Associate
FAO	= Food and Agricultural Organization
FAOSTAT	= Food and Agricultural Organization Statistics
GDP	= Gross Domestic Product

LIST OF ABBREVIATIONS AND SYMBOLS (CONT'D.)

ABBREVIATION	FULL WORD
Gm	= Gram
Kg	= Kilogram
MS	= Mean Square
No.	= Number
NS	= Not Significant
SAARC	= South Asian Association for Regional Co-operation
SAS	= Statistical Analysis System
SAU	= Sher-e-Bangla Agricultural University
SAURES	= Sher-e-Bangla Agricultural University Research System
SE	= Standard Error
SS	= Sum of Squares
Viz	= Namely

EVALUATION OF PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF NON- DESCRIPT BUFFALOES OF BHOLA DISTRICT IN BANGLADESH

ABSTRACT

The aim of the study was designed to Evaluate the Productive and Reproductive Performance of Non-Descript Buffaloes of Bhola District in Bangladesh. Data were collected through interview of randomly selected 349 members of Bhola districts who were involved in buffalo farming. The investigation revealed that majority of the buffalo farmers were poor (46.47%) and non-poor (45.07%), the education level of the farmers were below primary (70.48%), and up to primary (31.48%), age of the farmers were over 25 years old (72.27%), and among them about 96.36% farmers were male. The family members of the buffalo farmers were average 5.28. The mortality rate of buffalo calves and buffalo, were 17.08% and 8.75% respectively. The average lactation period was 5.77 ± 0.26 months, gestation period 285 ± 0.70 days average milk production per day was 1.56 ± 0.25 liter and total milk production in lactation period was 268.08 ± 6.34 liters. The reproductive parameters like age at first heat 37.2 ± 0.25 months, age at first pregnancy 38.4 ± 0.26 months, number of services per conception 1.77 ± 0.26 number, duration between estrus and insemination 10.09 ± 0.70 hours, post-partum heat period 106.20 ± 0.36 days, dry period 167.8 ± 0.67 days, calving interval 660.8 ± 0.97 days, Pregnancy rate 28.03 ± 0.02 % and age at puberty 455.33 ± 0.27 days respectively. All (100%) of the farmers practice natural insemination technique, where 63.1% farmers have their own bull for breeding. No farmer use record keeping system in the farm. There is a believe that buffalo meat is not good for health that the reason consumer refuse to take buffalo. There is no available market for buffalo meat. This study would help the policy makers to take necessary strategies to improve the socio-economic status of buffalo farmers in this region of Bangladesh.

Key words: Housing system, Feeding system, Production, Reproduction, Buffaloes.

CHAPTER-I

INTRODUCTION

Buffalo is an important animal to boost up agricultural economy (Suhail *et al.*, 2009). Buffaloes, the so-called 'Black gold' holds a strategic place next to the cattle in the overall livestock economy in Bangladesh contributing as an important source of milk, meat, drought power, hides and skins etc. (Islam *et al.*, 2017). However the productivity of buffalo is reported to be lowest (410 kg milk per buffalo per year) in Bangladesh compared to other south Asian countries. Studies show increasing buffalo population with the increasing demand of milk and meat in course of time in the country (Islam *et al.*, 2017, Siddiki *et al.*, 2016). The buffalo population is estimated to be 1.45 million (FAO, 2014) and it has earlier been reported that the coastal regions possess approximately 40% of the total buffalo population in Bangladesh (Huque and Borghese, 2013). Despite the vital importance of the species and livelihood dependency of farmers in the subsistence farming system, the productivity of non-descript non-descriptive buffaloes in the coastal belt is far below than the actual potential of the animal. Several factors are thought to be responsible for this lower level of buffalo production among which reproduction is one of the most important considerations. Efficient reproductive performance is very much essential for increased productivity and profitability of buffalo farming, particularly the performance of dairy buffalo production system relies on the acceptable level of reproduction. Thus, the reproductive efficiency is considered as an important parameter, which ultimately influences the economics of milk production of buffalo cows. Report has been shown that any impairment of normal reproductive function results in infertility and sterility of animals, leading to economic losses due to widening of dry period and calving interval, and thus reducing calving and lactation yield during the lifetime of animals (Agarwal *et al.*, 2005). Several reports have been published regarding reproductive and productive parameters as well as management systems of buffaloes (Hadi 1965; Faruque *et al.*, 1994; Kirabi 1995; Suhail *et al.*, 2009 and Dhaka *et al.*, 2017) however, information on those parameters in buffaloes are scanty in the coastal areas of Bangladesh. Thus a need was felt to understand the current status of reproductive performance and management of buffaloes in Bhola,

the most southern district of Bangladesh. The information obtained from this study could serve as a basis of exploitation of genetic potential, adopting appropriate breeding policies and good management practices for buffalo development in the area.

This study was done at Bhola during the period from July 2022 to January 2023. The study was conducted with the following objectives:

- To determine the productivity and reproductive performance of non-descript buffaloes.
- To identify the problems of raising non-descript buffaloes and to make recommendations for better production performance of non-descript buffaloes.

CHAPTER-II

REVIEW OF LITERATURE

The review of literature in any research is necessary as it provides a new dimension for reviewing the stock of knowledge and information relevant to the proposed research. This knowledge gives us a guideline for furnishing the future research problem and validation the existing findings. The focus of this chapter is to provide a selective review of the research works which are related to the present study.

2.1 Housing System of Buffalo

Amin *et al.*, (2015) reported that buffaloes were mainly reared on extensive housing system with free grazing which was a like to the present study. About 96% buffalo takes their wallowing facilities traditionally, only 4% are need to provide pond facilities. About 83.38% traditionally held in their shelter. In case of household rearing system at least 8 hours provide housing about 16%. Rajadurai *et al.*, (2018) who found that all the dairy farmers were facing the problems like high construction cost, lack of land for the construction of housing for the animals, low level of knowledge on scientific housing.

2.2 Breeding management of buffalo

Rajadurai *et al.*, (2018) where reported repeat breeding, unavailability of breeding bull, less availability of artificial insemination facility for buffaloes and low conception rate through artificial insemination were the major breeding constraint in buffalo rearing. In case of India, Records indicate that India, the inter-regional difference in the reproductive trait of Indian water buffalo is very little. The breeding and corresponding calving seasons are almost same throughout India, the breeding season from September to February and the calving season from July to November. During this breeding period, the bulls have been found to be very active sexually and the quality and quantity of semen is very high particularly during winter (November to February).

2.3 Productive and Reproductive Parameters of Buffalo

According to Rahman *et al.*, (2020): the average number of buffalos reared per farmers was 3.57 ± 0.34 , body Weights(kg) of buffalo cows, bulls, calves 239.53 ± 13.20 , 229.43 ± 10.11 , 17.21 ± 0.84 kg, respectively, average lactation period was 169.13 ± 4.49 days and milk production was 264.084 ± 6.34 kg. In this study we found average post-partum heat period 3.55 ± 0.3 days, dry period 5.50 ± 0.6 days, calving interval 22.26 ± 0.97 months, age at puberty 3.1 ± 0.25 years, age of first pregnancy 3.4 ± 0.26 years, numbers of service per conception 1.77 ± 0.26 times, duration between estrus and insemination 10.09 ± 0.70 hours and in-breeding percentage 77.28% in Bholá Siddiki *et al.*, (2016) reported that number of services per conception, post-partum heat period, age of first heat, age at first pregnancy and inter calving period of buffaloes in the selected area were 3.42 times, 5.31 months, 3.46 months, 3.82 months at Lalpur upazilla of Natore district in Bangladesh. We found some deviation in case of the number of services per conception and calving interval with Siddiki *et al.*, (2016). Siddiki *et al.*, (2016) reported that number of services per conception, post-partum heat period, age of first heat, age at first pregnancy and inter calving period of buffaloes in the selected area were 3.42 times, 5.31 months, 3.46 months, 3.82 months and 13.5 months respectively at Lalpur upazilla of Natore district in Bangladesh. We found some deviation in case of the number of services per conception and calving interval with Siddiki *et al.*, (2016).

2.4 Age at First Calving of Buffalo

Paul *et al.*, (2015) The average age at first calving of non-descript buffalo at Pirojpur and Barguna were age at first calving is 50.88 ± 1.71 and 51.00 ± 1.80 months respectively in Pirojpur and Barguna. In the present study, the age at first calving of

non-descript buffaloes were more or less similar to findings of Fadzil (1969) conducted an experiment on swamp buffalo in Malaysia under village condition and found that the minimum age at first calving was 3 years, 3 months and 26 days. Shah *et al.*, (1987) found that the average age at first calving of rural Nili-Ravi buffaloes in Punjab was 45.84 ± 0.19 months. On the other hand, Abeygunawardena *et al.*, (1995) in their experiment showed that the average age at first calving of Surti, Murrah, Nili-Ravi and Lankan buffaloes (Local) were 51.80, 55.00, 52.10 and 44.90 months respectively. Paul *et al.*, (2015) reported that Average post-partum heat period of non-descript buffalo at Pirojpur and Barguna were 153.30 ± 6.13 and 153.44 ± 6.78 days respectively in Pirojpur and Barguna. Wishy and Sawaf (1971) observed that the first post-partum estrus was 146.2 days.

2.5 Post-partum heat Period

Rao *et al.*, (1973) described that the mean post-partum heat interval was 125.73 days (Range 121-149 days). On the other hand, Liu *et al.*, (1985) reported that post-partum heat period for triple crossbred, Nili-Ravi, Murrah, and non-descript were 70.0 ± 27.8 , 127.9 ± 107.2 , 94.7 ± 82.7 and 30-169 days respectively. Parvez *et al.*, (1994) found that the post-partum heat interval average was 171.79 ± 4.01 days. So, the findings of the present study were more or less similar to the findings of various authors as mentioned above.

2.6 Calving Interval

Paul *et al.*, (2015) reported that, the average calving interval was 547.92 \pm 10.88 and 547.24 \pm 14.32 days respectively in Pirojpur and Barguna. Sheikh and Mohamed (1967) who found that first calving interval of Egyptian buffalo was 484.74 ± 2.86 days. Fadzil (1969) carried out an experiment on swamp buffalo in Malaysia under village condition and found that calving interval was 639 days. Parera *et al.*, (1987) found that average calving interval of non-descript buffaloes in Srilanka was 384.9 ± 62.9 days. The calving interval ranged from 329 to 816 days. The findings of present study were almost similar.

2.7 Lactation Length

Karim *et al.*, (2013) the average lactation length of non-descript 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 nutritritional status, managerial 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. Paul *et al.*, (2015) reported that the average lactation length of non-descript buffalo at Pirojpur and Barguna the lactation length was 286.12 ± 11.27 days and 290.44 ± 10.92 days in Pirojpur and Barguna, respectively. Faruque *et al.*, (1994) mentioned that the lactation length of non-descript buffaloes in the coastal area was 270 days. Ranjhan *et al.*, (1989) who found that the lactation period of Murrah and Nili-Ravi was 272 and 275 days respectively.

2.8 Gestation Period

Paul *et al.*, (2015) shows that, the average gestation period was 319.12 ± 4.69 days and 319.70 ± 5.93 days respectively in Pirojpur and Barguna. Sheikh and Mohamed (1967) found that the gestation period of Egyptian buffalo was 316.70 ± 0.19 days. Joshi *et al.*, (1968) showed that the length of gestation in Indian buffaloes averaged 308 ± 9.6 days.

2.9 Birth Weight

Paul *et al.*, (2015) shows that, the average birth weight was 24.21 ± 4.00 and 24.12 ± 3.60 kg respectively in Pirojpur and Barguna. In the present study the birth weight of non-descript buffalo calves was more or less similar to the findings of Chantalakhana *et al.*, (1984) who reported that the average birth weight of swamp male and female calves are 28.60 and 26.97 kg, respectively in Thailand.

Hussen (1990) reported that the average birth weight of non-descript buffaloes was 26.74 ± 2.4 kg in Tangail district. Faruque and Amin (1994) mentioned that the average birth weight of non-descript buffaloes of the coastal areas of Bangladesh was 22.00 ± 3.50 kg which was almost similar to the findings of presented study.

CHAPTER-III

MATERIALS AND METHODS

3.1 Study area

The study was conducted in Bhola Sadar, Lalmohon, Charfassion, Borhanuddin, Daulatkhan upazila under Bhola district of Bangladesh during July 2022 to January, 2023.

3.2 Population size and data structure

There were around 7000 heads in five upazila from the mentioned area. Data will be collected on 349 farmers around 22000 of these animals through farmer`s interview with pre-described questionnaire and visiting the areas.

3.3 Preparation of interview schedule

A structured interview schedule was carefully prepared, keeping the objectives of the study. The questionnaire contained in the schedule was simple, direct and easily understandable by the respondents. The schedule contained a closed and open form of questions. Some scales were included in the schedule, wherever necessary. The draft interview schedule was pre-tested in the study area. After preparation of interview schedule, data collection was started.

3.4 Data Collection

Data were collected through interview of randomly selected farmers who were involved in buffalo farming. Before doing the interview, the objectives of the study were explained clearly to the respondents. Then the questions were asked in a very simple manner with explanation wherever necessary. To collect necessary information from the respondents, both interviewing and observation were applied. The relevant data for this study were collected without biasness. Respondents had no specific written documents of their own. So, they had to rely on memory. In order to minimize the owner`s memory bias, two visits were made in a season and questions were asked in a logical sequence so that the respondents could recollect facts easily. Interviews were normally conducted in the respondent`s house during their leisure time. Data were collected on the personal and socio-economic characteristics of the respondents, particularly their sex, age, household size, educational attainment farm

management practices; production and reproduction characteristics of buffaloes, cost and benefits from buffaloes' farming in studied areas.

3.5 Parameters of the study

To evaluate the reproductive performance of buffalo the following parameters were considered.

3.5.1 Age at puberty

Age at puberty is the time between birth and first estrus. When a buffalo show the sign of first heat that age counted as age of puberty. By observing the wagging tail, swelling, watery discharge from vulva, jumping tendency to other and bleating detect the age of puberty of buffalo.

3.5.2 Lactation length

Lactation length means the period when a milch gives milk. Lactation period of buffalo is longer than other animals. The total period when milch gives milk were recorded in data sheet and analysed.

3.5.3 Milk yield

Milk yield means milk production expressed in kg per animal and day. The milk yield of non-descript buffaloes were recorded in data sheet and analysed.

3.5.4 Gestation period

Pregnancy period is known as gestation period. During gestation period a fetus develops, beginning with fertilization and ending at birth. This period is the time of conception to parturition.

3.5.5 Birth weight

Weight at first calving mean the body weight of calf when gives birth first. The body weight of calfs were recorded in data sheet for analysis.

3.5.6 Age at first calving

Age of first calving indicate that time when buffalo give first birth of a calf. It is the time of interval between birth and first calving. That is recorded in data sheet for analysis.

3.5.7 Calving interval

The term calving interval refers to the period from one calving to next calving. Data were recorded in data sheet for analysis.

3.5.8 Postpartum heat period

Postpartum heat period means first heat after calving. Data were recorded in data sheet for analysis.

3.5.9 Data Management and Analysis

Collected data were coded after ending of data collection and then compiled, tabulated and analyzed the data. The local units were converted into standard units. The qualitative data were transferred into quantitative data by appropriate scoring technique. Data were carefully tabulated and descriptive analysis was performed by using (SAS, 1998, version 6.12) software.



A



B



C



D

Plate 1: Representative photograph showing

- A. Data Collection from a Farm**
- B. Coming back home after day long grazing**
- C. Buffaloes are grazing**
- D. Milking of a Buffalo**



A



B



C



D

**Plate 2: Representative photograph showing
Data Collection from a Farm Owner (A, B, C, D)**

CHAPTER-IV

RESULTS AND DISCUSSION

It is important to understand the socio-economic characteristics of buffalo farmers in the study area. This was done with the hope of identifying those characteristics that may impact and also help to explain the farming activities of the area. The characteristics considered were age, farmer's economic status, educational attainment, household size, land acquisition type, farming experience, agricultural land, and farm output sizes etc.

4.1 Socio economic status of the farmers:

Characteristics of farmers are shown in Table-1. A total of 81% farmers were males and 19% were females. The average age of the respondent farmers was up to 37 years. Respondents were distributed into four age groups as. Farmers were found in all age groups. A wide variety of professions, from producer to day labourer, were found in this area (Table 1). There are two dominant job sectors in Bangladesh: government and non-government (BBS, 2018). Non-government job opportunities include self-employment and other informal jobs like ready-made garment shopkeeper, rickshaw pulling, maid and street hawking work. The low-income households were day labourers, rickshaw pullers, bus helpers, barbers, shop keepers, and CNG (compressed natural gas driven vehicle) drivers around the area. Among these greatest concentration (42.41%) in the group of was farmers than labour , Goash and rakhal.

The educational qualification of owners is shown in the Figure-1, which indicates that the majority of farmers (70.48%) had completed primary school. Whereas, about 10.31% of farmers were above secondary. Only 19.19% of farmers were with secondary education.

Every buffalo farmer has no land of his own, average land size was 280 decimals of the farm.

Table 1: Socio economic status of the farmers

Variables	Categories	Number of Farmers (n)	Percentage (%)
Age	Up to 30 years	187	53.58
	31-45	94	26.94
	46-60	47	13.46
	Above 60	21	6
Education	Primary	246	70.48
	Secondary	67	19.19
	Above secondary	36	10.31
Household	Up to 5 members	331	94.84
	Above 5 members	18	5.15
Land	Landless(0-.49b acres)	173	49.57
	Small (.5-2.5 acres)	112	32.09
	Medium (2.5-7.49 acres)	37	10.60
	Large (7.5+ Acres)	27	7.73
Gender	Male	282	80.80
	Female	67	19.20
Occupation	Farmer	148	42.41
	Labour	93	26.65
	Goash	79	22.64
	Rakhal	29	8.30

■ Male ■ Female

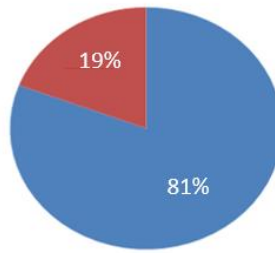


Figure 1. Satus of the respondent by gender

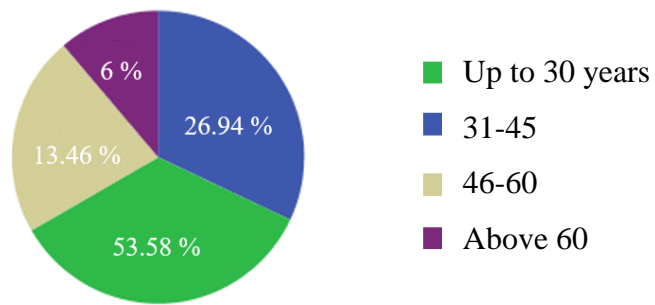


Figure 2. Age Distribution

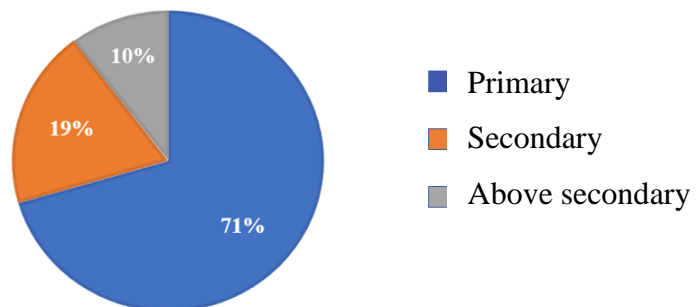


Figure 3. Education level of farmers

4.2 Housing system of the farmers:

The results in house types of the members are shown in Table- 2, respectively. In the study area, 261 farmers house were in Kacha Tin Shed,44 farmers in semi paka , 26 farmers houses were in Govt. Shed and 18 farmers in paka house . Most of the member in the collected data were made house by Kacha Tin Shed (about 92%).

Table 2: Housing system of the farmers:

Variables	Description	n	%	Cumulative %
House type	Paka	18	5.16	5.16
	Semi-paka	44	12.61	17.77
	Kacha Tin Shed	261	74.79	92.56
	Govt. house	26	7.44	100.00

4.3 Housing and Feeding Management Practices Among the Farmers:

This is the most important factor for buffalo rearing. More than 2 % farmers had no house for their buffalos where as 95% farmers had traditional buffalo shed without fencing and 4% farmers had fencing housing system for buffaloes (Table 3). In case of 85.10 % farm the buffalos were depend on natural grazing,14.89% buffalos fed on open grazing with paddy straw but anyone have no use any feed technology. Amin *et al.*, (2015) reported that buffaloes were mainly reared on extensive housing system with free grazing which was alike to the present study. About 96% buffalo takes their wallowing facilities traditionally, only 4% are need to provide pond facilities. About 83.38% traditionally held in their shelter. In case of household rearing system at least 8 hours provide housing about 16%. All of are occurs due to these results are similar to the findings of Rajadurai *et al.*, (2018) who found that all the dairy farmers were facing the problems like high construction cost, lack of land for the construction of housing for the animals, low level of knowledge on scientific housing.

Table 3: Housing and feeding Management Practices among the Farmers.

Types of Data	Number of farmers with categories Buffalo enterprise	
	Farmers Number=349	Percentage (%)
A. Type of Housing facilities:		
• Traditional Buffalo shed without fencing	331	94.84
• Fencing housing system	12	3.84
• No arrangement of housing	7	2.00
B. Housing system of Buffalo enterprises:		
• Shawn's/ Leaf's made house	311	95.98
• Tin's made house	13	3.98
C. Wallowing Facilities		
• Natural Water resource	311	95.98
• Natural with pond facilities	13	3.98
D. Housing period		
• Traditional	291	83.38
• Up to 8 hours	58	16.62
E. Feeding practices of Buffalo enterprises: Nature of feeding practices:		
• Open grazing at open field	297	85.10
• Open grazing with paddy straw feeding	52	14.89
• New technology	0	0

4.4 Breeding Management Practices:

In this study found that 100 % farmers are habituated with natural breeding but they have no maintain breeding bull and also breeding record. Largest number of farmers shows that buffalo breeding season mainly summer season. Most of them are confirmed pregnancy by no diagnosis, some are confirmed by AI technicians. The present study revealed that repeat breeding followed by less conception rate through no artificial insemination, non-availability of A.I. facility and non-availability breeding bull (96.85%) are the constraints faced by the farmers in breeding management (Table 4). Rajadurai *et al.*, (2018) where reported repeat breeding, unavailability of breeding bull, less availability of artificial insemination facility for buffaloes and low conception rate through artificial insemination were the major breeding constraint in buffalo rearing. Incase of India, Records indicate that India, the inter-regional difference in the reproductive trait of Indian water buffalo is very little. The breeding and corresponding calving seasons are almost same throughout India, the breeding season from September to February and the calving season from July to November. During this breeding period, the bulls have been found to be very active sexually and the quality and quantity of semen is very high particularly during winter (November to February). In this study we found average post-partum heat period 3.55 ± 0.3 days, dry period 5.50 ± 0.6 days, calving interval 22.26 ± 0.97 months, age at puberty 3.1 ± 0.25 years, numbers of service per conception 1.77 ± 0.26 times, in Bhola which is similar to this study.

Table 4: Breeding Management Practices Among the farmers.

Variables	Description	n	%	Cumulative %
Method of heat detection	Natural	349	100	100
	Using technology	0	0	100.00
Breeding Technique	Natural	349	100	100
	AI	0	0	100.00
Breeding season	Summer Season	318	91.11	91
	Rainy Season	20	5.73	97
	Winter Season	11	3.15	100
Pregnancy Diagnosis By	No diagnosis	349	100	100
	AI technician	0	0	0
	Using technology	0	0	0
Maintain Breeding Bull	No	338	96.85	96.85
	yes	11	3.15	100.00
Breeding Record Keeping	Yes	14	4.01	4.01
	No	335	95.99	100.00
Time of showing heat	Morning (5:00-11:59) am	33	9.4	9.4
	Noon (12:00-2:59) pm	12	3.4	12.8
	Afternoon (3:00-4:59) pm	07	2.05	14.84
	Evening (5:00-6:59) pm	5	1.43	16.27
	Early Night (7:00-10:59) pm	14	4.01	20.83
	Late night (11:00 pm – 12:30 am)	279	79.94	100

4.5 Reproductive Parameters of Buffalo:

I observed that average age at first calving was 37.2 ± 0.25 months, post-partum heat period 106.20 ± 0.36 days, dry period 167.8 ± 0.67 days, calving interval 660.8 ± 0.97 days, and age at puberty 455.33 ± 0.27 days in buffaloes of the selected areas (Table 5). In this study, almost all respondents viewed that average age at first heat that was the puberty of buffaloes was (3.1 years) which is similar to the findings of Siddiki *et al.*, (2016) reported that number of services per conception, post-partum heat period, age at first calving of buffaloes in the selected area were 3.42 5.31 months, 3.46 months, 3.82 months and 13.5 months respectively at Lalpur upazilla of Natore district in Bangladesh.

Table 5: Reproductive Parameters of Buffalo.

Parameters	(Mean+ SEM)
Age at first calving (Months)	37.2 ± 0.25
Service per conception (Number)	1.77 ± 0.26
Post-partum heat period (Day)	106.20 ± 0.36
Calving interval (Days)	660.8 ± 0.97
Age at Puberty (Day)	455.33 ± 0.27
Dry period (Days)	167.8 ± 0.67

4.5.1 Age at first calving:

I observed that the average age at first calving 37.2 ± 0.25 months, but Paul *et al.*, (2015) The average age at first calving of non-descript buffalo at Pirojpur and Barguna were age at first calving is 50.88 ± 1.71 and 51.00 ± 1.80 months respectively in Pirojpur and Barguna. In the present study, the age at first calving of non-descript buffaloes were more or less similar to findings of Fadzil (1969) conducted an experiment on swamp buffalo in Malaysia under village condition and found that the minimum age at first calving was 3 years, 3 months and 26 days. Shah *et al.*, (1987)

found that the average age at first calving of rural Nili-Ravi buffaloes in Punjab was 45.84 ± 0.19 months. On the other hand, Abeygunawardena *et al.*, (1995) in their experiment showed that the average age at first calving of Surti, Murrah, Nili-Ravi and Lankan buffaloes (Local) were 51.80, 55.00, 52.10 and 44.90 months respectively.

4.5.2 Post-partum Heat Period

I observed that Average post-partum heat period of non-descript buffalo in Bhola is 106.20 ± 0.36 . But Paul *et al.*, (2015) reported that Average post-partum heat period of non-descript buffalo at Pirojpur and Barguna were 153.30 ± 6.13 and 153.44 ± 6.78 days respectively in Pirojpur and Barguna. Wishy and Sawaf (1971) observed that the first post-partum estrus was 146.2 days. Rao *et al.*, (1973) described that the mean post-partum heat interval was 125.73 days (Range 121-149 days). On the other hand, Liu *et al.*, (1985) reported that post-partum heat period for triple crossbred, Nili-Ravi, Murrah, and non-descript were 70.0 ± 27.8 , 127.9 ± 107.2 , 94.7 ± 82.7 and 30-169 days respectively. Parvez *et al.*, (1994) found that the post-partum heat interval average was 171.79 ± 4.01 days. So, the findings of the present study were more or less similar to the findings of various authors as mentioned above.

4.5.3 Calving Interval

I observed that Average calving interval of non-descript buffalo at Bhola is 660.8 ± 0.97 . But Paul *et al.*, (2015) reported that, the average calving interval was 547.92 10.88 and 547.24 14.32 days respectively in Pirojpur and Barguna. The findings of the present study were more or less similar to the findings of Sheikh and Mohamed (1967) who found that first calving interval of Egyptian buffalo was 484.74 ± 2.86 days. Fadzil (1969) carried out an experience on swamp buffalo in Malaysia under village condition and found that calving interval was 639 days. Parera *et al.*, (1987) found that average calving interval of non-descript buffaloes in Srilanka was 384.9 ± 62.9 days. The calving interval ranged from 329 to 816 days. The findings of present study were almost similar

4.6 Productive Parameters of Buffalo:

I observed that the mortality of buffalo calves, buffalo, average buffalo mortality was 17.08%, 8.75%, 13.62%, respectively and the average number of remaining buffaloes after death per family were 3.83, and results are shown in Table 6. The average lactation period was 5.77 ± 0.26 Months, gestation period 285 ± 0.70 days average milk production per day is 1.56 ± 0.25 liter and total milk production in lactation period is 268.08 ± 6.34 liters.

According to Karim *et al.*, (2013) the average lactation length of non-descript 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 nutritritional status, managerial 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.

According to Rahman *et al.*, (2020): the average number of buffalos reared per farmers was 3.57 ± 0.34 , average lactation period was 169.13 ± 4.49 days and milk production was 264.084 ± 6.34 kg. In this study we found average post-partum heat period 3.55 ± 0.3 days, dry period 5.50 ± 0.6 days, calving interval 22.26 ± 0.97 months, age of first heat 3.1 ± 0.25 years, age of first pregnancy 3.4 ± 0.26 years, numbers of service per conception 1.77 ± 0.26 times, duration between estrus and insemination 10.09 ± 0.70 hours and in-breeding percentage 77.28% in Bhola which is similar to this study.

Table 6: Productive Parameters of Buffalo.

Parameters	(Mean+ SEM)
Milk Production per Day per Buffalo (Liter)	1.56±0.25
Lactation length (Days)	182.5±0.26
Gestation Period (Days)	285±0.70
Total milk production per Lactation period (Liter)	268.08±5.36
Birth weight (Kg)	17.21±0.67

4.6.1 Lactation Length

I observed that the average lactation length of non-descript buffalo in Bhola is 182.5±0.26, Where Paul *et al.*, (2015) reported that the average lactation length of non-descript buffalo at Pirojpur and Barguna the lactation length was 286.12 11.27 days and 290.44 10.92 days in Pirojpur and Barguna, respectively. The findings of the present study were showed the similarity with the findings of Ranjan *et al.*, (1989) who found that the lactation period of Murrah and Nili-Ravi was 272 and 275 days respectively. Faruque and Amin (1994) mentioned that the lactation length of non-descript buffaloes in the coastal area was 270 days.

4.6.2 Milk Yield

I observed that the average milk yield of non-descript buffalo at Bhola is 1.56±0.25 liter per day but Paul *et al.*, (2015) reported that, the average milk yield is 3.43±0.744 kg and 3.33±0.68 kg respectively in Pirojpur and Barguna.

4.6.3 Gestation Period

I observed that the average gestation period of non-descript buffalo at Bhola is 285 ± 0.70 But Paul *et al.*, (2015) shows that, the average gestation period was 319.12 ± 4.69 days and 319.70 ± 5.93 days respectively in Pirojpur and Barguna. Sheikh and Mohamed (1967) found that the gestation period of Egyptian buffalo was 316.70 ± 0.19 days. Joshi *et al.*, (1968) showed that the length of gestation in Indian buffaloes averaged 308 ± 9.6 days. So, the findings of the present study were more or less similar to the findings of various authors as mentioned above. The data collected from buffalo owners are more or less similar to the scientific study.

4.6.4 Birth weight

I observed the average birth weight of non-descript buffalo at Bhola is 17.21 ± 0.67 kg. But Paul *et al.*, (2015) shows that, the average birth weight was 24.21 ± 4.00 and 24.12 ± 3.60 kg respectively in Pirojpur and Barguna. In the present study the birth weight of non-descript buffalo calves was more or less similar to the findings of Chantalakhana *et al.*, (1984) who reported that the average birth weight of swamp male and female calves are 28.60 and 26.97 kg, respectively in Thailand. Hussen (1990) reported that the average birth weight of non-descript buffaloes was 26.74 ± 2.4 kg in Tangail district. Faruque and Amin (1994) mentioned that the average birth weight of non-descript buffaloes of the coastal areas of Bangladesh was 22.00 ± 3.50 kg which was almost similar to the findings of presented study.

CHAPTER-V

SUMMARY AND CONCLUSION

The study was conducted in Bhola Sadar, Lalmohon, Charfassion, Borhanuddin, Daulatkhan upazila under Bhola district of Bangladesh during July 2022 to January, 2023, with a view to Evaluate the Productive and Reproductive Performance of Non-Descript Buffaloes of Bhola District in Bangladesh. The present experiment was conducted under the Department of Animal Nutrition, Genetics and Breeding in Sher-e-Bangla Agricultural University (SAU), Dhaka. The objective of research work was to determine the productivity and reproductive performance and identify the problems of raising non-descript buffaloes and to make recommendations for better production performance of non-descript buffaloes. This study involves only field work for accumulation of data. The total 349 data were taken from the area respectively.

I observed that the average age at first calving was 37.2 ± 0.25 months. The average post- partum heat period of non-descript buffalo in Bhola is 106.20 ± 0.36 days. The average calving interval of non-descript buffalo at Bhola is 660.8 ± 0.97 days. The average age at puberty was found 455.33 ± 0.27 days. The average dry period 167.8 ± 0.67 days. The average lactation period was 5.77 ± 0.26 Months, gestation period 285 ± 0.70 days average milk production per day is 1.56 ± 0.25 liter and total milk production in lactation period is 268.08 ± 6.34 liters. The average lactation length of non-descript buffalo in Bhola is 182.5 ± 0.26 days. The average milk yield of non-descript buffalo at Bhola is 1.56 ± 0.25 liter per day. The average gestation period of non-descript buffalo at Bhola is 285 ± 0.70 days. The average birth weight of non-descript buffalo at Bhola is 17.21 ± 0.67 kg.

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 programs are necessary to improve genotype of these non-descript 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 (like sufficient Matirkillia for disaster management,

govt. pasture land in khas land and new arise Char, Proper strategic deworming, mass vaccination as well as veterinary coverage, improve AI facilities for getting rid of inbreeding problem, etc.) of Government and respective NGOs in the study areas. The performance of buffalo cows in different agro-climatic zones depends upon managerial practices adopted, sires used for breeding, environmental conditions and variations in feed and fodder availability. So, genetic and non-genetic factors have major impact on the productive and reproductive performances of domestic Buffalo. It is therefore, necessary to give emphasis on improvement in the husbandry practices and incorporation and evaluation of high merit genetic germplasm.

RECOMMENDATIONS

- 1) To formulate a practical and promotional policies concentrating on buffalo production system, processing and commercialization of buffalo products and ultimate growth of economic benefits for MEs, adequate consultation with experts, target groups, the concerned stakeholders and government will be necessary.
- 2) Coastal buffalo rearing practices required a modern shelter, year-round fodder production and processing to use during lean season to cope up with climatic changes and required rapid disaster response mechanism in place to promote buffalo sub sector for optimum production.
- 3) In cluster area, rural enterprises use basic non-descript knowledge, skills and tools that can be used to set up and manage micro-enterprises. What they need is awareness, inspiration, healthy business strategies and integrated support from outside. Extensive education and training services must be provided:
 - i. To develop farmer's capacity through initial start-up plans, marketing approaches, and strategies to grow business and marketing management, troubleshooting skills and risk assessment and management, etc.
 - ii. To increase farmer's performances through providing training and financial support on establishment of environmentally sustainable buffalo farm, milk processing (chilling and others) facilities availability at farmers level to combat economic stresses like covid-

19 pandemic, cyclones, flood etc. to maintain a sustain milk market.

- iii. The production and premium market linkage for safe buffalo meat products such as diversified meat items like meat ball, steak, T-bone, Tender loin, fillet etc. are required. Sustainable production and commercialization of diversified value-added buffalo dairy product processing as bioyogurt, buffalo cheese, buffalo mozzarella etc.

CHAPTER- VII

REFERENCES

- Abeygunawardena, H.W.D., Abaywansa, M.M.A. and Parera, O. (1995). A comparative study of reproduction and productive characteristics of indigenous swamp and Exotic River buffaloes in Srilanka. Proc. Reg. Symp, Paredeniya, Srilanka.
- Agarwal, S.K., Singh, S.K. and Rajkumar, R. (2005). Reproductive disorders and their management in cattle and buffalo: A review. *Indian J. Anim. Sci.* 75 (7): 858-873.
- Amin, M.R., Siddiki, M.A., Kabir, A.K.M.A. and Faruque, M.O. (2015). Status of buffalo farmers and buffaloes at Subarnachar upazila of Noakhali district. *Progressive Agriculture*, 26:71-78.
- Balzer, N. and Hess, U. (2009). Climate change and weather risk management: evidence from index-based insurance schemes in China and Ethiopia. In S. Were Omamo, U. Gentilini, & S. Sandström (Eds.), *Revolution: From food aid to food assistance* (pp. 103e122). ROME: World Food Program.
- BBS. (2018). Bangladesh Bureau of Statistics.
- Biswas, H., Dey, A.R., Begum, N. and Das, P.M. (2013). Epidemiological aspects of gastrointestinal parasites in buffalo in Bhola, Bangladesh. *Indian J. Anim. Sci.* 84: 245-250.
- Canbolat, O. (2012). Buffalo breeding and current situation in Turkey. *J. Tarım Türk* 30:176-180.
- Chantalakhana, C.P., Bunyavejchewin, S., Faarungsrng. and Kamnerdpetch, V. (1984). Estimates of heritability and relationship between body weight, weight gains and measurements of the swamp buffalo. *Buffalo Bulletin.* 3:3-5.

- Dhaka, B.L., Meena, G.S. and Meena, N.L. (2017). Reproductive performance of buffaloes under field conditions in Bundi district of Rajasthan, India. *Int. J. Curr. Microbiol. App. Sci.* 6(4): 595-599.
- FAO. (2014). FAOSTAT Database. Food and Agriculture Organization of the United Nations, Rome, Italy. Available at: <https://faostat.fao.org/>.
- Faruque, M.O. and Hossain, M.I. (2003). The Effect of Feed Supplement on the Yield and Composition of Buffalo Milk. *Italian J. Anim. Sci.*, 6: 488- 490.
- Faruque, M.O. and Amin, M.R. (1994). Non-descript buffaloes in the coastal area of Bangladesh, part-I. Distribution pattern and Phenotypes. *Bangladesh J. Training and development* 7(1):83-85.
- Fazdil, M. (1969). A study on calving frequency and age at the time calving of Malaysian swamp buffaloes. *Malaysian Ag. J.* 47(2):203-206.
- Hadi, M.A. (1965). A preliminary study of certain productive and reproductive characters of Marathwada buffaloes of Maharashtra State. *Indian Vet. J.* 42(9): 692-699.
- Huque, Q.M.E. and Borghese, A. (2013). Status and Perspectives of Buffalo in Bangladesh. *Buffalo Bulletin.* 32 (2): 1179-1183.
- Hussen, M.S. (1990). Performance of non-descript buffaloes in Tangail district M Sc Thesis Bangladesh Agriculture University, Mymensingh Bangladesh.
- Islam, S., Nahar, T.N., Begum, J., Deb, G.K., Khatun, M. and Mustafa, A. (2017). Economic evaluation of buffalo production in selected regions of Bangladesh. *J. Stock Forex Trad.*, 6:177.
- Joshi, S.C., Tomar, S.P.S. and Desai, R.N. (1968). Relative importance of maternal and environmental influences on pregnancy in buffaloes on military farming the north India. *Indian J. Dairy Sci.* 21(1):37- 42.

- Karim, M.R., Hossain, M.Z., Islam, M.R., Parvin, M.S. and Matin, M.A. (2013). Reproductivity, productivity and management system of indigenous buffalo (*Bubalus bubalis*) cows in coastal areas of Pirojpur and Borguna district of Bangladesh. *Progress. Agric.*, 24: 117-122.
- Kirabi, E. (1995). Buffalo population and production in Egypt. *Buffalo Newsletter* 3: 8.
- Liu, C.H., Chang, S.H. and Huang, H.P. (1985). The Chinese Indigenous buffaloes and their cross breeding. *Buffalo J.* 1(1): 9-18.
- Parera, B.M.A.O., Silva, L.N.A.D., Kuruwita, V.Y. and Karunaratne, A.M. (1987). Post-partum ovarian activity, uterine involution and fertility in Indigenous buffaloes at a selected village location in Srilanka. *Anim. Repr. Sci.* 14 (2):115-127
- Parvez, A., Aftab, M.K., Jaheer, A. and Hayet, S.H. (1994). Inheritance of some reproductive traits in Nili-Ravi buffaloes. *Buffalo Bulletin* 13(1):13- 17.
- Paul., Alam, M.S., Sufian, M.K.N.B., and Matin, M.A. (2015). Production and reproduction performance of indigenous buffaloes in coastal area in Bangladesh. *Wayamba J. of Anim. Sci.* – ISSN: 2012-578X; P1168-P1172.
- Rahman, M.K., Sarkar, M., Sumon, M.K.A., Rahim, A., Nandi, R. and Hasan, M.M., 2020. Socio-economic Status of Buffalo Value Chain at Bhola District in Bangladesh. *Bangladesh Vet. J.* 54:1-8
- Rajadurai, V., Rajaganapathy, R., Ganesan, P., Ponnuvel, K., Natchimuthu, and Sreekumar, D. (2018). Constraints faced by the dairy farmers in Puducherry. *Int. J. Advanced Research in Biological Sci.*, 5(2): 96-99. DOI: 10.22192/ijarbs.2018.05.02.011.
- Ranjhan, S.K., Patricio,S., Faylon., Vincent, G., Momongan, V.G. and Cruz, L.C. (1989). Production responses in crossbred buffaloes for meat, milk, and draught. *Proc. Symp. on buffaloes' genotypes for small farm in asia.* Asia Univ. Pertanian Malaysia. Pp.168-185.

- Rao, B.R., Patel, V.G. and Thaman, S.S. (1973). Seasonal trend in reproductive behavior of surti buffaloes. *Indian Vet. J.* 50(5):413- 417.
- Sarkar, S., Hossain, M.M., Amin, M.R., Bainwad, D.V., Deshmukh, B.R., Thombre, B.M. and Chauhan, D.S. (2013). Socio-economic status of buffalo farmers and the management practices of buffaloes in selected areas of Bagerhat District of Bangladesh. *Bangladesh J. Anim. Sci.* 42: 158- 164.
- SAS Institute, Inc. (1998). SAS (Version 6.12) [Computer program]. Cary NC: Author.
- Sheikh, A.S. and Mohammad, A.A. (1967). The reproductive performance of the Egyptian buffalo. *J. of Anim. Prodn. (UAR)* 5: 99-117.
- Shah, S.K.R., Mir, F.A. and Usmani, R.H.I. (1987). The performance of rural Nili-Ravi buffaloes. *Indian J. Anim. prod.* 42(2):88-90.
- Siddiki, M.A., Amin, M.R., Kabir, A.K.M.A., Faruque, M.O. and Khandaker, Z.H. (2016). Socio-economic status of buffalo farmers and the performances of buffaloes at Lalpur upazila of Natore district in Bangladesh. *Bangladesh J. Anim. Sci.*, 44(3):157-165.
- Suhail, S.M., Qureshi, M.S., Khan, S., Ihsanullah., Durrani, F.R., (2009). Inheritance of economic traits of dairy buffaloes in Pakistan. *Sarhad J. Agri.* 25: 87-93.
- Wishy, A.B. and Sawaf, S.A. (1971). Reproduction in buffaloes in Egypt III Service period and its components. *Z. Tirez Zatch Biol.* 87-325-334.

APPENDICES

Appendix 1. Questionnaire of the Survey

Buffalo Production in Coastal Area				
1. Name	Village	Branch	Upazilla	District
2. Gender:	3. Age (Years):	4. Education level	5. Household size:	6. Land size:
a. Female		a. Illiterate		
b. Male		b. Primary level		
		c. Secondary		
		d. Higher secondary		
		e. Tertiary level		
7. Participation in off/non-farm activity:	1. Yes 2. No	8. Income size (BDT):	9. Household with off-farm income:	
Specify:				
8. Farm size	a. Small (<4)	9. Buffalo Rearing System		
a. Medium (5-10)		a. Bathan		
b. Large (>10)		b. Household		
10. Housing of buffalo arrangement	A. Types of House : a) Traditional b) Fencing c) No			
	B. Housing System: a) Shown/leaf made House b) Tin made			
	C. Wallowing Facilities: a) Natural Water b) Natural with Pond			
	D. Housing Period: a) Traditional b) Up to 8 hrs			
C. Breeds of Buffalo	a. Murrah	b. Nili-Ravi	c. Others	
D. Feed supply	E. Source of Grass			
a. Natural	a. Cultivated			
b. Supplemental	b. Natural			
F. Name of Cultivated fodder	a.		d.	
	b.		e.	
	c.		f.	

- G. Source of Supplemental feed a. Own source b. Purchase
- H. Name of Supplemental Feeding a. d.
 ingredients b. e.
- I. Time of showing heat b.Noon
 a. Morning d. Evening
 c. afternoon e. Late Night
 e. Early Night
- J. Source of Drinking water a. Pond
 b. Tube well
 c. River
- K. Maintaining Breeding Bull a. Yes b. No
- L. Types of Breeding a. AI
 b. Natural
- M. Breeding a. Natural Services
 b. Artificial Insemination
- N. Breeding Season a. Summer
 b. Rainy
 c. Winter
- O. Method of heat P. Pregnancy Q. Record Keeping
 Detection diagnosis a. Yes
 a. No b. No
 b. AI technician
 c. Using
 technology
 technology

	For Dairy buffalo	In Bathan Level
	A) Productive trait	
11	Birth weight (kg)	
12	Daily weight gain (kg)	
13	Mature weight (kg)	
14	Initial body weight (kg)	
15	Daily weight gain (kg)	
16	Final body weight (kg)	
	For milk production	In Bathan Level
17	Daily milk yield (0-3month) (Litre/cow/day)	

18	Daily milk yield (3-6month) (Litre/cow/day)	
19	Daily milk yield (6-9month) (Litre/cow/day)	
20	Lactation length (days)	
21	Lactation yield (Litre/cow)	
22	Milk production is same all the year?	
23	If the answer is no, please mention the season with amount?	Time/month
24	Pick milk production time	
25	Off pick milk production time	
26	Average milk production time	
	B) Reproductive trait	
27	Age at sextual maturity (year)	
28	Age at first calving (year)	
29	Postpartum heat period (days)	
30	Service per conception (No)	
31	Calving interval (month)	
32	Gestation period (days)	

Appendix 2. List of the sampled farmers

Name	Father/Husband Name	Vill/Chor	Upazila	District	Mobile No
Zakir Howladar	Abdul Goni Howlader	Chondroproshad	Bhola Sodor	Bhola	01771373813
Monir Howladar	Abdul Goni Howlader	Chondroproshad	Bhola Sodor	Bhola	01782006865
Faruq Howladar	Solaiman Howladar	Chondroproshad	Bhola Sodor	Bhola	01716595019
Rezaur Howladar	SiddiQ Howladar	Chondroproshad	Bhola Sodor	Bhola	01796632594
Zamal Howladar	Ayub Ali	Chondroproshad	Bhola Sodor	Bhola	01746643246
Mynuiddin Mistri	Munaf Mistri	Chondroproshad	Bhola Sodor	Bhola	01724617170
Abdul Goni Howladar	Ayub Ali Howladar	Chondroproshad	Bhola Sodor	Bhola	01792789778
Shah Alam Bepari	Sikandar Bepari	Chor Chondroproshad	Bhola Sodor	Bhola	01783244950
Mahbub Shikder	Mokbul Shikder	Chondroproshad	Bhola Sodor	Bhola	01761725562
Dulal Matbor	Rotton Matbor	Chondroproshad	Bhola Sodor	Bhola	01816163000
Kalam Bepari	Shahjahan Saji	Tumchor	Bhola Sodor	Bhola	01737570068
Chan Kha	Hafez Kha	Kunjapotti	Bhola Sodor	Bhola	01729561555
Ripon Bepari	Syed Bepari	Chor Chondroproshad	Bhola Sodor	Bhola	01887177734
Sohag Khan	Kanchon Khan	Chondroproshad	Bhola Sodor	Bhola	01712251241

Sattar Howladar	Rustom Howladar	Chondroproshad	Bhola Sodor	Bhola	01771470326
Babul Mistri	Munaf Mistri	Chorgazi	Bhola Sodor	Bhola	01724617170
Zakir Teli	Abdul Khalek Rari	Tumchor	Bhola Sodor	Bhola	01745733599
Kabir Teli	Abdul Khalek Rari	Tumchor	Bhola Sodor	Bhola	01798781494
Rotton Bauli	Kashem Bauli	Tumchor	Bhola Sodor	Bhola	01798781494
Boshar Majhi	Abdur Rahman Majhi	Tumchor	Bhola Sodor	Bhola	01751824556
Shahid Bepari	Eshak Bepari	Chondroproshad	Bhola Sodor	Bhola	01312448528
Jahanara	Nasib Bepari	Chondroproshad	Bhola Sodor	Bhola	01312448528
Runa Begum	Al Amin	KunjoPotti	Bhola Sodor	Bhola	01732569531
Harun Bepari	Hossain Bepari	KunjoPotti	Bhola Sodor	Bhola	01780526179
Nure Alam	Kanchon Mistri	KunjoPotti	Bhola Sodor	Bhola	01833086945
Anowar Hossain	Amir Hossain	Chondroproshad	Bhola Sodor	Bhola	01762443833
Shafiq Kha	Sofder Kha	Chondroproshad	Bhola Sodor	Bhola	01745366679
Mozammel Haque	Ledu Howladar	Kunjapotti	Bhola Sodor	Bhola	01623522939
Nasib Bepari	Ali Ahmad Kha	Chondroproshad	Bhola Sodor	Bhola	01727488107
Tofael Khondokar	Ponchom Ali	KunjoPotti	Bhola Sodor	Bhola	01795124859
Sohrab Howladar	Sobahan Khondokar	Chondroproshad	Bhola Sodor	Bhola	01770227350
Nuruddin Polban	Sekandar Polban	Chorkali	Bhola Sodor	Bhola	01744130923

Nesar Howladar	Abdullah Al Dalal	Pataveduria	Bhola Sodor	Bhola	01771373813
Dholu Howladar	Rustom Ali	Pataveduria	Bhola Sodor	Bhola	01784663746
Afsar Molla	Shaikul Molla	Pataveduria	Bhola Sodor	Bhola	01732267182
Kamal Kha	Moktar Kha	Chorgazi	Bhola Sodor	Bhola	01736206934
Dulal Kha	Eshak Kha	Chorgazi	Bhola Sodor	Bhola	01799664458
Sogir Majhi	Gura Majhi	Chorgazi	Bhola Sodor	Bhola	01745366679
Harul Howladar	Aolad Ali	Chor Hossain	Bhola Sodor	Bhola	01784968678
Air Hossain	Shahjahan Hossain	Chor Chondroproshad	Bhola Sodor	Bhola	01793967513
Ismail	Jonab Ali	Chor Veduria	Bhola Sodor	Bhola	017244952535
Monsur	Ismail	Chor Veduria	Bhola Sodor	Bhola	01712950753
Ibrahim Hossin Babul	Ismail	Chor Veduria	Bhola Sodor	Bhola	01719912414
Md. Ibrahim	Abdur Rob	Chor Chorkipara	Bhola Sodor	Bhola	01736673607
Kamrul	Hossain	Chor Chotkimara	Bhola Sodor	Bhola	01762480741
Faruk Koyeldar	Aijol Koyeldar	Chor Chotkimara	Bhola Sodor	Bhola	01736673607
Kabir Hadari	Siddiq	Chor Chotkimara	Bhola Sodor	Bhola	01763321071
Nirob	Jolil	Chor Chotkimara	Bhola Sodor	Bhola	01771070235
Khokon	Dulal	Chor Chotkimara	Bhola Sodor	Bhola	01739362472
Nurnobi	Md. Kanchon Lahiri	Chor Romesh	Bhola Sodor	Bhola	01795379125
Abu Sufiyan	Gaimuddin	Chor Romesh	Bhola Sodor	Bhola	01759918458

Lahiri					
Abul Kashem	Jalal Lahiri	Chor Romesh	Bhola Sodor	Bhola	01773054672
Abu Taher	Daimuddin Lahiri	Chor Romesh	Bhola Sodor	Bhola	n/a
Md. Miraj	Kanchon Lahiri	Chor Romesh	Bhola Sodor	Bhola	01798822971
Sobuj Lahiri	Kashem Lahiri	Chor Romesh	Bhola Sodor	Bhola	01937186911
Md. Hanif Mal	Haji Motaleb Hossain	Chor Romesh	Bhola Sodor	Bhola	01752847386
Monir Lahiri	Ojiul Lahiri	Chor Romesh	Bhola Sodor	Bhola	01317659725
Belayet Hossain Lahiri	Kubut Ali Lahiri	Chor Romesh	Bhola Sodor	Bhola	01770546707
Nasir Lahiri	Muslim Lahiri	Chor Romesh	Bhola Sodor	Bhola	01301075543
Nasir Lahiri	Habib Lahiri	Chor Romesh	Bhola Sodor	Bhola	01788752268
Najim Howladar	Hasan Howladar	Chor Romesh	Bhola Sodor	Bhola	01718859736
Hasan Howladar	Nuruzzaman	Chor Veduria	Bhola Sodor	Bhola	01718859736
Md. Kamal	Sobur	Poschim Ilisha	Bhola Sodor	Bhola	0172622670
Hanif Howladar	Rustom Howladar	Chor Veduria	Bhola Sodor	Bhola	01749990165
Sorowar Howladar	Hanif Howladar	Chor Veduria	Bhola Sodor	Bhola	01749990165
Al Almin	Moslehuddin	Chor Veduria	Bhola Sodor	Bhola	01768006765
Mizanur Rahman	Abdul Karim	Chor Veduria	Bhola Sodor	Bhola	01950973832
Md. Jasim	Abdul Gofur	Chor Samaiya	Bhola Sodor	Bhola	01736274012
Mohsin	Md. Josim	Chor Samaiya	Bhola Sodor		01797203848
Md. Oliur Rahman	Tofazzol Hossain Bepari	Chor Ilisha	Bhola Sodor	Bhola	01712431175

Omor Faruque	Tofazzol Hossain Bepari	Chor Ilisha	Bhola Sodor	Bhola	01712605941
Md.Zamal Howladar	Chanmiya Howladar	Bhola Sodor	Bhola Sodor	Bhola	01718660400
Liton Howladar	Chanmiya Howladar	Bhola Sodor	Bhola Sodor	Bhola	01739341120
Nizam Howladar	Chanmiya Howladar	Bhola Sodor	Bhola Sodor	Bhola	01718660400
Jewel Howladar	Chanmiya Howladar	Bhola Sodor	Bhola Sodor	Bhola	01796127160
Boshir Jomadar	Shajahan Jomadar	Ilisha	Bhola Sodor	Bhola	01759137539
Foysal Jomadar	Boshir Jomadar	Ilisha	Bhola Sodor	Bhola	01794888317
Kamal Molla	Kader Molla	Gupta Munshi	Bhola Sodor	Bhola	01710779986
Shahjahan Molla	Kader Molla	Gupta Munshi	Bhola Sodor	Bhola	01754841508
Nokib Jomadar	Boshir Jomadar	Ilisha	Bhola Sodor	Bhola	01759137539
Md. Kolimullah	Abdur Shukur	Bhola Sodor	Bhola Sodor	Bhola	01317860646
Jasim Forazi	Abdul Barek	Dokkhin Dhonia	Bhola Sodor	Bhola	01716646016
Abul Barek	Nur Mohammad	Dokkhin Dhonia	Bhola Sodor	Bhola	0196570529
Md Sohel	Md. Shahjahan Jomaddar	Dokkhin Dhonia	Bhola Sodor	Bhola	01729676917
Kutti Miya	Abdul Goni Masteri	Dokkhin Dhonia	Bhola Sodor	Bhola	01971110842
Parvej	Md. Shahjahan	Dokkhin Dhonia	Bhola Sodor	Bhola	0170947377
Nurnobi	Abdul Barek	Dokkhin	Bhola Sodor	Bhola	01965705496

		Dhonia			
Nur Mohammad	Kutti Miya	Dokkhin Dhonia	Bhola Sodor	Bhola	n/a
Liton Jomadar	Kalu Jomadar	Dokkhin Dhonia	Bhola Sodor	Bhola	01915793692
Mosleh Uddin	Ali Ahmed	Dokkhin Dhonia	Bhola Sodor	Bhola	01915793682
Javed	Mozammel	Dokkhin Dhonia	Bhola Sodor	Bhola	01990298242
Md. Rofi	Md. Sadek	Dokkhin Dhonia	Bhola Sodor	Bhola	01918733856
Ruhul Amin	Abdul Malek	Dokkhin Dhonia	Bhola Sodor	Bhola	01322570963
Md. Firoz	Abdul Kader Miyaji	Bhola Sodor	Bhola Sodor	Bhola	01743294803
Abdus Sattar	Abdul Kader Miyaji	Bhola Sodor	Bhola Sodor	Bhola	01711024074
Maolana Fozlur Rahman	Abdul Kader Miyaji	Bhola Sodor	Bhola Sodor	Bhola	01712953390
Abdul Mannan	Mozammel Haque	Poschim Ilisha	Bhola Sodor	Bhola	01718190308
Al Amin	Mozammel	Poschim Ilisha	Bhola Sodor	Bhola	01837869972
Dulal Molla	Hanif Molla	Gupta Munshi	Bhola Sodor	Bhola	01771335092
Mofizul Islam	Abdul Berek	Chor Anondo	Bhola Sodor	Bhola	01716009797
Jamal khan	Hanif Khan	Sachra	Burhanuddin	Bhola	01795549254
Mohasin	Mofizul hauq	Sachra	Burhanuddin	Bhola	01953151636
Firoz	Md.mofu	Sachra	Burhanuddin	Bhola	01953151636
Mofij kazi	Rotton kazi	Sachra	Burhanuddin	Bhola	01977558295
sohidul	Sajahan	Sachra	Burhanuddin	Bhola	01724875129
Siraj	Jalil	Sachra	Burhanuddin	Bhola	01923893488
Elias	Siraj	Sachra	Burhanuddin	Bhola	01351725665

Danu shiuli	Dali uddin shiuli	Sachra	Burhanuddin	Bhola	01726992649
Nirob ali shiuli	altab hossain shiuli	Sachra	Burhanuddin	Bhola	01778811928
Nazim pari	Hasem pari	Sachra	Burhanuddin	Bhola	01918468617
Ab.khalek sarder	Manu sarder	Sachra	Burhanuddin	Bhola	01732984567
Adijal	Gagon ali	Sachra	Burhanuddin	Bhola	01937542512
Shajal	Gagon ali	Sachra	Burhanuddin	Bhola	n/a
Mynuddin	Musa biswas	Sachra	Burhanuddin	Bhola	01986377210
Ajhar	Gagon ali	Sachra	Burhanuddin	Bhola	01986377211
Barek	Abdul hauqe	Sachra	Burhanuddin	Bhola	01911218341
Jahangir khan	Fazlu karim	Sachra	Burhanuddin	Bhola	01704524137
Ab. Rahman	Ab. Kader	Sachra	Burhanuddin	Bhola	01918468617
Lal mia	Ab. Barek	Sachra	Burhanuddin	Bhola	01918468618
Mijan	Usuf dalal	Sachra	Burhanuddin	Bhola	01706701066
Usuf khan	Zabbar khan	Sachra	Burhanuddin	Bhola	01977896454
Jakir khan	Hanif Khan	Sachra	Burhanuddin	Bhola	01930422558
Sakil khan	Safu khan	Sachra	Burhanuddin	Bhola	01782206172
Sahidul	Ab. Kader	Sachra	Burhanuddin	Bhola	n/a
Jamal shiuli	Jalal shiuli	Gabindrapur	Burhanuddin	Bhola	01304086523
Safu khan	Fazlu khan	Gabindrapur	Burhanuddin	Bhola	01784207106
Akhter khan	Hanif Khan	Gabindrapur	Burhanuddin	Bhola	01963644377
Chandu khan	Fazle khan	Gabindrapur	Burhanuddin	Bhola	01789764512
Usuf shiuli	Ayjal	Gabindrapur	Burhanuddin	Bhola	01754236797
Sohag shiuli	Ansar shiuli	Gabindrapur	Burhanuddin	Bhola	01754322345
Razzak shiuli	Jalil shiuli	Sachra	Burhanuddin	Bhola	01905791285
Md. Ali	Chandu	Gabindrapur	Burhanuddin	Bhola	01740001231

khan					
Ansar shiuli	Ansar shiuli	Sachra	Burhanuddin	Bhola	01882223211
Usuf khan	Fazle khan	Gabindrapur	Burhanuddin	Bhola	01922232221
Jamal khan	Hanif Khan	Gabindrapur	Burhanuddin	Bhola	01795549254
Abu khan	Fazle karim	Gabindrapur	Burhanuddin	Bhola	01914720364
Mamun khan	Safu khan	Gabindrapur	Burhanuddin	Bhola	01931486577
Monir hawlader	Nazu hawladwe	Gabindrapur	Burhanuddin	Bhola	01732174496
Akter mazi	Manzu mazi	Gabindrapur	Burhanuddin	Bhola	01632478900
Kaysor pari	Safijal pari	Sachra	Burhanuddin	Bhola	01345786543
Monir pari	Kaysor pari	Sachra	Burhanuddin	Bhola	01998469122
Manir shiuli	Mannan shiuli	Gabindrapur	Burhanuddin	Bhola	01789076533
Jalal ahmed shiuli	Dalil uddin	Gabindrapur	Burhanuddin	Bhola	01932456789
Faruk shiuli	Mofazzal shiuli	Gabindrapur	Burhanuddin	Bhola	01932456790
Billal shiuli	Ajhar shiuli	Gabindrapur	Burhanuddin	Bhola	01883245689
Barek shiuli	Arob ali shiuli	Gabindrapur	Burhanuddin	Bhola	01945789000
Alomgir	Danu	Gabindrapur	Burhanuddin	Bhola	01700324678
Sazib	Danu	Gabindrapur	Burhanuddin	Bhola	01700324679
Mastofa	Nazir ahmed	Gabindrapur	Burhanuddin	Bhola	01932564323
Jasim	Mostofa	Gabindrapur	Burhanuddin	Bhola	01884532016
Afsar pari	Sijul hauqe	Gabindrapur	Burhanuddin	Bhola	01742021256
Situ khan	Zafor khan	Gabindrapur	Burhanuddin	Bhola	01918468617
Neser baburchi	Unus	Gabindrapur	Burhanuddin	Bhola	01716021359
Satttar baburchi	Ab. barek	Gabindrapur	Burhanuddin	Bhola	01716021360
Jamal sarder	Senu sarder	Jaya	Burhanuddin	Bhola	01999345010
Tamim	Riaj chairman	Jaya	Burhanuddin	Bhola	01729330725
Babul khan	Chandu khan	Sachra	Burhanuddin	Bhola	01915110519

Nurjahan begum	Md. Asadullah khan	Sachra	Burhanuddin	Bhola	01915110520
Shirina begum	Mohiuddin	Sachra	Burhanuddin	Bhola	01918468617
Ab. Ali	Ab. Latif master	Darun	Burhanuddin	Bhola	01915045506
Mahe alom	Situ mal	Sachra	Burhanuddin	Bhola	01923893488
Chan mia	Barek	Sachra	Burhanuddin	Bhola	01760002134
Asadul	Abdul kader	Sachra	Burhanuddin	Bhola	01798561742
Sahidul	Sultan mridha	Sachra	Burhanuddin	Bhola	01798561743
Ab. Mannan	Nosu shikder	Sachra	Burhanuddin	Bhola	01786456348
Jalal ahmed shiuli	Dalil uddin	Sachra	Burhanuddin	Bhola	01775374842
Hanif khan	Fazlu khan	Gabindrapur	Burhanuddin	Bhola	01775374842
Musa biswas	Ab. Kader	Sachra	Burhanuddin	Bhola	01302306782
Mohsin	Mofu shikder	Sachra	Burhanuddin	Bhola	n/a
Firoz	Mofu shikder	Sachra	Burhanuddin	Bhola	01953151633
Abdul shikder	Hanif Khan	Sachra	Burhanuddin	Bhola	01998469122
Mainuddin	Musa biswas	Sachra	Burhanuddin	Bhola	01986377210
Siraz shiuli	Jalil	Sachra	Burhanuddin	Bhola	01917164403
Jahangir	Fazle khan	Sachra	Burhanuddin	Bhola	01704524137
Ab. Khalek	Ab. Rashid	Sachra	Burhanuddin	Bhola	01925284961
Abu. Kalam khan	Fazle karim	Sachra	Burhanuddin	Bhola	01914720364
Zakir hossain	Hanif	Sachra	Burhanuddin	Bhola	01930422558
Nazmul islam mridha	Md. Nurul islam mridha	Darun	Burhanuddin	Bhola	01725662335
Abul kasem	Md. Ali mridha	Darun	Burhanuddin	Bhola	01903881013
Ritu begum	Kabir patowary	Darun	Burhanuddin	Bhola	01964227183

Md. Riaz khan	Montaj khan	Darun	Burhanuddin	Bhola	01996972731
Md. Naziur rahman	Khandoker jillur rahman	Darun	Burhanuddin	Bhola	01918283322
Sahanaj begum	Md. Billal	Darun	Burhanuddin	Bhola	01310381428
Sahabuddin khan	Ab. Majed	Darun	Burhanuddin	Bhola	01993194347
Maseda begum	Md.motahar	Darun	Burhanuddin	Bhola	01910442993
Golenur rahman	Abu taher	Darun	Burhanuddin	Bhola	01918350767
Marium begum	Md. Jahangir	Darun	Burhanuddin	Bhola	01924168312
Md. Kabir	Usuf dalal	Darun	Burhanuddin	Bhola	01728361794
Laizu begum	Zakir hossain	Darun	Burhanuddin	Bhola	01925888020
Md. Jasim uddin	Ab. Mannaf	pakkhya	Burhanuddin	Bhola	01729739451
Lokman	Amir hossain	Darun	Burhanuddin	Bhola	01795480595
Ayub ali	Ab. Rashid	Darun	Burhanuddin	Bhola	01739967551
Yamin khan	Hamid khan	Darun	Burhanuddin	Bhola	01939896656
Abdur rashid	Hasib	Darun	Burhanuddin	Bhola	01406859745
Nasima begum	Aamir hossain	Darun	Burhanuddin	Bhola	01409320003
Rabea begum	Md. Mokhlesur rahman	Darun	Burhanuddin	Bhola	01782687812
Nazir	Jalil rahman	Darun	Burhanuddin	Bhola	01918283322
Laiju	Abdul hay	Darun	Burhanuddin	Bhola	01995451072
Mst Anwara	Md. Mostafa Cowkidar	Darun	Burhanuddin	Bhola	01983376184

Begum					
Md. Moslem	Tofazzol Hossain	Darun	Burhanuddin	Bhola	01918468617