

CHAPTER 1

INTRODUCTION

Dairy farming is one form of urban agriculture and it often occurs in integration with others. Firstly, urban agriculture improves a household's access to food during times of shortage, instability or uncertainty (Bush, 2010; Zezza & Tasciotti, 2010). Secondly, urban agriculture can act as an income source as farmers produce for markets or sell surplus, which ameliorates income security (Cohen & Garrett, 2010; Mougeot, 2005). Lastly, it improves the individual health by providing highly nutritious and fresh foods (Zezza & Tasciotti, 2010). There are some downsides to urban agriculture such as the increased risk for the spread of diseases from animals to humans as well as sanitary and environmental problems due to farm waste, urine and manure (Bonfoh, et al., 2010; Menzi, et al., 2010).

In Bangladesh, dairy is considered as an important activity for improving the socioeconomic rural families, especially the small and marginal farmers and land less agricultural laborers. Statistics shows that, the contribution of the livestock to the country's gross domestic product (GDP) is around 1.54% and to agricultural GDP is about 13.62% with GDP growth rate 3.40% itself. The livestock sub-sector provides full time employment for 20% of the total population and part-time employment for another 45% (DLS, 2018). It plays a great role in alleviating poverty eradication employment generation and an instrument of social change in rural Bangladesh. The domestic availability of milk in Bangladesh is 158.19 ml/day/head where demand is 250ml/day/head. So, 37 percent of requirements remain to fulfill the complete public demand (DLS, 2018). Traditional dairying in Bangladesh is characterized by small-scale backyard type production in rural areas and only a few large commercial farms are found near urban areas. Dairying in Chittagong city, like other cities is rest with the individual unit of small size. Most of the farmers belong to the small or marginal category, owing two or three heads of cattle and less than two hectare of land.

Cattle population in Bangladesh is about 24.09 million (DLS, 2018). Only a limited number of farmers have cow for milk production. Maximum cattle are indigenous type. These animals are reared by providing green grass and straw and little amount

concentrate is given which is not enough for them. Husbandry practices and health care of these animals are poor (Jabbar and Raha, 1984). The average milk production of local cows is very low and it varies between 300 to 400 liters per lactation period of 180 to 240 days. Low productivity of indigenous cows is a major constraint for future development of the livestock sector. High productive exotic breeds and their crosses normally do not have adequate resistance against the prevalent diseases. They do not thrive well in our environment. In spite of all these problems, some people have shown interest for development of small dairy farms. Generally crossbred cows under village condition yields 600 to 800 liters of milk per lactation of 210 to 240 days (Islam, 1992).

In Chittagong district area, small and large scale dairy farms have been building up day by day. The adequate knowledge of management practices is very necessary for making this industry more profitable. Therefore the current study is conducted with the following objectives.

- a. To determine the real status regarding breeding, feeding, housing, milking, marketing of milk and management aspects of dairy farms in semi-urban area.
- b. To compare the productive and reproductive performances of crossbred and indigenous cows on dairy farm management reared in small dairy farms.

CHAPTER 2

REVIEW OF LITERATURE

The main goal in a commercial dairy operation is to optimize calf production per cow as commercially as possible. It is well established that maintaining a satisfactory fertility level is the fundamental aspect for successful operation of any cattle breeding program.

The average calving interval ranged from 365-536 days among the indigenous and crossbred cattle. (Kamal, 2010). Talukdar (2003) observed the average calving interval in RCC in farming condition was 374.73 days. But Khan, et al. (2000) found the average calving interval of RCC in farm conditions and in rural conditions were 458.40 days and 529.35 days. On the other hand calving interval of crossbred was 635.10 days and in indigenous cow was 539.40 days (Ali, et al. 2000).

The service per conception of RCC in rural and in farm condition were 1.47 and 1.57 (Khan, et al. 2000). For an ideal farm the optimum service per conception should be 1.33. (Kruif, 1978).

Nutrition affects the age at puberty. In tropics under conditions of very poor nutrition and high degree of environmental stress which delays the age of puberty. (Nurraddis, et al. 2017).

The low conception rate can be caused by failure of estrus detection because most of the farmers are unaware of secondary signs of estrus such as mucus discharge and swollen vulva. (Shamsuddin, et al. 2006).

Talukdar (2003) reported that the gestation length of RCC was 279.58 days. Another research revealed that the length of gestation period of RCC in rural and farm conditions were 282 days and 281 days (Khan, et al. 2000).

A notorious disease known as brucellosis affects reproductive tract and decreases the fertility. (Rahman, et al; 2006) reported the seroprevalence of brucellosis 2.4-18.4%. Another research revealed that seroprevalence of brucellosis in cattle is 4.4% and in human is 6% (Azimun, 2007). Cattle aged more than 5 years had significantly

higher prevalence of 7.69 and 2.56% than that aged below 5 years.(Rahman, et al;2009).

Repeat breeding is another constraint for dairy farming. Early embryonic death is one of the main cause of repeat breeding which in turn causes the economic loss to the dairy farm. (Rahman, et al; 1996). Aspergillus, Candida also cause repeat breeding in cattle. (Kamal, et al; 1999).

BLRI (2004) found the total lactation yield was 800 litres in RCC in rural condition. (Khan, et al; 2000) reported the average milk production per cow per day of RCC was 1.35-2.65 kg in farm condition and in rural condition 1.08-2.57 kg.

The duration of post-partum anoestrus is affected by level of production and suckling as a distinction from milking, in that the interval from calving to first estrus was greater in cows with higher production and in cows nursing calves. A longer postpartum interval to first estrus occurred in nursed dairy cows because suckling reduced the release of gonadotrophin hormones. (Stephanie et. al; 2002)

Involution of uterus is prolonged in pluriparous cows when compared to primiparous cows and the interval from calving to first estrus is greater in older pluriparous cows with 4 or more parturitions. (Stephen, et al; 2002).

Herd size and housing have effects on reproductive health of dairy cattle. In Closely confined houses flies are abundant and some data indicate that exposure to flies exacerbates problems of heat stress. (Young, et al; 2007).Concrete flooring reduces the expression of estrus intensity and lameness, which is one of the consequences of housing. Closely associated with increased herd size, there is a reduction in the accuracy and efficiency of estrus detection. In large herds cows loss their individual identity, they are not so accurately identified. Confined spaces and muddy floors sometimes prevent cows from showing signs of estrus. (Arthur, et al; 1989).

CHAPTER 3

MATERIALS AND METHODS

2.1. Study Area

The study was conducted at ten selected farms from Fatikchhari upazila of Chattogram district in Bangladesh. The study is performed 15 November 2019 to 13 December 2019

2.2. Surveying features

The survey schedule was prepared based on the following key items: owner's general information, cattle population, sources of fund, housing system, feeds and feeding system, breeding system, overall management system, costs and returns of raising dairy cows, problems in dairying etc.

2.3. Farms selection:

The selection of farm is done by random selection for this purposes. The data regarding productive and reproductive parameters of 570 crossbred cows and 160 indigenous dairy cows were collected.

2.4. Data collection

Data collection performed through direct interviews and personal visits to the farm of selected farmers. Before the interview a briefing on dairy industry improvement is provided. Responses of farmers were recorded directly on the interview schedules. Data on farmer's occupations, business type, education level, land size, training received, fund source, income, types of dairy cattle etc. were collected. Apart from these, reproductive performance such as dry period, calving interval, milk yield, lactation period, service per conception etc. was also collected. Besides, cost benefit ratio was also measured from the collected data.

2.5. Data Analysis

Collected data from the farmers were compiled and tabulated. Tabulated data were arranged as percent value.

CHAPTER 4

RESULTS AND DISCUSSION

3.1. General information of dairy farm owners

The data collected from the dairy farm owners and staffs in Fatikchhari Upazilla presented in Table 1. 40% of the farm owners had agriculture as the principal occupation and the rest are educated young man, businessman, etc. It was observed that 70% of the farmers had taken dairying as a main business and the rest as side business. Kabir (1995) conducted an economic study and observed that the average literacy rate of farm households was also sufficiently higher than the national average. More than 76% house numbers of family in all the farm categories had m above primary level of education. Majority of the The crossbred farm owners are highly educated enthusiastic person. The highest percentage (40%) of farmers possesses 1-3 acres of land and lowest percentage (10%) of farmers possesses 2-4 acres of land. It was found that 50% farmers had training on dairy farms and 50% farms had no training on dairy farm management. For establishing dairy farms, 40% of dairy farmers were dependent on bank loan, 20% on their own sources and 40% on bank loan and own source. The average capital investment was Tk. 400,000 to 800,000 Tk.

Table 1: General information of farm owner

Parameters	Statements	No. of farms	Percentage (%)
Owner's occupation	Dairy farming	2	20
	Business	3	30
	Service holder	1	10
	Agriculture	4	40
Dairy farming as a business	Main Business	7	70
	Side Business	3	30
Land size (acre)	1-2	2	20
	1-3	4	40
	2-4	1	10
	Above 5	3	30

Training received	Yes	5	50
	No	5	50
Source of fund	Credit/loan from bank	4	40
	Own source	2	20
	Both	4	40
Herd size	10-30	1	10
	31-50	2	20
	51-70	3	30
	71-90	2	20
	91-100	2	20
Monthly income(Lakh)	4-5	1	10
	5-6	3	30
	6-7	2	20
	7-8	4	40

Table 2: Different categories of dairy cattle in the farms

Categories of animal	Indigenous animal	Percentage (%)	Crossbred animal	Percentage (%)	Average no. of animal
Milch cow	25	3.42	200	27.40	23
Dry cow	10	1.36	40	5.47	5
Pregnant cow	15	2.05	35	4.79	5
Heifer	72	9.86	85	11.64	16
Yearling bull	3	0.41	10	1.36	3
Bull calf	10	1.36	70	9.60	8
Heifer calf	15	2.05	130	17.80	15
Total	150	20.83%	570	79.16%	

3.2. Productive and reproductive parameters of crossbred and indigenous cows:

Dry period: The average dry period for crossbred and indigenous cows was 99.5 days (Table 3). There was a variation in the length of dry period of crossbred and indigenous cows. Dry period is important for udder health development and the growth of fetus .the standard dry period is 60 days.

Calving interval: The average length of calving interval of crossbred and indigenous cows stood at 415.6days (Table 3). Nahar (1987) found that under urban conditions, the mean calving interval of Sindhi and Sahiwal cows were 415 and 429 days, respectively. Ali et al. (2000) stated that average length of calving interval of crossbred and indigenous were 653 and 539 days, respectively which contradict to this study. The calving interval is inverse to the profitability of the farm. The average calving interval of RCC in farm conditions and in rural area were 458.40 days and 529.35 days (Khan et al 2000). BLRI (2004) reported that the calving interval of RCC was 12 months under traditional systems and the crossbred cows were 635.10 days.

Service per conception: The average services per conception was 2.92 (Table 3). The average service per conception in RCC were 1.47 in rural condition and 1.57 in farm condition .1.45 of RCC in BAU dairy farm (Talukder, 2003)and 1.5 in Mymensingh rural area (Azizunessa, 2002)

Table3: Productive and reproductive performances of dairy cow in the visited farm

Parameters	Average
Dry Period (days)	99.5
Calving interval(days)	415.6
Service per conception	2.95
Calving to first service (days)	115
Highest milk production (Li/d)	15.5
Lowest milk production (Li/d)	7.40
Milk yield(Li/lactation)	1150
Lactation period(days)	290

Highest and lowest milk production: It was revealed from Table 3 that the highest milk production from cows was 15.5litres/day, and lowest milk production from cows were 7.4 litres/day, respectively.

Milk yield per lactation: Milk yield per lactation was 1505liters. Another studies run by Halim (1992) who found that total milk production per lactation of crossbred and indigenous cows were 800 and 296 litres, respectively.

Lactation period: The average lactation period for cows was 290 days. Similar study performed by Halim (1992) who found the length of lactation period for crossbred and indigenous cows were 259 and 228 days, respectively.

Costs of rearing dairy cows in the study area: In this study cost items including were feed labor, housing, Medicinal cost, AI cost, electricity cost and interest on fixed and operating capital.

Feed cost: Cost of feed included here on paddy straw, green grass and concentrate. Feeds were valued according to the market prices actually paid for the items. Home produced feeds were also valued according to the market prices in the market. Some owners produced green grass. Farmers feed their cows by using weeds, legume as a substitute of green grass.

Labour cost: The total labour cost was transferred into per cow per day level. However, it can be observed that on an average labour cost per cow per day amount Tk. 30.00.

Housing cost: The maximum building of dairy farm is half bricked with tin shade. The cost of housing was computed by taking the consideration of the depreciation cost, repairing cost and interest of the average value of cattle shed. It was observed that on an average housing cost per day per cow was Tk. 210.

Veterinary cost: It was found that veterinary cost/cow/day was Tk. 5.50. Halim (1992) who found that the treatment cost per lactation of crossbred cows was Tk. 95.00. It was found in this study that the treatment cost was higher for crossbred.

A.I. cost: From the Table 5, it was found that A.I. Cost for a crossbred was Tk. 2.50. Interest on capital and operating cost: feed cost, hired labour cost and veterinary cost. The interest for capital was calculated at the rate of 1.25 % per

annum. Table 5 shows that the interest on capital (average value of cow operating capital) per day per cow was Tk. 8.25.

Table 4: Costs of rearing crossbred dairy cows per day returns per day per cow

Items	Quantity (kg)	Unit price (tk/kg)	Total cost (tk)
Green grass	12	5	60
Concentrates	4	20	80
Straw			35
Labour cost			30
Building cost			210
Veterinary cost			5.5
A.I cost			2.5
Transport cost			2.5
Accessories			1.5
Interest on capital			9.5
Total			434

3.3. Returns from rearing crossbred dairy cows/day/cow in the study area

The return composed of return from milk yield, cow dung, empty gunny bag and return from use of animal for other purposes. All these items were considered in computing the gross return from dairy cows returns per day were calculated on per day basis and an average per day return from cow was Tk. 5.50.

Table 5: Returns from rearing per dairy cow per day in the study area

Return items	Unit	Quantity	Price(taka/lit)	Total
Return from milk	Litter	11.45	60	687
Return from cow dung	kg	5	4	20
Empty gunny bag				25
Total				732
Gross cost		434		
Net return				298
Cost benefit ratio		1.68		

Discussions:

By analyzing the data it is revealed that the cost benefit ratio is 1.68 which is a satisfactory figure. It is possible due to good management.

Chapter 5

CONCLUSION

It is found that the management condition of medium and large scale dairy farms Fatikchhari upazila is more or less traditional and the productive and reproductive performance of crossbred cows was more satisfactory than that of indigenous cows. Day by day much people show so much interest in dairy industry because it is improving day by day .It will be more profitable if government aids is increased such as subsidy on purchasing of tools, feed, etc., and low interest bank loan.

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Appendix

Questionnaire

Name of the farmers:

Address:

Occupation:

Farmer's business type: Side / Main

Land size:

Sources of fund: Bank loan / NGO / Own

No. of animals:

Type of animals: Heifer / Bull / Pregnant / Dairy cattle / Lactating

Name of breed: cross / pure / deshi / local

Amount of milk production per year:

Housing system: Intensive / Semi intensive

Feeding system and ingredients cost

- a. @ Feed ingredients:
- b. @ Supplements (if any)
- c. @Feeding method (Individual/Group)

Herd size:

Productive and Reproductive traits of animals:

Service per conception:

Duration of dry period:

Calving interval:

Calving to first service (days):

Milk yield / production: Monthly / yearly

Lactation period:

Highest milk production (Litre/d):

Lowest milk production (Litre/d):

Milk yield (Litre/lactation):

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Biography

I am Saikat Barua, son of Mr. Nirjon Kanti Barua and Mrs. Sanchita Barua. I passed Secondary School Certificate in 2011 (GPA-5.00) followed by Higher Secondary Certificate in 2013 (GPA-4.80). Now I am an intern veterinarian under Faculty of Veterinary Medicine in Chattogram Veterinary and Animal Sciences University (CVASU). In future, I would like to work as a veterinary practitioner and research on animal diseases and production improvement in Bangladesh.