Study on Management, Milk Production Level and Economic Performances of an Organic Dairy Farm in Chandpur District, Bangladesh

A Production Report Submitted

By

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Faculty of Veterinary Medicine

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Khulshi, Chattogram-4225, Bangladesh

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Table of Content

List of Table

ABSTRACT

A study was designed to investigate the managemental procedure and production level of crossbred of an organic dairy cattle farm at Matlab North Upazila in Chandpur District. The purpose of the study was to evaluate the overall farm management of 90 cattle. Reports on milk production and distribution, sanitation and cleanness, feeding, heat detection, breeding, healthcare, preventive measures with such related activities were recorded per day and the nutritional parameter of milk was observed by milk analyzer. Average milk production was 11.0 liters and daily milk production was maximum in third to fourth parity. Milk from about forty five cows contains more than 3% fat and rest contains less than 3% fat. The first forty five cows were crossbred of Holstein Friesian and others were cross of Holstein Friesian and deshi cow. The study also demarcates that the conception rate is higher in natural breeding than the artificial insemination. The studies mention the schedule of vaccination and anthelmintic along with the daily activities routines of a farm. All standard parameter of feed and milk are shown and why it varies from time to time, overall this study shows how to make a farm economically profitable by maintaining proper management and good hygiene system.

Key words: Farm management, Fat percentage, Conception rate, cow

CHAPTER 1

INTRODUCTION

Bangladesh is a densely populated agriculture based country and farm animals play the vital role in the national economy of this country. The total cattle population of our country is 24.4 million (DLS, 20118-2019). The contribution of livestock sub-sectors to the agricultural production and the annual growth rates of the livestock sub sectors are 13.62 and 7.6%, respectively (DLS, 2018-2019). The contribution of livestock sub-sectors in GDP in the year of 2015-2016, 2016-2017, 2017-2018 were 3.21, 3.32 and 3.40, respectively (DLS, 2018-19).The supply of the domestically produced livestock products (Meat and Milk) are progressed 1.8% annually (DLS, 2019). There are about 24.2 million cattle, out of which 7 million are dairy cattle of local and crossbred (DLS, 2018). Among these populations, 7 millions are only dairy cattle (DLS, 2018-2019) of which 87% are indigenous and 13% are crossbred cows (BBS, 2018).Data from the leading organization of dairy farmers, BDFA, say that now there are 1,200,000 dairy farms in the country and 9,400,000 people are directly or indirectly involved in the industry. The estimated investment in the local dairy sector now is around Tk90,000 crore (BDFA,2019). In recent, there are many dairy farm organized in Chandpur District of Bangladesh. Progress in dairying totally depends on the compatible care and effective management of the farm. All dairy operations must be in a planned way with due regard to the comfort of the animals. Pregnant cows and just after calving cows should be cared properly and they should get the attentive attention of the dairy farmer and that is why a well and proper management is so inevitable .Management is the art and science of combining ideas, facilities processes, materials and labour to create and market a worthwhile product or service successfully. For a proper management, a well-known skillful manager is mandatory to make a farm profitable. For the economic purposes, milk production is one of the most important factors in dairy farm. According to DLS (2018), Bangladesh produces 9.4 million tonnes of milk (against the requirement of 15.04 million tonnes) in a year and according to International Farm Comparison Network (IFCN), total milk production in Bangladesh stands at 8.08 million tonnes. This implies that Bangladesh produces only 63 percent of the total requirement (while as per IFCN it is 54 percent). As per BBS (2018), Bangladesh imports 0.11 million tonnes of milk. Although milk from the cow is processed, it is not an engineered or made food. It

contains about 87% water and 13% solids. The fat parts of the milk contain fat soluble vitamins. The solids other than fat, including proteins, carbohydrates, water soluble vitamins, and minerals. These nutrients in milk help to make it the nature's most nearly perfect food. Milk and milk products contain high quality proteins. The whey protein constitutes about 19 percent of the protein content of milk. Casein which a protein found only in milk, contains all of the essential amino acids. It is responsible for 82% of the total proteins in milk and is used as a standard for evaluating protein of other foods. Protein is very much needed to build and repair our body tissues and to form antibodies which circulate in the blood and help fight against infection. Milk especially contains the following nutrients: calcium, phosphorus, magnesium, and potassium. The calcium founds in milk is readily absorbed by the body. Phosphorus plays a magnificent role in calcium absorption and utilization. Phosphorus is also needed in the proper ratio to calcium to form bone. Milk provides these two minerals in almost the same ratio as found in bone. Milk is also a crucial source of riboflavin (vitamin B_2) which helps to promote healthy skin and eyes, as well as vitamins A and D. Milk production in a dairy farm depends mostly on its hygienic management and mathematical nutritional feed supply.

Purposes:

The purposes of the study were:

I) To evaluate the management status (i.e. farm management, feeding management) of an organic dairy farm.

ii) To record the hygienic and health condition of the farm as well as animals.

iii) To observe the yield of average milk production.

CHAPTER 2

MATERIALS AND METHODS

2.1 Study Area

The study was carried out hygienic management and production of an organic dairy farm at Matlob North in Chandpur district.

2.2 Duration of Study

The study duration was from 25 June, 2020 to 8 July, 2020 when I was staying at my native village after abating the intense of worldwide ongoing corona pandemic.

2.3 History of Farm

In recent there are many established dairy farm in Chandpur district. Soleman organic dairy farm is one of them which was established in 2004.The farm is located at Mohonpur, Matlob North, Chandur. The farm initially started with four cows. Gradually the number of cows is increased. The total cattle population in this farm is about 90 in two shed. Among them there 62 lactating cows, 6 dry cows, 1 bull and 21 cows are calf. The animal record is given below.

Table 1: Record of animal

Date	Cow	Male calf	Female calf	Bull	Death	Total
18.01.2004	1	1	1	-	-	3
9.09.2005	3	-	2	1	-	6
23.05.2007	5	1	3	-	1 sold	9
28.11.2010	8	4	4	1	-	17
12.06.2012	14	2	2	1	1 sold	20
20.03.2014	23	4	3	4	-	34
19.01.2016	32	8	7	5	4 sold	56
18.05.2019	45	10	8	-	6 sold	69

2.4 Data Collection:

Data was collected by using questionnaire. The questionnaire is given below.

2.5 Sample collection:

Milk sample is collected two times in a day (morning & evening).After collecting the sample was carried in lab by using portable ice box and analysis different milk nutrient parameter by using milk analyzer.

2.6 Data analysis:

The total cattle population in this farm is about 90 in two shed. Among them there 62 lactating cows, 6 dry cows, 1 bull and 21 cows are calves. For the study the animal used which reared intensive or semi intensive housing system and supplied balance ration with the exception for local non descriptive breed, those are reared under plane nutrition and loose housing system. The recorded data were subjected to statistical.

2.7 QUESTIONNAIRE

Date: sample no:

1. Name of the Farm:

Owners

name.……..……

Address.……

Farm size.……

No. of Milking Animals……

Average Milk Production.……

Breed: Local / Cross (Dam ID)……

Type of breeding: Natural/Artificial……

2. Description of the Animal:

a) Cow ID. ……

b) Date of Birth…… Age……

c) Weight……

d) BCS……

e) Parity.……

f) Status of Animal: Non Pregnant/Pregnant (…….month)……

3. Description of Milk Production:

a) Frequency of Milking ……

b) Milk Production per Day….lit (Morning-…..lit/Evening- …..Lit).

c) Days in Milk……

d) Where Milking……. (Outside/Milk Parlor/House)

e) Type of milking ……Hand milking/Machine milking

f) Any infection in Udder: Y/N.

g) Any infection in Teat or Udder : Y/N (If Y then No of Teat infected……)

h) Milk Production level before infection:

i) Milk Production level after Infection:

j) Pre-parturient diseases during last calving….Y/N. If Y then name of the disease.

4) Environment & Management condition:

a) Housing…stanchion(intensive)/semi-open(semi intensive)/open/other

b) Housing System……face in/face out/other

c) Floor Type…..concrete/semi-concrete/muddy/bamboo made

d) Frequency of floor washing……no/……..times

e) Washing the udder before milking…….Y/N. If Y then the name of the antiseptic solution

f) Washing the udder after milking.....Y/N. If Y then then name of the antiseptic solution

g) Washing milker's hand before milking…..Y/N. If Y then the
name of the antiseptic solution

h) Use of any food after milking…….Y/N

i) Source of water…….Tube-well/river/pond

j) Practice of Dry cow therapy……..Y/N

k) How long the cow remained dry before last calving…… 3 months/N

l) Stimulation of milk let down by calf……Y/N

5) Result of WST……+/-

6) Result of CMT……. +/-

7) Result of Surf Field Test

CHAPTER 3

RESULT AND DISCUSSION

3.1 Management of Farm:

Farm management is a very crucial factor to make the dairy farm more profitable. In Soleman Organic dairy farm they maintain proper hygienic management and following the points.

· Housing
· Feeding & watering
· Breeding
· Grazing
· Record keeping
· Sanitation
· Treatment and Vaccination

3.2 Housing:

An efficient management of a dairy cattle farm will be uncompleted without a well - planned & adequate housing system. Inaccurate planning management of animal housing may result in additional labor charge and then reduce the profit of farm. There are two shed in Soleman organic dairy farm. The housing is completely intensive with face in system. The floor is concreted. The approximate length of feed alley 4 ft, manger 2.2ft, Stall 4.5ft, Gutter 1 ft, Passage 4ft. There are different shed in that dairy farm. Such as milk cow shed, dry cow shed, maternity box, Isolation shed, Calf shed, Bull shed.

3.3 Feeding & Watering Management.

Healthy rumen equal to healthy cattle. Although sufficient nutrition and cattle health goes beyond taking care of the rumen microbes reducing digestive problems &promoting a rumen with healthy microbe population can prevent many serious problems in cattle.

In this Farm, feed supply per day per animal:

ATI Cattle feed	6kg
German Grass	20kg
Straw	5kg
Salt	50gm

In Soleman organic dairy farm, workers provide German grass 20 kg, ATI cattle feed 6kg,straw 5 kg and salt 50 gm for every cattle maintaining the proper ratio of daily basis requirement.

3.4 Feed analysis:

ATI cattle feed was evaluated in laboratory and following nutrient found.

DM intake	4-6% of the DM.
Neutral detergent fiber (NDF)	27% of the DM
Fat	4 of the DM
CP	18% of the DM
CF	46 of the DM

(Data was collected from the previous feed analysis record of this farm)

In this dairy farm, the feed ingredients are stored in feed storage room. They fed their cow ATI cattle feed. They also supply adequate amount of fodder that are cultivated in their own land. Sometimes they also supply some straw as a feed. In this table shows the requiremental nutrient percentages that must have contained in the feed .A proper well organized feed routine is highly remarkable to make a firm profitable.

3.5 Breeding:

Primarily they performed an artificial insemination in their herd. But conception rate was poor. So they decided to perform natural breeding in their herd. They reared a bull whose mother provided more milk. Finally they used this bull for natural breeding and observed the conception rate is almost 90%.

3.6 Ventilation:

In proper housing design always should be kept for maximize ventilation. 100 feet of space between buildings, optimize, air flow. Stalls & feeding areas specially need sufficient air movement to make ensure full utilization by cows. Whatever the system, the air velocity should be 220 feet per minute. (Howard and Ensminger, 2006)

3.7 Lighting:

In each pan should necessary proper lighting. The electrical wires should be designed in a proper way. Not hanging any wire, otherwise, accident may occur at any time. (Howard and Ensminger,2006)

In the farm of dairy unit, there is enough ventilation facility. The farm is located East-West in position. There is also enough lighting. There are no bedding materials in the brick floor. Besides there are enough protective measure against mosquitoes and other insects.

3.8 Heat abatement:

Although cold weather is rarely a major cow comfort issues, hot weather quite often impinges on cow comfort, soothing feed intake, impairing reproductive performance etc. Heat stress becomes apparent in dairy cattle when the total heat load exceeds the cow's capacity to carry. The heat load consists the heat generated by the cow & the heat provided on the cow from surrounding environment. The environmental load includes any number of factors; however the temperature humidity index (THI) incorporates several of them to give an estimate of environment heat stress.

3.9 Milking time:

There are two times for milking, one time is morning and another time is evening. Washing of animal and udder are performed before milking. The floor is also cleaned in that time. The type of milking is hand milking for that They have 10 workers of this farm.

3.10 Manure disposal:

There has a gutter for disposal of manure and urine. There is a big manure tank behind the farm. The manure is used for bio-gas plant and some used in fodder land for the better growth of grass. After using in bio-gas plant, the remain manure is sold.

3.11 Sanitation of the farm:

The sanitary condition of this farm is quite satisfactory. Cleaning of floor is performed by washing in the morning by running tape water. In a week, they clean the whole floor by using disinfectant (potassium permanganate). The floor is only made of concrete brick floor, no bedding materials are used. The manure is disposed in the pit behind the room. There is only one drain which is 26cm in width and 44f in length in between paved and unpaved area.

3.12 Record keeping:

Record keeping is essential to find out the best cows & can know which one is profitable & helps to cull the inferior animals. The important records are given below:

- Milk yield record
- Cattle feed register
- Fat % in milk
- Calf register
- Breeding record
- Health record of individual cow
- Stock register of cattle

3.13 Treatment:

Prevention is better than cure so hygienic management is the foremost factor for a good farm. In Soleman Organic dairy farm they maintain good hygienic management. If disease occurred then have to be treated in a proper way. Seasonally FMD was found in severe form and some calf die instantly .They usually used potassium permanganate locally and antibiotic in systemically .Some animal affected with mastitis and decrease their milk production rate. In this case, they used intramammary infusion and antibiotic

in systemically. In every three to four months deworming of all animals. Besides, treatment was given for coughing, fever, inappetite etc.

3.14 Vaccination schedule:

All the healthy animal are vaccinated on a scheduled basis. The schedule is provided below both bacterial and viral.

Table 2: Bacterial vaccine (LRI)

Vaccine	Preservation	Dose & route	Booster
Anthrax live spore vaccine	3-6 month	1ml s/cly	Yearly
Black quarter killed	6 month	5ml s/cly	Ever 6 month
Hemorrhagic septicemia vaccine oil adjuvant killed	6 month	2ml s/c	Yearly

Starting from the farm, they maintained above this schedule because this vaccination schedule covers all the major disease that are frequently occurred. Proper vaccination keeps animal healthy and increases the production percentage.

Table 3: Viral Vaccine (LRI)

Viral Vaccine	Type
FMD Vaccine	Monovalent 3 ml s/cly every 6 month Bivalent 6 ml s/cly Trivalent 9m s/cly
Rinder pest, Tissue culture vaccine	Dissolve in 100ml distilled water & administered 1 ml/animal of 6 months old
Anti-rabies vaccine	Calf (>30lb): 10ml daily for 7days Heifer: 20ml for 14 days Cattle: 30 ml for 14 day

Mentioning all viral vaccines are maintained to curb the infection of all major viruses.

3.15 Deworming:

All the animals are dewormed against the infestation for both internal parasites (endoparasites) and external parasites three times in a year. They usually used Albendazole and triclabendazole as an anthelmintic for the curb of parasite infestation.

Table 4: Anthemintic Schedule:

Name of the drug(Group)	Schedule of drug apply
Albendazole	1st dose
Triclabendazole	2nd dose
Albendazole	3rd dose

This anthelmintic schedule is followed by this farm for every animals.The owner of this farm is highly concerned regarding the attack of parasites because he knows it very well that parasite can cause the most hamper on animal health as well as production rate. So he antheminates all the animal after every three month at proper dosages.

Table 5: Daily work schedule in Soleman organic dairy farm

Time	Activities
5.30-6.00am	Washing of floor, removal of dung and detection of heat.
6-8.30am	Washing of milk utensils and milking.
8.30-10.0am	Supply of concentrate feed, Milking & supply of roughage.
10.15-12pm	Bathing of animals, Grass collection from fodder land.
12.00-3.30pm	Leisure period
3.30-5.45pm	Washing of milk utensils & milking.
5.45-6.00pm	Supply of concentrate & roughage feed.
6.30-7.00pm	Cleaning & washing of the floor as well as the premises, dung removal.
7.00-5.30am	Leisure period.

In this table shows the regular activities of the farm. The workers of this farm do the all work properly according to the routine wise.

Table 6: Descriptive statistics of milk yield, age and body weight parameter.

ID No	No. of Cow.	Age (Av. Year)	Av. Body Weight(kg)	No of Parity	Milk Yield(Lit/day)	
					Morning	Evening
ID:1	16	5.5-6.5	475	4	8	4
ID:2	12	5-6	435	4	6	2
ID:3	10	5-6	435	3	7	3
ID:4	15	5.5-6	475	4	5	2
ID:5	8	4-5	390	3	7	3
ID:6	5	3-4	375	2	4	2
ID:7	8	3-4	250	1	4	1

Parity was positively associated with milk production performances. This finding tallies with other studies and may be partly explained by the highest milk production capacity coupled with greater feed intake in older cows than young ones (Johnson et al., 2002). However, cow in 5th and more lactations were no longer better producers compared to those in their 3rd lactation period. The older age may contribute to abate milk production through turnover rate of the secretory cells, with higher numbers damaging compared to the newly produced active secretory cells. Fat tissue cells usually replace dead secretory cells.

In above table ID (1, 2, 3, 4, and 5) the cows are cross of Holstein Frisian and the rest is dashy Cows. In ID (1, 3, 5) the cows yield av. 10 to 12 litter per day but in ID (2, 4) the cows yield av. 6 to 8 litter due to thy affected mastitis previously. So milk production is decreased ID (2, 4) cows. In above table, milk production is high in third to fourth parity. Milk production is also increased in high body weight.

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Table 7: Nutrient Parameter of Milk

Sample no	Fat%	Solid%	Protein%	Lactose%	Density	Mineral%
01.	2.9	8.52	3.34	4.63	1.0298	0.72
02.	3.26	8.97	3.55	4.95	1.0316	0.73
03.	3.28	8.93	3.50	4.87	1.0312	0.72
04.	3.1	9.08	3.49	4.85	1.0314	0.76
05.	2.96	9.1	3.14	4.94	1.0523	0.70
06.	2.76	8	3.26	4.71	1.0423	0.73
07.	2.86	8.56	3.55	4.12	1.0368	0.78
08.	3.2	9.7	3.34	4.32	1.0123	0.72
09.	3.08	8.05	3.00	4.08	1.0456	0.78
Average	3.04	8.76	3.35	4.60	1.03481	0.73

In general, the gross composition of cow's milk contains 87.8% water, 4.9% lactose (carbohydrate), 3.4% fat, 3.2% protein, and 0.7% minerals (referred to as ash). Milk composition alters depending on the species (cow, goat and sheep), breed (Holstein, Jersey), the animal's feed, and the stage of lactation period. Although there are minor alterations in milk composition, the milk from different cows are stored together in bulk tanks and provides a relatively consistent composition range in the dairy farm.

The composition of fat percentage of milk is higher than 3% in sample no. 2, 3, 4, 8, 9. The fat percentage is lower than 3% in sample no.1, 5, 6, and 7. The protein percentage is higher than 3% in all samples.

CHAPTER 4

CONCLUSION

The hygienic management of Soleman organic dairy farm is satisfactory that's why many diseases are prevented in this farm. The milk production level is also appeasement.To make a farm profitable economically proper management is mandatory.

CHAPTER 5

LIMITATION

Due to the ongoing corona pandemic, i could not include more requiremental information regarding this production report and others additional parameter could not be analyzed due to the lacking of laboratory in my village.

CHAPTER 6

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The Author

BIOGRAPHY

I'm **Tuhin Alam Dipu**, an intern student at Chattogram Veterinary and Animal Sciences University (CVASU), originate from Chandpur district. After completing one year intern period, I will receive my Doctor of Veterinary Medicine (DVM) degree with lots of real life experiences. I have an interest on large animal production and their management .I have a great intention to perform clinical practice as a permanent clinical practitioner in future.