"Management and Production Performances of Buffaloes on Commercial Farms in Chandanaish and Anwara Upazila, Chattogram"

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“Management and Production Performances of Buffaloes on Commercial Farms in Chandanaish and Anwara Upazila, Chattogram”

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List of Acronym

CHA	Chandanaish
ANW	Anwara
FMD	Foot And Mouth Disease
BQ	Back Quarter
HS	Hemorrhagic Septicemia
AI	Artificial Insemination

ABSTRACT

The study was undertaken know the management system of buffaloes in coastal areas, and hill and plain land in semi-intensive and extensive rearing systems. With this purpose, the study was conducted for about 6 months through direct interviewing of farmers, farm visits, and data collection at Chandanaish and Anwara Upazila in the Chattogram region. A sample of 164 buffaloes were observed whereas 57 were milking buffalo to achieve the motives in the selected area. It was observed that the buffaloes are allowed to graze in the riverside areas in Anwara and hilly land in Chandanaish for the whole day and kept confined at night. They are given straw, sometimes green grass, and very few amounts of concentrate as feed supply other than grazing. The average milk production of a buffalo cow was noted as 2.75±0.64 liters per day. Other phenotypic traits like average body weight were 292.08 ± 5.55 kg. The gestation period remains similar at about 305 days in both systems and the average calf birth weight was 29.10 ± 2.73 kg.

Other management activities, such as breeding methods, housing systems, feeding systems, animal diseases, vaccinations, and deworming status, were noted. Finally, it was concluded that the production status can be increased by proper management and by giving proper training to the farmers in that particular area.

Chapter 1

Introduction

The buffalo (*Bubalus bubalis*) belongs to the class Mammalia, subclass Ungulata, order Artiodactyla, suborder Ruminantia, family Bovidae, subfamily Bovinae. Asian buffalo includes two subspecies known as the River and Swamp types, the morphology and purposes of which are different as are the genetics. The River buffalo has 50 chromosomes whereas the Swamp buffalo has 48 chromosomes.

The buffalo population in the world is actually about 168 million head;161 million can be found in Asia (95.83%);3717 million are in Africa, almost entirely in Egypt (2.24%);3.3 million (1.96%) in South America, 40000 in Australia (0.02%); 500000 in Europe (0.30%) (Borghese, 2005).
These buffalo may be found in institutional herds as well as the flood zones of the Ganges and Meghna in southern Bangladesh and the Brahmaputra-Jamuna in central Bangladesh. Bangladesh develops dairy buffaloes that are crossbred from swamps and river variants like Murrah and Nili-Ravi.

In 2003 Bangladesh had 772764 buffalo heads owned by 270228 holdings representing 1.52% of the total holdings in the country. The average buffalo head per holding was 2.67 (Paul et al., 2019).

The buffalo production in Bangladesh is about 1.516 million (Livestock-Economy - DEPARTMENT OF LIVESTOCK SERVICES (DLS)-, n.d.)

In Bangladesh, swamp buffaloes are essential for agriculture and have diverse phenotypic characteristics that are influenced by different farming systems. This study explores how semi-intensive and extensive farming practices affect various traits of swamp buffaloes.

It's well known that buffaloes are excellent at turning poor roughage into milk and meat. Compared to high-yielding cows, they are reported to have a 5% higher crude fibre

digestibility and a 4-5% greater metabolic energy conversion efficiency for milk production. (Mane & Chatli, 2015). Also, they are raised by the farmers in a semi-intensive free grazing system.In Bangladesh, rice straw is used as the primary diet for buffaloes, in spite of it being a poor source of protein and calories. Possible feeding materials include cassava leaves, sugarcane leaves, microsilage of sugarcane leaves, wayside grass, elephant grass, maize with corn cob and pineapple bran. (Paul et al., 2019).

In semi-intensive systems, where buffaloes receive controlled feeding and grazing, adult male buffaloes typically reach an average body weight of 300-400kg, while females average around 200-300 kg. These buffaloes often produce more milk, averaging 1.5-3 liters per day, with a total milk yield of 280-576 liters per lactation period. The post-partum period, or the time between calving, is generally about 12-15 months, with the age of first calving typically around 2.5-3 years. The gestation period averages 305 days, and calves are born weighing 30-35 kg.

In contrast, extensive systems, which depend more on natural forage and less on supplementary feeding, may see lower average body weights, with males weighing around 200-300 kg and females 180-280 kg. Milk production can be less consistent, averaging 1-2 liters per day, with lactation yields ranging from 180-360 liters. The post-partum period may extend to 15-18 months, with first breeding occurring at a slightly older age of 3-3.5 years. The gestation period remains similar at about 305 days, and calves usually weigh 25-30 kg at birth.

Depending on the country's geography and plant patterns, different buffalo husbandry and production methods applicable. The hilly and coastal regions provide plenty of green vegetables and wide grazing land, hence these sites are ideal for the extensive systems used for raising buffaloes.

Buffaloes are raised in semi-intensive methods on plain and marshy ground in locations with a shortage of grazing pasture. The methods used by the two systems for caring and raising animals differs somewhat. However, there are a few typical practices. The

absence of routine vaccination, artificial insemination systems, and animal identification and record-keeping systems are elements of these common procedures.

By comparing these traits under different management systems, the report aims to provide insights into optimizing buffalo husbandry practices to enhance productivity and animal welfare in Bangladesh.

Chapter 2

Materials and Methods

2.1 Study area:

The study was conducted at Juidondi Village of Anwara Upazila and Kanchanabad Union & Barkal Union of Chandanaish in Chattogram District of Bangladesh. The coordination of the area was 22°9’9’’ N and 91°52’6’’ E for Juidandi, 22° 14' 3" N and 92° 3' 16" E for Kanchanabad, and 22° 11' 53" N and 91° 57' 46" E for Barkal. Juidandi is located near the Sangu River in the Anwara area. Barkal village is also surrounded by small streams and branches of the Sangu River in the Chandanaish area that are suitable for buffalo rearing. On the other hand, Kanchanabd area is hilly. So many local farmers here rear buffaloes for commercial purposes in semi-intensive rearing. The availability of the buffaloes is the main reason for selecting the area as the study area.

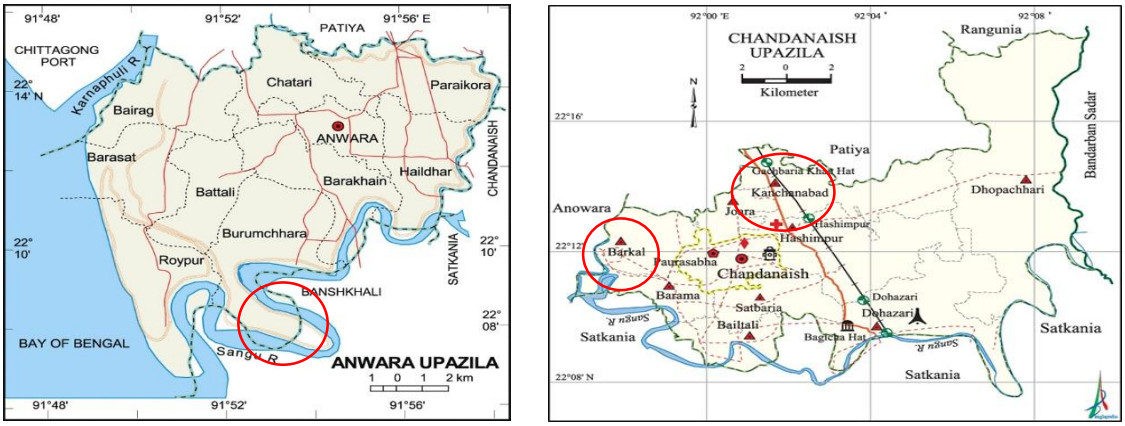

Figure 1. Study areas

2.2 Selection of Sample:

Random selection was done while selecting the farmers, and the criteria for the selection were that the farmer should have a minimum of one milking buffalo and a calf.

2.3 Duration of study:

The total procedure of this study, including questionnaire preparation, farm visits, data collection, and data review, was held from April to September of 2024.

2.4 Preparation of Questionnaire and data collection:

The questionnaire was prepared by following the objectives to know the management and production performances of the concerned animals. Both qualitative and quantitative data were collected by visiting the farms and individual interviews.

2.5 Data management:

For this study, some specific criteria were selected as variables according to the objectives of the study. Those variables are as follows: Housing system, Feeding system, Reproductive condition, Live weight, Average milk yield, Breeding system, Calf birth weight, Animal diseases, Vaccination and Deworming.

2.6 Data analysis:

After the collection of data from the field, the data were rechecked and then transferred to MS Excel 2007 for processing and summarizing. After that, the data were analyzed with the help of SPSS.

2.7 Statistical Analysis:

For statistical analysis, the gathered data were inserted into Microsoft Excel and afterwards exported to SPSS. To assess the percentages of various variables, descriptive analysis has been performed.

Figure 2. Data collection

2.8 Questionnaire Description:

The questionnaire contains 8 sections of 40 items. In the first two sections, questions centered on the farmers and farms' information, including farmers' names, educational qualifications, occupations, locations, contacts, years of experience, and the number of total animals, male & female, calf, yearling bull, heifers, pregnant, non-pregnant and lactating animal. Then 3 sections are animal information, production, and reproduction performances, those are including age, live weight, parity milk production, and breeding system average. Drying period, post-partum period, gestation period, average weight, and weaning age of the calf. The last 3 sections include the housing system, feeding routine, and disease prevalence of the buffaloes.

Chapter 3

Results and Discussion

3.1 Demography of study population:

3.1.1 Herd size:

The average herd size of the selected farms ranges from ≥5 animals per holding. The herd size composed of different categories of buffalo according to their reproductive status and percentage of their population size was 20.12 % yearling bull, 12.80% heifer, 15.85 % pregnant cows, and 14.63 % non-lactating pregnant cows, 16.46 % non-pregnant lactating.

All the farmers in the study area of Juidandi follow a semi-intensive rearing system for farming as it is a coastal area. The percentage of milking cows, non-lactating cows, and heifers was 35, 15 & 16 respectively in the upper part of the coastal area reared under a semi-intensive management system which somewhat resembles our findings.

On the other hand, the farmers of Kanchanabad and Barkal also followed a similar rearing system whether the farmland was hilly or plain land respectively.

Table 01: Demographic statistics of study population

Reproduction status	Chandanaish		Anwara	
	Count	Percentages(%)	Count	Percentages(%)
Calf	16	14.04	11	22
Yearling Bull	29	25.44	4	8
Heifer	17	14.91	4	8
Pregnant	13	11.40	13	26
Pregnant Lactating	24	21.05	9	18
Non-pregnant Lactating	15	13.15	9	18
Total	114	100	50	100

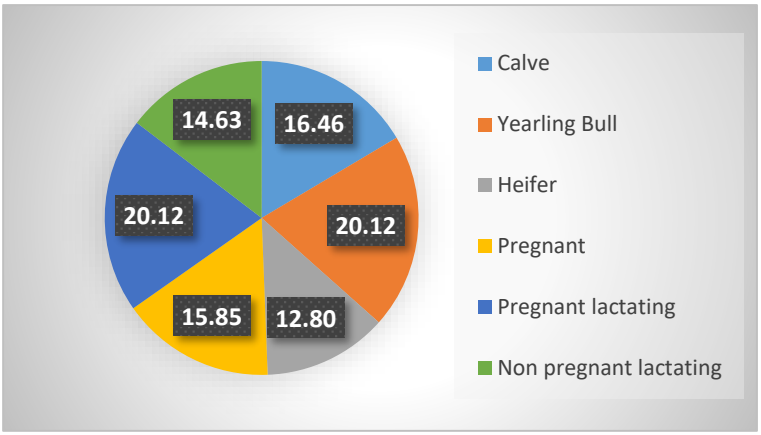

Figure 3. Demographic statistics of the study population

3.2 Feeding system:

The feeding system in the study area was mainly a semi-intensive system. After milking in the morning, the animals were allowed to graze in the charred area for about 6-7 hours. On the other hand, animals were allowed to graze in hill tracks area in the evening. During confinement from afternoon to the next morning, then offered green grasses such as Durba (*Cynodon dactylon*), Halancha (*Enhydra fluctuates*), Water hyacinth (*Eichhornia crassipes*), etc. collected from the riverside, road-side, fallow land and crop residues (mainly rice straw) at night. A similar finding explained that the majority of respondents in the Subornochar upazila of Noakhali district (80%) were entirely reliant on roadside and underused land grasses (Amin et al., 2015). According to Sarkar et al. (2013), the majority of farmers in Bangladesh's Bagerhat district depended solely on grazing. The animals are also given straw and small amounts of concentrate feed such as rice polish, wheat bran, etc. The amount of feed was decided upon their production status. In the mentioned area only, a few farmers have their own land to produce green fodder for their animals. Those who have no fodder land only depend on the free grazing method.

Table 02: feeding management of Buffalo farms

Parameters	Categories	Frequencies	Percentages(%)
1. Feeding method	Tethering	05	50
	Free-ranging	05	50
2. Grazing land	Own	02	20
	Public land	08	80
3. Fodder cultivation	Practiced	02	20
	Not practiced	08	80
4. New feeding technology	UMS, UMB practiced	00	00
	Not practiced	10	100
5. Sources of feed	Own	01	9.00
	Purchased	03	30.04
	Collect from fallow land	06	60.06
6. Feeding of balanced ration	Yes	00	00
	No	10	100
7. Vitamins, minerals, and supplements	Yes	08	80
	No	02	20
8. Sources of drinking water	Deep tube well	04	40
	River	02	20
	Pond	04	40

3.3 Housing system:

In the study areas, 70% of farmers had traditional buffalo sheds without fencing and 30% had fenced dwelling systems. Most of the houses had only roofs with no fences. Only a a few of them have separate maternity, calf sheds and isolation sheds. Akbar et al. (2009) reported that most of the buffalo house in the Bathan area was made with only roofs prepared with straw or tin without boundary walls and the floor was always muddy which was very similar to our current study.

About 60% of farm floors were made of bricks and they also have concrete fences along with the required height surrounding the farm with tin-shed roofs. There was no provision for wallowing facilities in the shed and relied on natural circulating air.

In the Chandanaish area, the responders who offered a shed made of a muddy floor and straw-based roof, which was primarily used at night (100%), chose to keep their buffaloes near their residence so that they could check on them more regularly. The

majority of farmers built some shelters with tin roofs and others, with muddy floors and inadequate space but most of the homes lacked a boundary wall (Sarkar et al., 2013).

Table 03: Housing management of Buffalo Farms

Parameters	Categories	Frequencies	Percentages(%)
1. Housing shed	Shed with fence	03	30
	Shed without fence	07	70
2. Housing period	All time	02	20
	Only at night	08	80
3. Housing system	Inside dwelling	01	10
	Near dwelling	04	40
	Separate shed	05	50
4. Roof type	Tinned	08	80
	Straws	00	00
	Locally available materials	02	20
5. Floor type	Concrete	01	10
	Bricks	06	60
	Muddy/Soil	03	40
6. Floor space	Adequate	08	80
	Not adequate	02	20
7. Manger	Provided	07	70
	Not provided	03	30
8. Ventilation	Natural	09	90
	Artificial	01	10
9. Drainage facility	Fair	07	70
	Poor	03	30
10. Manure disposal	Fertilizer	06	60
	Other(fuel)	04	40

3.4 Milk Yield Production Status:

With an average lactation period of 196.50±14.77 days and a daily average milk yield of only 2.75± 0.64 L/day/head. The highest milk production and milking cows were recorded at 21 L (29.37%) and 6 in number in farm CHA6 as per record and the lowest milk production and milking cows were recorded at 1.5 L (2.10%) and 1 in number in farm CHA5 as per record (Figure 4) per day. The lactation yield is 450L,540L,540L,360L,405L,630L,390L,525L,630L, and 630L in the mentioned farm respectively (Figure 4). Hand milking was practiced in all farms. They utilized the milk

for family consumption and calf feeding and the rest of the milk was sold to the local tea stall and villagers.

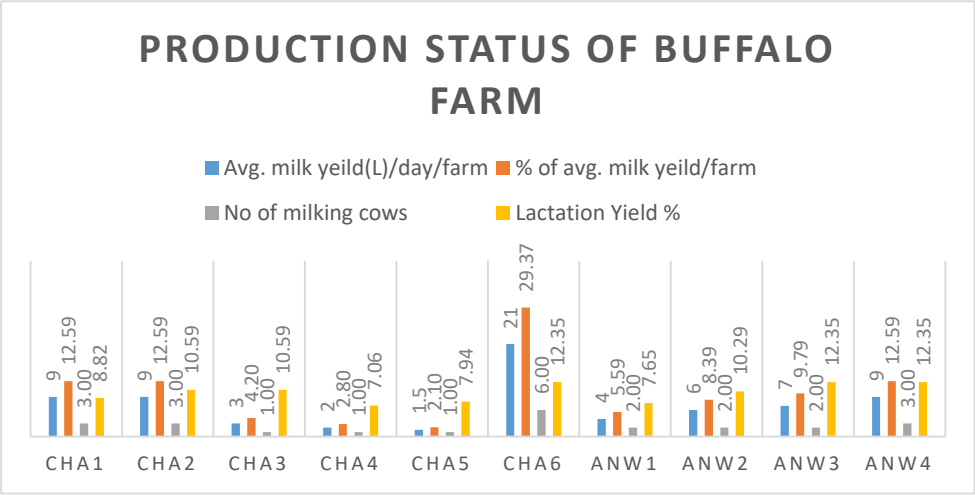

Figure 4. Production status of Buffalo farms

3.5 Body weight-wise production status:

Production status	**Body weight(Mean ± SD)**
Calf at birth	29.10 ± 2.73
Production status	**Body weight(Mean ± SD)**
Yearling bull	242.50 ± 9.01
Heifer	282.50 ± 4.67
Pregnant	319.55 ± 5.02
Non-pregnant lactating	295.04 ± 2.25
Pregnant Lactating	320.83 ± 6.88
Overall	**292.08 ± 5.55**

Based on production status, body weight was examined in this study. The results showed that non-lactating pregnant cows had the highest body weight (320.83 ± 6.88) in kg, while yearling bulls had the lowest body weight (242.5 ± 9.01) in kg. All animal types combined had an average body weight of 292.08 ± 5.55 in kg. Also, the average calf birth weight was 29.10 ± 2.73 kg. The lowest body weight was recorded in the heifer (282.5 ± 4.67) and the highest was for pregnant lactating cows (320.83 ± 6.88). Overall body weight among all classes of animals was 300.90 ± 2.74 (Das, n.d.). Table shows the total study population's body weight taken by buffaloes' various production status.

3.6 Breeding system:

Since there are breeding bulls nearby, a majority of farmers in the study region prefer natural insemination rather artificial insemination (AI). They think AI is very complicated for them as there are low availability of semen and also a lack of AI workers. Most of the farmers (70%) keep breeding bulls, and few farmers who raise buffaloes for subsistence rely on artificial insemination (20%). The findings of this study were similar to those that the majority of family farmers (95%) in Bangladesh used the natural mating method despite the fact that there are only a very few breeding bulls (Uddin et al., 2016). The majority of farmers claimed that buffaloes exhibited heat mostly in the winter and they detected heat in a symptomatic way. According to Akbar et al. (2009), there is always an adequate number of breeding bulls available in coastal areas, and no further fertility problem was recorded. Some farmers of the Chandanaish region were trying to apply an AI system to their cows which are very small in number.

Table 04: Breeding management of Buffalo farms

Parameters	Categories	Frequencies	Percentages(%)
1 . Heat detection	Symptomatic	10	100
	Using teaser bull	00	00
2 . Method of breeding	Natural	08	80
	AI	02	20
3 . Breeding bull	Yes	07	70
	No	03	30
4 . Pregnancy diagnosis	Own judgment	09	90
	AI technician	01	10
5 . Breeding record	Yes	00	00
	No	10	100

3.7 Average age of 1st breeding (years):

The average age of 1st breeding recorded in the study area was 2 years in maximum buffalo cows. Several reports showed that the minimum age of 1st calving for buffalo is 3-3.5 years which is more or less similar to the present study. The minimum age of 1st breeding was 2 years of swamp buffalo in Malaysia which supported the present study (Desta, 2012).

3.8 Animal diseases, Vaccination & Deworming:

In the study area, all farmers mentioned that they have vaccinated their buffaloes against infectious diseases like Foot and mouth Disease, Black Quarter, Anthrax, and Hemorrhagic Septicemia. It indicates that they have some knowledge about the prevalence of infectious diseases in buffaloes. The prevalence of infectious diseases like FMD, HS, and BQ were the main health hazards in buffalo farming (Gupta et al., 2014).

Moreover, maximum buffaloes were dewormed on a regular basis according to the farmers. They were dewormed by anthelmintics mostly used Injectable Nitroxynil @10-15mg/kg body weight, Ivermectin @0.2-0.4mg/kg body weight, and bolus Albendazole @10-20mg/kg body weight. They all take the medical service from the local LSPs as Upazila Veterinary Hospital is far and away from their locality.

Table 05: Occurrences of diseases in buffalo farms

Farms	Viral	Bacterial	Metabolic	Reproductive	Others
Cha1	FMD				
Cha2	FMD				
Cha3					
Cha4	FMD				
Cha5		BQ	Diarrhoea, Acidosis		
Cha6	FMD				
Anw1	FMD	HS	Diarrhea	Conception failure	Fascioliasis
Anw2	FMD	HS, Pink Eye	Acidosis, Diarrhoea		
Anw3	FMD	HS			Fascioliasis
Anw4	FMD	HS			

Limitations

There were many difficulties had to face during the study. Some majors of them are as follows-

- Unable to get adequate and proper responses through questionnaires due to the ignorance of the farmers.
- No proper veterinary service in the study area and the farmers only depend on LSPs.
- Unable to show multiple production performances in a graph due to inefficiencies in data analysis.

Conclusion

The results revealed that instead of applying scientific feeding, breeding, housing, and health management methods, a majority of farmers decided to raise their buffaloes in the traditional backyard method. The majority of the buffaloes in the studied region, despite their age, sex, or farming technique, were swamp types, reported to the study. The findings also showed that the semi-intensive farming technique and performance of the swamp-type buffalo were feasible and beneficial. A semi-intensive bathan farming system produced the maximum live weight and daily milk production in buffaloes, whereas an extensive bathan farming system gave the highest lactation length and yield. Live weight, daily milk supply, length of lactation, and lactation yield were found to be relatively similar to the area and crossbred types.

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October, 2024

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Biography

I am Mohammad Abrar Halim, son of Md Abdul Halim and Jabonnasa Khanm from Village: Barkal, Upazila: Chandanaish, District: Chattogram. I passed the Secondary School Certificate examination in 2015 (G.P.A- 5.00) and the Higher Secondary Certificate examination in 2017 (G.PA- 4.58). I am a student of 24th Batch and now I am an intern student under the Faculty of Veterinary Medicine in Chittagong Veterinary and Animal Sciences University. I have a keen interest in veterinary medical research and I want to serve the nation through my knowledge and creativity so that we can conquer the current challenges in this field.

APPENDIX

Feeding management of Buffalo

Housing management of Buffalo