The impact of herd management practices on the production performance of commercial dairy farms in Chandanaish Upazila in Chattogram

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The Author

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List of Abbreviations

Abbreviation	Elaboration
HF	Holstein Friesian
AI	Artificial insemination
LSP	Livestock service providers
GDP	Gross domestic product
R,C	Roughage, Concentrate

Abstract

In dairy farms, management practices are known to effect productivity and profitability of the farm. For enhancing the productivity of dairy farms, understanding the association of productive performance with management practices is needed for making correct decision to overcome the challenges. The aim of the study was to evaluate the present condition of management practices of dairy farms and determine the association of farm level management systems with production performance of dairy cattle both at farm and individual level. A cross-sectional study was conducted on 26 selected commercial dairy farms in Chandanaish Upazila from April to May, 2023 to explore the management factors associated with dairy farm productivity and profitability. A structured questionnaire was prepared to collect data from the farmers about the farm management practices. A univariable analysis was performed using one-way ANOVA and linear regression, where farm management factors were independent variables and production parameters were the dependent variables such as., milk production of farm and individual level, milk selling price, feed and treatment cost of farm. From univariable linear regression model analysis, per day farm level milk production was higher in large herd size farm that includes high lactating cows ($P < 0.001$) and higher milk production from individual cow supplemented with silage ($P < 0.05$). Decreasing amount of concentrate and increasing roughage in dairy ration would help to reduce the feed cost in farm ($P<0.001$). Introduction of purchased animal in farm had significant impact on treatment cost of farm ($P < 0.05$) Farm location and farmer education level had higher impact on milk selling price ($P < 0.001$). The study revealed that managemental factors including farm and farmer demography, farm biosecurity, nutrition has greater impact on productivity and profitability to the farm so based on this study findings, the present condition of productivity and profitability of the farms in Chandanaish Upazila can be improved.

Keywords: Farm management, productivity, profitability, milk production

Chapter 1 Introduction

For an agro-based economical country like Bangladesh, livestock is considered as an integral component of the rural economy as way of living of the most of the people depend on agriculture and it influences the process of bring socio-economical change in the livelihood of subsistence farmers by generating employment opportunities in poverty elevation (Rahman S et al., 2014). In Bangladesh, 20% of people are directly and 50% are indirectly employed in livestock enterprise for livelihood. In the year 2021-2022, the magnitude of contribution of livestock in national gross domestic product (GDP) is around 1.9% which is estimated 16.52% GDP to agriculture. In last 10 years (2012-22), the total estimated cattle population and milk production has been increased from 23.3 to 24.7 million and from 5.2 to 14.4 million ton respectively that means dairy farming in Bangladesh showing positive growth capacity day by day. However, the currently available national milk production is 14.4 million tons against the requirement of 17.2 million tons per year which indicates that the current domestic milk production is inadequate to meet the demand (DLS, 2021-22). Inefficiencies towards the sound management practices at dairy farm is one of the main constraints of dairy farming that includes low producing cattle breed, high feed cost, inadequate knowledge about production diseases and their prevention and control (Patil et al., 2009). Efficient management practices are considered one of the most important key elements of the profitability of dairy farming at both farm and individual level production. Variations in management practices could considerably affect the expected farm level milk production. To maintain systemic management practices at farm, need to focus on the farm and farmer demography, farm biosecurity, nutrition, production and reproduction, preventive measures against diseases and parasitic infestation at dairy farms (Gloy et al., 2002; Birhan et al., 2023)

In proper management practices, farmer demography (farmer age, education level, experience in dairying) plays a crucial role as farmers are the one who takes decision on management practices and other key determinants for overall functioning of farms

(Odhiambo, 2019; Lianou and Fthenakis, 2021). Under farm demography, breed selection with good genetic potential is one of the important factors for dairy farming. The productive performances of our local or indigenous cattle are not satisfactory due to their poor genetic potentiality. On the other hand, the production outcome of exotic cross breed cows are outstanding in a condition of sound management (Al-Amin and Nahar, 2007).

Nutritional management is another crucial segment of the dairy farming as dairy cow convert roughages into a valuable product like milk The real challenge of nutritional management is to fulfil the individual animal nutritional requirements by allocating available nutrients (Albert, 2019). That's why it is essential to formulate different categories of feed formulations for different stages of cattle (heifers, pregnant cows, lactating cows, dry cows) to get optimum level production from the herd. The productivity and profitability of the farm strongly depend on the availability of feed resources as the scarcity of feed and roughages lead to the increase of feed. A study found that decreasing roughage concentrate ratio from 60:40 to 50:50 elevate the feed cost greatly as the pricing of concentrate feed is higher than the roughages (Thakur et al., 2018). To maintain the optimum level of production also need to focus on other managemental factors includes biosecurity and preventive measures to disease control at farms to ensure a healthy herd. Farm biosecurity management practices (quarantine, isolation, vaccination, control strategies before introducing new animal to the herd, death animal management, manure management) help to prevent the introduction and spread of diseases at farm (Stelian and Livia, 2020). Disease risk management is also notifiable indicators of farm level production status of dairy farms as prevalence of infectious diseases reduce the production outcome by reducing milk production per cow, resulting calf mortality, culling losses, associated with treatment cost to control the diseases (Kaneene and Scott Hurd, 1990; Donovan et al., 1998). Milk production at both farm and individual level is also depends on various biologically potential managemental factors like age of puberty, service per conception, conception rate, calving interval. To make the dairy farm economically viable need to ensure early puberty and calving at early age subsequently (Islam et al., 2008). For increasing average milk production per cow per day need to focus on the management

practices including increasing lactation length, decreasing age of 1st calving and calf production intervals. (Shamsuddin et al., 2006).

Chattogram district is one of the major commercial dairy farm hubs in Bangladesh. There are 18 sub-districts (upazilas), Chandanaish Upazila is one of them. In Chandanaish Upazila, small and large-scale dairy farming are expanding day by day. In order to sustain the dairy development in this region, it is essential to evaluate the management practices and production status of dairy farms and its impact on overall farm or cow-level production. According to author's knowledge, there is no comprehensive reports on productive status of dairy cattle under various managemental conditions in Chandanaish Upazila. The present study is undertaken to meet this need by assessing the production potential and to determine the possible association the farm and individual cow level productive parameters in dairy cow in Chandanaish Upazila, Chattogram.

Thus, the present study is aimed with the following objectives,

1. To estimate the real status of overall dairy farming at Chandanaish Upazila including housing, feeding, breeding, milk production, disease occurrence, and treatment cost.
2. To assess the different management aspects of commercial dairy farms in Chandanaish Upazila.
3. To determine the farm level and individual level management factors associated with production performance or profitability of dairy farm

Figure 1.1 Lactating cows in different farms in Chandanaish Upazila (N = 26)

Chapter 2 Materials and methods

Description of study area and population

The study was conducted in Chandanaish Upazilla located at 22.2111°N 92.0417°E at northern-west of Chattagram district, Bangladesh (Figure 1). There are nine unions and one municipality. There about 36.4 % of people depends on agriculture for their mode of life (Banglapedia, 2021). In the selected farms in this study, number of animals ranging from 2 to 86. The number of lactating cows per farm ranged from 2 to 31 with an average of 7.8 (median: 6). On average, daily milk production per cow and per farm ranged from 5 to 35 liters (median:15.4) and 20 to 500 liters (median:114.8) respectively. All the selected farms-maintained quarantine before introducing new animal to the farm, had separate isolation shed for diseased animal and performed regular vaccination and deworming. All selected farm had their own cultivable land. All of the farmers were sold the most of their farm produced milk.

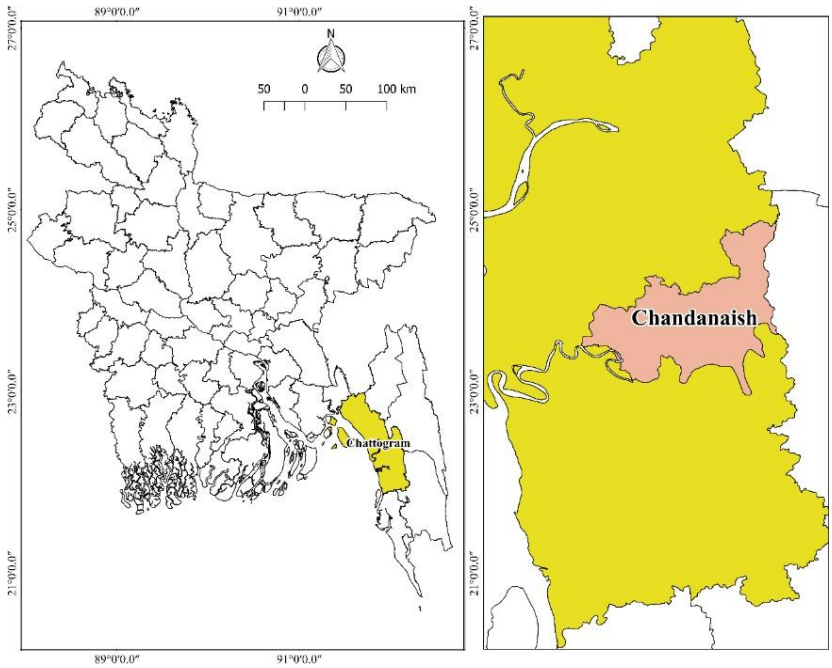

Figure 2.1 Geographical location of Chandanaish Upazilla

Study design

A cross-sectional study was conducted on 26 selected intensive dairy farms of Chandanaish Upazilla, Chattogram between April to May 2023 applying a structured questionnaire at Chandanaish Upazila. This upazila have nine unions from these 26 farms from four unions (Boiltoli, Barama, Dohazari, Joara) and municipality were enrolled in the study. A list of the registered cattle farmers was collected with the help of the upazila veterinary hospital (UVH), Chandanaish.

Data collection

An organized questionnaire was prepared to collect data from the selected farms. The questionnaire was administered to the farm owner or manager or responsible person (e.g., employee or workers) on farm. The questionnaire was prepared in local language (Bengali) to make it easier for the farmers to understand. The questionnaire was explained to one trained Livestock Service Provider (LSP) employed in Livestock and Dairy Development Project (LDDP) run by Department of Livestock Services (DLS) in UVH, Chandanaish. The LSP reached to each of the farms by physical visit and data were collected through face-to-face interviewing of farmer and they also perform inspection of the farms. The farmers voluntarily participated in this study, and they were allowed to withdraw their participation at their choice. Details about the questions included into the subsections has been given in the supplementary table 2.

Statistical analysis

Data from the questionnaires were entered into an MS Excel spreadsheet. The data was cleaned, sorted, coded and categorized before importing the dataset into STATA 13 (Stata Corp. College Station, TX, USA) for statistical analysis. Descriptive analysis was performed using a boxplot for milk production at farm and individual level, feed cost per farm per day, milk selling price, treatment cost to determine the association with other variables .A summary (mean, range, median) was presented for quantitative variables such as, farmer age, farm size, number of heifers, lactating cow, dry cows, dry period in days,

and the amount of feed (e.g., roughage, concentrate, commercial feed, and silage), milk production at farm and individual level, selling price of milk, treatment cost in last 6 month and frequency, numbers and percentages calculated for the generic data, such as farmer education, farm type, shed type, floor cleaning time of farm, any new animal introduced in farm, produce milk bi-product at farm, source of semen. The quantitative variables were checked for normal distribution based on visual observation in histogram. A one-way ANOVA was performed to identify the possible significant variables ($P = 0.10$) to be included in the model building. Then univariable linear regression models were built to determine the association with outcomes (milk production at farm and individual level, feed cost per farm per day, milk selling price, treatment cost in last 6 month) and different farm level independent variable such as, farm demographical factors, biosecurity related practices, nutrition related variables, and breeding related practices. Variables $P < 0.05$ were considered significantly associated with the outcome variable and were expressed in terms of regression co-efficient (β), and P value.

Chapter 3 Results

Herd characteristics

Farmers (*n*= 26) had a wide range of educational background from no formal education (*n* = 4) to primary, secondary or higher secondary (*n* = 15) and graduation or higher (e.g., Diploma, M.Sc., M. Com) (*n* = 7). From the selected dairy farmers, some of them reared cattle for only dairy purpose (*n* = 4), dairy and beef on regular or seasonal basis (*n* = 14) and dairy with other species (*n* = 4) including goat, sheep, buffalo. cross type of breed (n = 13), pure and cross (n = 70) and local and unknown (*n* = 6) in intensive (*n* = 20) and semi-intensive system (*n* = 5). Farm population comprised of Holstein Friesian (n = 11) as a pure breed and along with pure breed there was cross breed of different percentage (HF x Jersey, HF x Local, HF x Sahiwal, Sahiwal x Local) (*n* = 15). Selected farms had a herd size ranging between 3 to 86 cows, of which number of lactating cows, dry cows and heifers varied from 2 to 31, 1 to 30 and 2 to 35 respectively. Among 26 selected farms (*n* = 6), farmers allowed entry of new animal from different sources like cattle market (*n* = 7) and from other farm of locality and other district (n = 19) and all those farms were maintained quarantine period ranging from 5 to 20 days before introducing the new animal to the existing herd. Farmer's perception about biosecurity management of their farm has been given in supplementary table 1. Farmers from 13 farms cleaned their shed floor 2-3 times a day and the other 12 farms cleaned the shed 4-6 times a day among them. Among 26 selected dairy farm, 21 farms used disinfectant foot bath from them 10 farmers used foot bath on regular basis and 11 farms used it occasionally.

Farm level factors associated with the farm milk production

Table 1 shows that there were nine farm level variables that were associated with farm level milk production. Among farm demographical factors, farms with dairy and other species of animals had a significantly higher milk production than, farms with dairy and beef. Farmers who had total number of animals more than 50 per farm found higher milk production at farm level. Higher numbers of heifers, lactating and dry cows in a farm were

also associated with an increased farm level milk production. Farms that used to feed the cattle in a way of roughage, concentrate together were found higher milk production in their farm than the farmers who feed roughage and concentrate separately. Some farm had higher milk production and they used it to make milk bi-product.. Farmers who cleaned the floor 4-6 times in a day found higher milk production at farm level than the farmers who performed cleaning 3-5 times. Among nutritional variables, those farmers gave roughage in the above 31 kg found highest production of milk at the farm level.

Table 3.1 Univariable linear regression between farm level milk production (liters) and different significant farm level variables at $P < 0.05$ in 26 commercial dairy farms in Chandanaish Upazilla in Chattogram

Variable name	Categories	N	Mean	Overall P[1]	β	P[2]
Farm demographical variables						
Farm type	Dairy and beef	14	82.9	0.03	Reference	
	Only dairy	6	100.0		17.1	0.706
	Dairy and others	4	235.0		152.1	0.008
Farm size	1-50	22	88.6	<0.001	Reference	
	above 50	3	306.7		218.0	<0.001
Number lactating cow	1-10	21	85.2	<0.001	Reference	
	Above 10	4	270		184.8	<0.001
Number of heifers	1-10	14	82.1	<0.001	Reference	
	Above 11	5	264		181.8	
Number of dry cows	1-10	13	80.8	<0.001	Reference	
	Above 11	6	248.3		167.6	<0.001
Feeding type	R, C separately	19	87.2	0.01	Reference	
	R, C together	6	208.3		121.1	0.01
Produce milk bi-product	Yes	18	88.9	0.04	Reference	
	No	7	181.4		92.5	0.04
Biosecurity related variables						
Cleaning times in a day	2-3 times	13	76.9	0.05	Reference	
	4-6 times	12	155.8		78.9	0.05

Nutritional variables						
Amount of roughage provided per day per cow (kg)	5-20	9	73.3	<0.001	Reference	
	21-30	10	91		17.6	0.64
	31 to above	4	265		191.7	<0.001

[1] P value were obtained from *One-way ANOVA*

[2] P obtained from the linear regression

Farm level factors associated with the per cow milk production

Table 2 shows that association between per cow milk production with different farm level variables. From farm demographical variables, farms which had number of heifers more than 11 found higher milk production than the other farms. In nutritional variables, farmers used silage as a feed along with roughage and concentrate found higher milk production from per cow.

Table 3.2 Univariable linear regression between per cow milk production in farm (liters) and different significant farm level variables at P < 0.05 in 26 commercial dairy farms in Chandanaish Upazilla in Chattogram

Variable name	Categories	N	Mean	Overall P[1]	β	P[2]
Farm demographical variables						
Number of heifers	1-10	82.1	15.1	<0.001	Reference	
	Above 11	264	24.3		9.19	0.02
Biosecurity related variables						
Cleaning times	2-3 times	13	11.7	<0.001	Reference	
	4-6 times	12	19.3		7.64	<0.001
Nutritional variables						
Use of silage	Yes	21	25	0.03	Reference	
	No	2	15.0		9.95	0.03

[1] P value were obtained from *One-way ANOVA*

[2] P obtained from the linear regression

Farm level factors associated with the per liter selling price of milk

Table 3 shows that the association between selling price of milk per liter with different farm level variables. In demographical factors, farmers from Joara union were selling milk in higher price than other union of Chandanaish Upazilla. From selected farmers, who had graduation or higher level of educational background sold milk in higher price than the other farmers. Farms that contained higher number of lactating cattle found higher milk selling price. In productive variables, those farms per day milk production was more than 300 L, they sold milk in higher price than the other farms.

Table 3.3 Univariable linear regression between selling price of milk per liter (BDT) and different significant farm level variables at P < 0.05 in 26 commercial dairy farms in Chandanaish Upazilla in Chattogram.

Variable name	Categories	N	Mean	Overall P[1]	β	P[2]
Farm demographical variables						
Farm location	Boiltoli	7	52.8	0.002	Reference	
	Barama	4	58.7		5.89	0.19
	Dohajari	6	67.8		14.97	0.001
	Joara	1	80		27.14	0.002
	Municipality	8	62.5		9.64	0.01
Farmer education	Secondary/ higher secondary	15	57.13	<0.001	Reference	
	Illiterate	4	57.13		15.01	<0.001
	Graduate	7	72.14		0.37	0.92
Number lactating cow	1-10	21	59.61	0.04	Reference	
	Above 10	4	70		10.38	0.04
Milk production per farm	10-100 L	14	61.9	0.04	10.7	0.04
	101-150 L	4	51.2		Reference	
	Above 200 L	7	65.7		14.5	0.01

[1] P value were obtained from *One-way ANOVA*

[2] P obtained from the linear regression

Farm level factors associated with the treatment cost in last 6 month

Table 4 shows that association between treatment cost of last 6 month of a farm with different farm level variables. From demographical variables, farms which allowed the entry of new cattle in last year expensed more in treatment cost in last 6 month than others. Farms that had total number of cattle more than 50 they expensed more in treatment purpose than other farms. Farmers who used to feed roughage and concentrate together spent less money in last 6 month in treatment purpose than the farmers who feed the cattle roughage concentrate separately. In reproductive variables, farmers who used the semen from commercial company spent more in treatment cost than the farmers who used the semen from DLS for breeding. In those farms which had the history of any abortion case in last 1 year they expensed more in treatment cost in last 6 month.

Table 3.4 Univariable linear regression between Treatment cost of last 6 month (in thousand BDT) and different significant farm level variables at P < 0.05 in 26 commercial dairy farms in Chandanaish Upazilla in Chattogram.

Variable name	Categories	N	Mean	Overall P[1]	β	P[2]
Farm demographical variables						
Newly purchased animal in last year	Yes		22.4	0.01	Reference	
	No		91.7		69.2	0.01
Farm size	1-50	15	29.3	0.01	Reference	
	above 50	3	110		80.7	0.01
Feeding type	R,C separately	13	25.4	<0.001	Reference	
	R,C together	4	10.9		83.4	<0.001
Reproductive variables						
Source of semen	DLS	6	8	0.05	Reference	
	DLS\commercial company	11	62.8		54.8	0.05
Abortion history	No	13	17.6	<0.001	Reference	
	Yes	5	108		90.4	<0.001

[1] P value were obtained from *One-way ANOVA*

[2] P obtained from the linear regression

Farm level factors associated with the feed cost per cow per day

Table 5 shows that association between feed cost per cow per day with different farm level variables. Among nutritional variables, farmers who gave roughage in the range of 21 to 30 kg and concentrate above 6 kg per cattle expensed higher feed cost than others farms who used concentrate lower than 6 kg and roughage higher or lower than the mentioned range.

Table 3.5 Univariable linear regression between feed cost per cow per day and different significant farm level variables at P < 0.05 in 26 commercial dairy farms in Chandanaish Upazilla in Chattogram.

Variable name	Categories	N	Mean	Overall P[1]	β	P[2]
Amount of roughage	5-20 kg	11	665	0.05	301.7	0.04
	21-30	4	593.4		230.1	0.03
	> 30 kg	9	363.3		Reference	
Amount of concentrate	1-5 kg	12	330.4	<0.001	Reference	
	> 6 kg	11	735.7		405.3	<0.001

[1] P value were obtained from *One-way ANOVA*

[2] P obtained from the linear regression

Figure 3.1 Available feed ingredients (roughage, concentrate, commercial feed, silage) supplied to the cattle in farm

Figure 3.2 Cleaning process and milk collection center at farm

Chapter 4 Discussion

This study showed that association of different farm level management related factors with high quantity of milk production at farm and individual cow and selling price of milk, and lower feed and treatment cost on farms. In current unfavorable economic condition, ensuring profitability of the farm is the biggest concern for the farmers. Through the findings of the study, farmers able to evaluate how the profitability and the productivity of the farm is related to the farm management practices.

Farm level factors associated with the farm milk production

The study found that farms with large herd size reported high production at farm level and there is significant variation among farm size with the number of heifers, lactating, dry cows at farm ($P < 0.01$), this increasing level of milk production in large herd size is consistent with the previous study from Bangladesh (Datta et al., 2019). In large scale dairy farm, number of lactating cows are high which mainly attribute to the high milk production at farm level. Then cleaning times of shed floor is also related with high level of milk production at farm. Cleaning is one of the most important parts of farm hygiene if it conducted more often in farm, it helps to lower the pathogen level and interrupt the disease cycle (Berriman et al., 2013) that ultimately contribute to retain the high production at farm.

Farm level factors associated with the per cow milk production

The study demonstrated that farmers who used silage as a feed supplement along with other feed ingredients in farm found higher amount of milk from per cow. The digestibility of the silage is the main factor which regulate the milk production of cow. That's mean higher level of digestibility leads to higher milk production in cow. The digestibility can be improved by maintaining the proper quality of silage with good preservation during preparation that will initiate the high intake and utilizing its nutrients properly (Kaiser A.G. , 2020).A study found that feeding legume-based silage improving the rumen

function and energy supply to the mammary gland that ultimately help to increase the milk production potential of the farm (Dewhurst et al., 2003)

Farm level factors associated with the per liter selling price of milk

Farmers from Joara union of Chandanaish upazila were sold milk in higher price than the farmers of other unions. There was a significant co-relation between farm location with number of lactating cows in farm and per cow milk production. That indicate farmers of that union had higher number of the lactating cow that ultimately lead to high level of milk production per farm due to higher production of milk they could able to sell in in different areas or dairy processing industries in higher price.

Farm level factors associated with the treatment cost in last 6 month

The study reported that, farmers who allowed the introduction of new animals in existing herd from other district/locality /cattle market had to expense more in treatment cost. Studies found that, introduction of new animal act as a risk factor for transmission of infectious pathogen in the farm (Gari et al., 2010; Hasib et al., 2021). If introduced any animal to the existing herd without maintaining proper quarantine period and knowing the whole health history it could act as a vehicle to spread different diseases in farm that ultimately increase the treatment cost of the farmer.

Farm level factors associated with the feed cost per cow per day

The study revealed that increasing amount of roughage than concentrate would lead to decrease the feed cost of farm. A study also found that roughage concentrate ratio (roughage: concentrate) increased from 50:50 to 60:40 help to decrease the feed cost of the farm(Thakur et al., 2018). As the pricing of green fodder are lower than the concentrate prices, it implies that increasing the proportion of roughages in animal feed than concentrates directed towards lower feed cost that have a positive impact on farm profitability.

Limitations

This study observed significant differences among the farms on managemental practices and its association with farm profitability however, because of time limitation ended with a small number of farms (n = 26). A reasonable large sample size and long term follow up of the farm are required to take in account the dynamic changes in farm managemental practices and overall impact on the farm profitability to make the decision on effective managemental practices.

Conclusions

The present investigation summarizes that the higher farm size and frequent farm cleaning increases the farm level milk production and using of silage as feed supplement increases individual level milk production. The lower quantity roughage and higher quantity concentrate in ration formulation highly increase the feed cost of the farm. Selling price of the milk can vary based on the geographical location and milk production level of the farm. Introducing newly purchased cows in farm increases the total treatment cost despite isolation and quarantine in the existing management. In spite of having lots of issues in farm management practices, dairy farming is the most economical enterprise in Chandanaish Upazila. So, if proper support can be given through different training programmes on managemental practices by government and private organization overall productivity of the dairy farm can be improved which in turn will play a significant role to elevate the socio-economic status of the upazila.

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Biography

Tishita Sen Ape, daughter of Tilak Kanti Sen and Shipra Rani Chowdhury passed Secondary School Certificate examination in 2014 (GPA: 5.00) from Jamalkhan Kusum Kumari Girl's High School, Chattogram followed by Higher Secondary Certificate examination in 2016 (GPA: 5.00) from Govt. Hazi Muhammad Mohsin College, Chattogram. Then, I enrolled for Doctor of Veterinary Medicine (DVM) degree in Chattogram Veterinary and Animal Sciences University, Chattogram, Bangladesh in 2017-18 session. Now, I am an intern student under Faculty of Veterinary Medicine, CVASU. In future, I would like to work in surgery and research related fields.

Appendices

Supplementary tables

Supplementary Table 1: Descriptive summary of the farmer, farm biosecurity, nutritional, productive and reproductive management and herd population of 26 dairy farms of Chandanaish Upazila in Chattogram. Categorical variables were presented using frequency numbers and percentages and quantitative variables were presented using frequency numbers, mean, minimum, maximum, and median values.

Variable name	Categories	Number (%)	Mean (Min-Max)	Median
Farmer education	Secondary\Higher secondary	15 (57.7)		
	Graduate	7 (26.9)		
	Illiterate	4 (15.4)		
Farm type	Dairy and beef	14 (56)		
	Dairy and others	5 (20)		
	Only dairy	6 (24)		
Shed type	Intensive	20 (80)		
	Semi-intensive	5 (20)		
Cleaning times	2-3 times	7 (36.8)		
	4-6 times	12 (63.2)		
Newly purchased cattle in last year	Yes	14 (73.7)		
	No	5 (26.3)		
Produce milk bi-product	Yes	18 (69.2)		
	No	8 (30.8)		
Source of semen	Commercial company	10 (40)		
	DLS/CC	15 (60)		
Farmer age		23	41.1 (25-65)	40
Farm size		27	21.1 (2-86)	11.5
Number of lactating cows		25	7.8 (2-31)	6
Number of heifers		20	8.4 (1-35)	4.5
Number of dry cows		20	9.3 (1-30)	4.5
Dry period (days)		25	74.8 (45-90)	75

Amount of roughage(per cattle in kg)	24	26.2 (5-60)	25
Amount of concentrate (per cattle in kg)	23	6.3 (1-15)	5
Amount of commercial feed (per cattle in kg)	11	2.8 (0.5-6)	2
Amount of silage (per cattle in kg)	3	5.7 (2-10)	5
Feed cost per day per farm (BDT)	24	519.06 (100-950)	450
Milk production per cow	25	15.36 (5-35)	15
Milk production per farm	25	114.8 (20-500)	100
Selling price of milk (in BDT)	26	61.2 (50-80)	60
Treatment cost in last 6 month (in BDT)	18	42722.2 (1000-180000)	21000

Supplementary file: Questionnaire

A survey about assessing the impact of management practices on the production and reproduction performances of dairy cattle in Chandanaish Upazilla

Objectives

- To determine the production status of the Chandanaish upazilla.
- To assess the impact of management practices on production and reproduction.

উত্তরদাতার ব্যক্তিগত তথ্য এবং ডেটা সর্বজনীন করা হবে না বা সাধারনের ব্যবহারের জন্য উন্মুক্ত করা হবে না, শুধুমাত্র গবেষণা এবং শিক্ষার উদ্দেশ্যে ব্যবহার করা হবে।

তথ্য সংগ্রহকারীর নাম : ..... তারিখ: ..... /...../২০২৩

আইডি নং :

(A) Farm Demography related questions

১. খামারের নাম .....

২. খামারের লোকেশন (ইউনিয়ন): ..... (গ্রাম): .....

৩. খামারির নাম: .....

৪. খামারির মোবাইল নম্বর: .....

৫. শিক্ষাগত যোগ্যতা (টিক চিহ্ন দিন) ☐ প্রাতিষ্ঠানিক শিক্ষা নাই ☐ প্রাইমারি ☐ সেকেন্ডারী (হাইস্কুল)

☐ স্নাতক বা ডিপ্লোমা অন্যান্য .....

৬. খামারির বয়স : ..... বছর

৭. কত সালে খামার শুরু করেছেন ? .....

৮. আপনার খামারে কী কী জাতের গাভী আছে? (Breed) (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ Pure breed ☐ সংকর জাত (Cross) ☐ জাত অজানা (Unknown) ☐ দেশীজাত (Local breed)

৯. যদি খামারে সংকর জাত থাকে, তবে সংকর হয়েছে কাদের মধ্যে? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ (Holstein Friesian) HF ☐ HF X LOCAL ☐ HF X Sahiwal ☐ HF x Jersey

☐ Sahiwal x Local অন্যান্য .....

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১০. যদি খামারে সংকর জাত থাকে, তবে % কত? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ 50% ☐ 62.5% ☐ 75% ☐ 82.5% ☐ 87.5% ☐ 100% অন্যান্য .....

১১. খামারের ধরন (টিক চিহ্ন দিন)

☐ ডেইরী + বিফ (রেগুলার) ☐ ডেইরী + বিফ (সাময়িক) ☐ শুধু ডেইরী

☐ ডেইরী + অন্যান্য (ছাগল/ভেড়া/মহিষ)

১২. কোন ধরনের দুগ্ধজাত পন্য কী তৈরি করেন খামারে উৎপাদিত দুধ হতে? (যেমন :ঘি, দই, মাখন, রসমালাই, মিষ্টি ইত্যাদি) (টিক চিহ্ন দিন)

☐ হ্যাঁ ☐ না অন্যান্য .....

১৩. গাভীর বাসস্থানসমূহ(টিক চিহ্ন দিন)

☐ বদ্ধ (Intensive)

☐ বেধে রাখা হয় আবার খোলা ও ছাড়া হয় (Semintensive)

☐ খোলা রাখা হয় (Loose)

অন্যান্য .....

১৪. বদ্ধ ঘর হলে, গরু গুলোর দুই সারি কীভাবে থাকে? (টিক চিহ্ন দিন)

☐ দুই সারি মুখোমুখি (Face in)

☐ দুই সারি বিপরীত দিকে (Face out)

☐ শুধুমাত্র এক সারিতে

অন্যান্য .....

১৫. বকনা গরুর সংখ্যা কত (১ বছরের বেশি বয়সী থেকে প্রথম বার গাভীন বাচ্ছা দিবে) ? .....

১৬. দুধ দোহন বন্ধ আছে কিন্তু গর্ভবতী এমন গরু র সংখ্যা কত? .....

২

(B) Biosecurity related questions

১. খামারে প্রবেশমুখে জীবাণুনাশকের ব্যবস্থা আছে? (Foot bath) (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

২. জীবাণুনাশকের ব্যবস্থা থাকলে, কোন সলিউশন ব্যবহার করা হয়? (টিক চিহ্ন দিন)

☐ সেভলন ☐ পটাশ ☐ ব্লিচিং পাউডার অন্যান্য .....

৩. খামারে প্রবেশমুখে জীবাণুনাশক কী নিয়মিত ব্যবহার করেন? (টিক চিহ্ন দিন)

☐ হ্যাঁ, প্রতিদিন ব্যবহার করি ☐ না, মাঝে মাঝে ব্যবহার করি অন্যান্য .....

৪. অসুস্থ গরুকে সুস্থ গরু হতে আলাদা রাখার ব্যবস্থা আছে ? (Isolation) (টিক চিহ্ন দিন)

☐ হ্যাঁ ☐ না অন্যান্য .....

৫. নতুন গরু খামারে কিনে আনার পর আলাদা করে কী রাখেন? (Quarantine) (টিক চিহ্ন দিন)

☐ হ্যাঁ ☐ না অন্যান্য .....

৬. আলাদা রাখলে আনুমানিক কত দিন আলাদা রাখেন? .....

৭. গরু কিনে আনেন কোথা থেকে? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ গরু বাজার ☐ এলাকার অন্য খামার থেকে ☐ দূরবর্তী (অন্য জেলা) অন্য খামার থেকে

☐ ভারত থেকে অন্যান্য .....

৮. বিগত ১ বছরে কতগুলো নতুন গরু খামারে কিনেছেন ? .....

৯. খামার শেডের ফ্লোর দিনে কয় বার পরিষ্কার করেন? (টিক চিহ্ন দিন)

☐ ১ বার ☐ ২ বার ☐ ৩ বার ☐ ৪ বার ☐ ৫ বার ☐ ৬ বার বা বেশি অন্যান্য .....

১০. শেডের ফ্লোর কিভাবে পরিষ্কার করেন? (টিক চিহ্ন দিন)

☐ পানি ☐ পানি + ব্লিচিং পাউডার ☐ পানি + সেভলন অন্যান্য .....

১১. খামারে রেকর্ড বই এ কোন ডাটা সংরক্ষন করেন? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

১২. যদি সংরক্ষন করে, তবে কি কি ডাটা সংরক্ষিত আছে? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ খাবারের তথ্য ☐ টিকা ও কৃমিনাশকের তথ্য ☐ খামারের লাভ ক্ষতির হিসাব তথ্য

☐ কৃত্রিম প্রজনন বিষয়ক তথ্য ☐ দুধ উৎপাদন বিষয়ক তথ্য অন্যান্য .....

১৩. খামারের পাশে নিজস্ব চাষযোগ্য জমি আছে? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

C) Nutritional management-related questions

১. চাষযোগ্য জমিতে কী কী ঘাস চাষ করা হয়? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ নেপিয়ার ☐ জামান ☐ পারা ☐ পাকচং অন্যান্য .....

২. আপনি গরুর জন্য কোনো বিজ্ঞানসম্মত খাদ্য তালিকা অনুসরণ করেন? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

৩. যদি বিজ্ঞানসম্মত খাদ্য তালিকা অনুসরণ করেন,তবে এই তালিকা কে তৈরী করেছেন? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে) ☐ ভেটেনারি ডাক্তার ☐ খামারি নিজে অন্যান্য .....

৪. যদি খামারী নিজে তৈরী করেন তবে কোন বিষয়টি বেশি গুরুত্ব দেন? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ বয়স ☐ প্রজনন ক্ষমতা ☐ দুধ উৎপাদন অন্যান্য .....

৫. যদি বিজ্ঞানসম্মত খাদ্য তালিকা অনুসরণ করেন, তবে বয়স অনুযায়ী আলাদা গরুর জন্য আলাদা তালিকা কী অনুসরণ করেন?(যেমন, গাভীন গরুর জন্য আলাদা, বাছুরের জন্য আলাদা, দুধ দেয়া গরুর জন্য আলাদা খাদ্য তালিকা অনুসরণ করা) (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

৬. আপনি কি বিগত ৫ বছরে সরকারিভাবে গো-খাদ্য তালিকা প্রস্তুত নিয়ে কোন ট্রেনিংএ অংশগ্রহণ করেছেন? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

৭. খাবার কিভাবে দেন? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ ঘাস, দানাদার একসাথে ☐ ঘাস ও দানাদার আলাদা ☐ শুধুঘাস অন্যান্য .....

৮. খাবারের সাথে কি কি নিউট্রিয়েন্ট সাপ্লিমেন্ট সরবরাহ করেন উল্লেখ করুন? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ ভিটামিন ☐ মিনারেল ☐ প্রোবায়োটিক ☐ না, নিউট্রিয়েন্ট সাপ্লিমেন্ট ব্যবহার করিনা অন্যান্য .....

৯. ইঞ্জকশন/ মুখে কোনো নিউট্রিয়েন্ট সাপ্লিমেন্ট সরবরাহ করলে উল্লেখ করুন (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

১০. দৈনিক খাবার কয়বার দেন? (খাবারের ধরণ অনুযায়ী)

ঘাস..... বার; দানাদার ..... বার; করমার্সিয়াল ফিড ..... বার

১১. দৈনিক ঘাস, দানাদার, ফিডের (ফিড দিলে) পরিমান (প্রতি গরুতে)

১. ঘাস ..... কেজি ২. খামারে প্রস্তুতকৃত দানাদার খাদ্য ..... কেজি ৩. ফিড..... কেজি

অন্যান্য .....

৪

১২. খাবার পানি কিভাবে দেন? (টিক চিহ্ন দিন)

☐ সবসময় দেয়া থাকে ☐ দিনে ৪ বার ☐ দিনে ৩ বার অন্যান্য .....

১৩. বাচ্চা হওয়ার সাথে সাথেই কী মা থেকে বাচ্চা আলাদা করে ফেলেন? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

১৪. শালদুধ আনুমানিক বাছুরের জন্মের কত সময়ের মধ্যে খাওয়ান? .....

১৫. শালদুধ বাছুরকে কীভাবে খাওয়ান? (টিক চিহ্ন দিন)

☐ বাছুর নিজে মায়ের কাছ থেকে খায় ☐ বাছুরকে ফিডার দিয়ে খাওয়ান

অন্যান্য .....

১৬. খামারের শালদুধ সংরক্ষনের কোন ব্যবস্থা আছে ? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

(D) Breeding Management-related questions

১. গাভী গরম হয়েছে (হিটে আসছে) বুঝতে পারেন ? (টিক চিহ্ন দিন)

☐ Very confident (হিটে আসার তারিখ, লক্ষন, কোন মাসে হিটে না আসলে তার কারন ও বলতে পারেন)

☐ Confident (হিটে আসার তারিখ, লক্ষন গুলো সম্পকে অবগত)

☐ Somehow detected (হিটে আসার লক্ষন গুলো দিয়ে বুঝেন)

☐ No idea (ধারণা নাই)

২. গাভী গরম হয়েছে (ডাকে আসছে) কিনা তা কে নির্ণয় করেন ? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ খামারি ☐ কর্মচারি ☐ ভেটেনারি ডাক্তার অন্যান্য .....

৩. হিট নিণয় করার কত ঘন্টা পর কৃত্রিম প্রজনন করেন?.....

অন্যান্য .....

৪. কৃত্রিম প্রজনন কে করেন? ? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ খামারের কর্মী ☐ সরকারী কৃত্রিম প্রজননকারী ☐ বেসরকারী কৃত্রিম প্রজননকারী

☐ ভেটেনারি ডাক্তার অন্যান্য .....

৫. কৃত্রিম প্রজননকারী কী বীজ দেয়ার জন্য সময় মতো উপস্থিত হতে পারেন খামারে? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

৬. প্রতি কৃত্রিম প্রজননে কত টাকা খরচ হয়?.....

৭. কোথাকার সিমেন ব্যবহার করেন? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ ডি.এল.এস ☐ Commercial কোম্পানি অন্যান্য .....

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৮. কত % এর সিমেন ব্যবহার করেন? ? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ 50^% ☐ 62.5% ☐ 75% ☐ 82.5% ☐ 87.5% ☐ 100% অন্যান্য .....

৯. গরুকে নিয়মিত টিকা দেন? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

১০. কি কি টিকা দিয়েছেন? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ খুড়া রোগ ☐ তড়কা ☐ গলাফোলা ☐ এল.এস. ডি ☐ ওলান প্রদাহ অন্যান্য .....

১১. গত বছর কোনো বুষ্টার টিকা দিয়েছেন কী? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

১২. গরুকে নিয়মিত কৃমিনাশক খাওয়ান? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

১৩. ১ম কৃমিনাশক কত বয়স থেকে খাওয়ান? .....

১৪. কৃমিনাশক কত মাস অন্তর অন্তর খাওয়ান? .....

(E) Productive and reproductive performance -related questions

১. দুধ দোহন করেন দিনে কয় বার (টিক চিহ্ন দিন) ☐ ৩ বার ☐ ২ বার ☐ ১ বার

২. দুধ দোহনকারী কী নিদিষ্ট গরুর জন্য নিদিষ্ট করা আছে? (একই গরুকে প্রতিদিন একই কর্মী দুধ দোহন করে) (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না অন্যান্য .....

৩. দুধ দোহনের আগে কর্মীরা ওলান প্রদাহ প্রতিরোধে কোনো ব্যবস্থা নেন? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ সাবান দিয়ে হাত ধুয়া ☐ সাবান দিয়ে হাত ধুয়া +ওলানে জীবাণুনাশক স্প্রে করা ☐ অবগত নয়

অন্যান্য .....

৪. বাচ্চা দেওয়ার আগে দুধ দোহন কী কিছু সময় (কয়েক মাস) বন্ধ রাখেন? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

৫. বাচ্চা দেয়ার কত দিন/ মাস আগে দুধ দোহন বন্ধ করেন?.....

৬. দুধ দোহন কীভাবে বন্ধ করেন? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ খাবার কমিয়ে দিয়ে ☐ দুধ দোহনের সময় কমিয়ে দিয়ে ☐ দুধ দেয়া গরুর ঘর হতে আলাদা করে ফেলেন

☐ ঔষধ ব্যবহার করেন অন্যান্য .....

৭. দুধ দোহন করেন কোন পদ্ধতিতে? (টিক চিহ্ন দিন) ☐ হাতে ☐ মেশিন

৮. দৈনিক গড়ে কত লিটার দুধ পেয়ে থাকেন পুরো খামার হতে?.....

৯. দৈনিক একটি গাভী হতে গড়ে কত লিটার দুধ পেয়ে থাকেন.....

৬

১০. প্রতি লিটার দুধ কত টাকায় বিক্রি করেন?.....

১১. ধরুন আপনার খামারের ৫ টা গাভীকে বীজ তার মধ্যে কয়টা গাভী গভধারন করলো? (টিক চিহ্ন দিন)

☐ বেশিরভাগ সময় ৫ টিতেই গর্ভধারণ হয় ☐ বেশিরভাগ সময় ৪ টিতে গর্ভধারণ হয়

☐ বেশিরভাগ সময় ৩ টিতে গর্ভধারণ হয় ☐ বেশিরভাগ সময় ১-২ টিতে গর্ভধারণ হয়

১২. একটা গাভীকে গভধারন করনোর জন্য গড়ে কয়বার বীজ দিতে হয়?.....

১৩. বাছুর গড়ে কত বছর বয়সে ১ম হিটে আসার লক্ষন দেখায়?.....

১৪. গাভী গড়ে কত মাস/দিন পর বাচ্চা দেয়?.....

১৫. বিগত ১ বছরে খামারে কোনো গভপাত (বাচ্চা নষ্ট) হয়েছে? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

(F) Disease and Outbreak -related questions

১. বিগত ১ বছরে খামারে কোনো রোগ দেখা গেছে? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

২. এই রোগে কোন গরু মারা গেছে? (টিক চিহ্ন দিন) ☐ হ্যাঁ ☐ না

৩. বিগত ১ বছরে গরুতে কী কী রোগ হয়েছিল? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ খুড়া রোগ ☐ এল.এস. ডি ☐ ওলান প্রদাহ ☐ গভপাত/ বাচ্চা নষ্ট হয়ে যাওয়া

অন্যান্য .....

৪. কী কী ঔষধ ব্যবহার করেছেন?.....

.....

৫. চিকিৎসা বাবদ আনুমানিক কত টাকা খরচ হয়েছে (টাকায় লিখুন)

গত মাসে..... টাকা; গত ৬ মাসে..... টাকা; গত ১ বছরে..... টাকা

৬. আক্রান্ত গাভীতে দুধ উৎপাদন কমে গেছে কিনা?.....

৭. অন্য কোন রোগ দেখা গেছে কিনা? (একাধিক টিক চিহ্ন দেওয়া যেতে পারে)

☐ ডায়রিয়া ☐ ওলান প্রদাহ / ম্যাস্টাইটিস ☐ গর্ভপাত / বাচ্চা নষ্ট হয়ে যাওয়া ☐ শ্বাসকষ্ট

অন্যান্য .....

৮. বিগত ১ বছরে আপনার খামারে কোন বাছুর (১-৬ মাস বয়সে) মারা গেলে উল্লেখ করুন ..... টি

৯. বিগত ১ বছরে আপনার খামারে কোন গরু (১ বছরের উর্ধে) মারা গেলে উল্লেখ করুন ..... টি

১০. বিগত ৬ মাসে আপনার খামারে কোন গরুতে ডায়রিয়া দেখা গেলে উল্লেখ করুন ..... টি

১১. বিগত ৬ মাসে আপনার খামারে কোন গরুতে ক্ষুরারোগ দেখা গেলে উল্লেখ করুন ..... টি

১২. বিগত ৬ মাসে আপনার খামারে কোন গরুতে লাম্পি স্কিন ডিজিস দেখা গেলে উল্লেখ করুন ..... টি

আপনার খামার সম্পর্কিত অন্য কোনো তথ্য থাকলে উল্লেখ করতে পারেন

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আপনার মূল্যবান সময় দিয়ে গবেষণায় অংশগ্রহণ করার জন্য অসংখ্য ধন্যবাদ