

CHAPTER-I

INTRODUCTION

Livestock keeping has been and is important in and around ancient and modern cities (Waters Bayer, 1996; Schiere, 2001). It is but one form of urban agriculture and it often occurs in integration with others. Urban agriculture is used as a strategy by many urban dwellers to improve their livelihoods and overall well-being. 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 generating activity as farmers produce for markets or sell surplus, which contributes to a household's income security (Cohen & Garrett, 2010; Mougeot, 2005). Lastly, it contributes to improved health among the urban population by providing highly nutritious and fresh foods (Zezza & Tasciotti, 2010). Despite these positive aspects of food security, livelihoods and access to nutritional foods, there are downsides to urban agriculture. Some major problems are the increased risk for the spread of diseases from animals to humans as well as sanitary and environmental problems related to waste, water and manure (Bonfoh, et al., 2010; Menzi et al., 2010).

In Bangladesh, dairy development is recognized as an important activity suitable for increasing the income level of rural families, especially the small and marginal farmers and land less agricultural laborers. Livestock plays an important role in the agricultural economy of Bangladesh. The contribution of the livestock sub-sector to the country's gross domestic product (GDP) is around 3.6 percent and to agricultural GDP is about 11.72 percent (BBS, 1996). The share of this sub-sector to total value of exports was 6.19 percent and to value of agricultural exports was 18.04 percent in 1994-95 (BBS, 1997a). This sub-sector provides full time employment for about to 20 percent of the rural population (MOFL, 1990; Alam, 1995; GOB, 1997). Dairying is a valuable treasure and source of poverty eradication, employment generation and an instrument of social change in rural Bangladesh. The bulk of milk production in our country is in the hand of thousands of small producers scattered all over. The domestic production of milk in

Bangladesh is only 13.81 percent of minimum requirements (GOB, 1997). To bridge the gap, the country had to import 57273 metric tons of milk by spending Taka 2646 million of hard earned foreign exchange annually during the period 1985/86 to 1993/94 (Kabir, 1995). 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 24.13 million (FAO, 1994). In the rural area, cattle are kept mainly for draught purpose. Only a limited number of farmers have cow for milk production. Maximum cattle are non-descriptive type, which do not belong to any specific breed and termed as indigenous cattle. These animals are kept mainly in the stall with limited grazing on the roadside, embankment slope; fallow land and paddy straw are their staple food. 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. Such low productivity of indigenous cows is an important 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 if milk per lactation of 210 to 240 days (Islam, 1992).

In Chittagong district area, small and large scale dairy farms have been increasing day by day. Especially low income group of people has taken this farming as profitable enterprise. In order to establish future plan for dairy development in this region, it is essential to know details about the management practices and performances of different types of dairy breeds. Thus the study was undertaken with the following objectives.

- i) To determine the real status regarding breeding, feeding, housing, milking, marketing of milk and and management aspects of dairy farms in semi-urban area.
- ii) To compare the productive and reproductive performances of crossbred and indigenous cows on dairy farm management reared in small dairy farms.
- iii) To determine the costs and returns of marginal dairy farmers in dairy farms.

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MATERIALS AND METHODS

2.1. Study Area

The study was conducted at ten selected farms from Patiya and Hathazari Upazila of Chittagong district in Bangladesh. Data were collected by a designed survey schedule through a pre-formed **questionnaire (attached in appendix)** according to objectives of the current study during January to December, 2017.

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, over all management system, costs and returns of raising dairy cows, problems in dairying etc.

2.3. Farms selection

A total of ten small dairy farms were randomly selected and surveyed for this purposes. The data regarding productive and reproductive parameters of 870 crossbred cows and 260 indigenous dairy cows were collected.

2.4. Data collection

Data were collected through direct interviews and personal visits to the farm of selected farmers. Before beginning the interview, each respondent was given a brief description about the nature and purpose of the study. 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 ration 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.

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RESULTS AND DISCUSSION

3.1. General information of small dairy farm owners

The data collected from the farmers on the general information of dairy farm owners in Chittagong district presented in Table 1. The results showed that the highest percentage (40%) of the farmers had agriculture as the principal occupation and the rest job seekers, agriculture etc. It was observed that 80% of the farmers had taken dairying as a main business and the rest as side business. Highest percentage (60%) of the farmers had secondary level education and nobody was found illiterate and under secondary education level. Kabir (1995) conducted an economic study and found that the average literacy rate of farm households in all farm categories was also sufficiently higher than the national average. More than 76% house numbers of family in all the farm categories had above primary level of education. The crossbred farm owners had relatively higher level of education. Farmers were further categorized based on land owner. The highest percentage (40%) of farmers possesses 0.5-1 acres of land and lowest percentage (10%) of farmers possesses 1-2 acres of land. It was found that 40% farmers had training on dairy farms and 60% farms had no training on dairy farm management. For establishing dairy farms, 30% of dairy farmers were dependent on bank loan, 20% on their own sources and 50 % on bank loan and own source. The average capital investment was Tk. 2, 00,000 to 5, 00,000 Tk.

Table 1: General information of farm owners

Parameters	Statements	No. of farms	Percentage (%)
Owner's occupation	Agriculture	4	40
	Service holder	1	10
	Business	2	20
	House wife	1	10
	Dairy farming	2	20
Dairy farming as a biz	Main Business	8	80
	Side Business	2	20
Education level	Primary education	3	30
	Secondary education	3	30
	Higher Education	2	20
	Higher education	2	20
Land size (acre)	0---0.5	2	20
	0.5---1	4	40
	1---2	1	10
	2-----5	1	10
	Above 5	2	20
Training received	Yes	4	40
	No	6	60
Source of fund	Credit/Loan of bank or NGOs	4	40
	Own source	6	60
	Both	3	30
Herd size (Number)	25-40	2	20
	41-55	1	10
	56-70	4	40
	71-85	1	10
	86-100	2	20
Monthly income (Lakh)	2-3	4	40
	3.1-4	2	20
	4.1-5	2	20
	Above 5	2	20

Table 2: Different categories of dairy cattle in the farms

Type of animal	Indigenou s animal	Percentage (%)	Crossbred animal	Percentag e (%)	Average No. of cattle/ farm
Milch cow	50	4.42	290	25.66	34
Dry cows	20	1.77	80	7.08	10
Pregnant	30	2.65	70	6.19	10
Heifer	100	8.85	260	23.01	36
Yearling bull	10	0.88	20	1.77	3
Bull calf	20	1.77	60	5.31	8
Heifer calf	30	2.65	90	7.96	12
Total	260	23.01	870	76.99	1130

3.2. Productive and reproductive parameters of crossbred and indigenous cows

Dry period: The average dry period for crossbred and indigenous cows was 98.5 days (Table 3). There was a variation in the length of dry period of crossbred and indigenous cows. These results were in agreement with Ali et al. (2000) and Nahar et al. (1992). Ali et al. (2000) observed that average dry period for crossbred and indigenous cows were 97.2 and 141 days, respectively. Nahar et al. (1992) found that the average dry period for F1 graded Sindhi and Sahiwal as 146 and 127 days, respectively.

Calving interval: The average length of calving interval of crossbred and indigenous cows stood at 419.5 days (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.

Service per conception: The average services per conception was 2.92 (Table 3). These results were in agreement with Ali et al. (2000) who reported that the service per conception of crossbred and indigenous cows were 3.33 and 1.98, respectively in Gaibandha district.

Table 3: Productive and reproductive performances of dairy cow

Parameters	Average
Dry period (days)	98.50 days
Calving interval (days)	419.5 days
Service per conception	2.92
Calving to first service (days)	115
Highest milk production (Li/d)	10.70
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 10.7 litres/day, and lowest milk production from cows were 7.4 litres/day, respectively,

Milk yield per lactation: Milk yield per lactation was 1150 liters. Similar studies were made 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. Another study made 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 consisted of feeds, labour, housing, veterinary services, AI and costs of capital that is interest on fixed and operating capital. In the process of raising dairy cows, farmers often concomitantly

require to keep calf and heifer in their farm. In such a situation the purpose of costing did not to be realistic to isolate the dairy cows from other animals to the farm business. It is noted that average daily total cost of raising per dairy cow was taka 67.51 in the study area (Table 4). Item wise costs are discussed below.

Feed cost: Cost of feed included expenses on paddy straw, green grass and concentrate. The purchased feeds were valued according to the average prices actually paid for the items. Home supplied feeds were also charge according to the average prices prevailing in the market. Only a few owners produced green grass. Farmers used to feed their cows by using weeds as a substitute of green grass. It is evident from Table 4 that feed cost was the most important component that represents 58.72 per cent of total cost.

Labour cost: Labour was computed as the total cost of labour used for raising dairy cows. Then the total labour cost was converted into per cow per day level. However, it can be noted that on an average labour cost per cow per day amount Tk. 25.00.

Housing cost: In the study area the farmers used half building and tin shed houses for dairy animals. The cost of housing was calculated by taking into account the depreciation cost, repairing cost and interest of the average value of cattle shed. It was found that on an average housing cost per day per cow was Tk. 200.

Veterinary cost: It was observed that veterinary cost/cow/day was Tk. 5.50. Halim (1992) who found that the treatment cost per lactation of crossbred cows was Tk. 92.00. 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. 2.20. Interest on capital and operating cost: In the present study, the market value of dairy cows was considered as the Capital. The operating capital was calculated on the average variable cost such as 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: Feed Costs of rearing crossbred dairy cows per days returns per day per cow in the study area

Items	Quantity (kg)	Total cost (Tk.)
Paddy straw		42
Green grass	12	60
Concentrates	4	80
Labor cost		25
Housing cost		200
Veterinary cost		5.5
A.I. cost		2
Others		
Transport		2.5
Tools and equipments		1.2
Interest on capital		8.25
Total		384.45

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

The return from dairy cow consisted 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. 3.50.

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

Return items	Unit	Quantity	Price (Tk/liter)	Total (Tk.)
Milk	Litter	9.2	50	460
Return from calf				
Value of cow dung	kg	5	2	10

Empty gunny bag	Tk	20		
Total				490
Gross cost			384.45	
Net return				105.55
Cost benefit ratio			1.27455	

Returns from empty gunny bag: Returns from empty gunny bag per cow was calculated by taking average income from empty gunny bag. Return from empty gunny bag was Tk. 20.00 per day basis.

Table 6: Economics study

Condition	Percentage
Profitable	75
Less Profitable	20
Balanced	5

Net return and Benefit Cost Ratio (BCR) from dairy cows: Deducting all costs from gross returns arrived at net return from dairy cows. Table 6 reveals that daily net return per dairy cow was Tk. 105.55 and Cost Benefits Ratio of dairy enterprises, which is on an average 1:1.27.

Most of the farmers (70%) said that dairy farming was profitable, 25% said less profitable and 5% said balance.

From the above discussion, it may be concluded that the present management condition of small dairy farms in Chittagong district is more or less traditional and the productive and reproductive performance of crossbred cows was better than that of indigenous cows. Most of the farmers believe that dairy farming is a profitable enterprise and can be more profitable if Government gives support on feed cost, marketing, loan and management training.

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CONCLUSION

The present management condition of medium and large scale dairy farms in Chittagong district is more or less traditional and the productive and reproductive performance of crossbred cows was better than that of indigenous cows. Most of the farmers believe that dairy farming is a profitable enterprise and can be more profitable, if government gives support on feed cost, marketing, loan and management training.

CHAPTER V
REFERENCES

- Bonfoh, B., Schwabenbauer, K., Wallinga, D., Hartung, J., Schelling, E., Zinsstag, J., ...
& Tanner, M. (2010). Human health hazards associated with livestock production. *Livestock in a changing landscape*, 1, 197-220.
- Bush, R. (2010). Food riots: Poverty, power and protest. *Journal of Agrarian Change*, 10(1), 119-129.
- Cohen, M. J., & Garrett, J. L. (2010). The food price crisis and urban food (in) security. *Environment and Urbanization*, 22(2), 467-482.
- FAO., 1994. *Production Year Book* Rome, Italy.
- Islam, M. A. (1992). A comparative economic analysis of milk cows and buffaloes in two selected village of Mymensingh district in Bangladesh (Doctoral dissertation, M. Sc. Thesis. Department of Agricultural Finance, Bangladesh Agricultural University, Mymensingh, Bangladesh).
- Jabbar, M. A., & Raha, S. K. (1984). Consumption pattern of Milk and Milk products in Bangladesh. *The Bangladesh. J. Agri. Eco*, 7(2), 29-44.
- Mougeot, L. J. (Ed.). (2010). *Agropolis:" The Social, Political and Environmental Dimensions of Urban Agriculture"*. Routled

Menzi, H., Oenema, O., Burton, C., Shipin, O., Gerber, P., Robinson, T., & Franceschini, G. (2010). Impacts of intensive livestock production and manure management on the environment. *Livestock in a changing landscape*, 1, 139-163.

Questionnaire in dairy farming system on urban area of Chittagong

Steinfeld, H., Mooney, H. A., Schneider, F., & Neville, L. E. (Eds.). (2013). *Livestock in a changing landscape, Volume 1: Drivers, consequences, and responses*. Island Press.

Zeza, A., & Tasciotti, L. (2010). Urban agriculture, poverty, and food security: empirical evidence from a sample of developing countries. *Food policy*, 35(4), 265-273.

Appendix

QUESTIONNAIRE

DAIRY FARMING SYSTEM IN URBAN AREA OF CHITTAGONG

Name of the farmers/ raiser:

Address:

Occupation:

Contact No:

Age of farming:

Education level of the farmer: Primary/Secondary/ Higher Educated

Farmer's Business type: Side/ Main

Land size:

Sources of fund: Bank loan/NGO/ Own

No. of animals:

Income/year/month:

Type of animals: Heifer/ bull/ Pregnant /dairy cattle/Lactating

Name of breed: cross/pure/deshi /Local

No. of milk production per year:

Animals marketing age and weight:

Housing system (Intensive/Semi-intensive):

Feeding system and ingredients cost

@ Feed ingredients:

@ Supplements (if any):

@ Feeding time:

@ Feeding method (Individual/Group):

Herd size: 10---20/ 20—30/ 40—500/50 above

Productive and Reproductive traits of animals:

Service per conception,

Lactation yield/period/dry period/ gestation period
/ calving interval

Milk yield or production----yearly/monthly

Any disease incidences or parasitic infestation occurred?:

Vaccination & medication done: 1) Yes 2) No

If yes, name of the vaccine or medicine:

Mortality:

Disease symptoms before dying:

Price /Purchased adult animal:

Predatory attack or missing animals ():

Limitations or problem of rearing problem:

Income:

Vaccination and medication costs:

ACKNOWLEDGEMENTS

I consider it my utmost obligation to express my gratitude to Almighty, the omnipresent, kind and merciful who gave me the health, thoughts and the opportunity to complete this task.

I was fortunate in having the generous advice and encouragement of my learned supervisor, Professor Dr. M. A. Hossain , Department of dairy and poultry Sciences, Faculty of Veterinary Medicine, Chittagong Veterinary and Animal Sciences University in selecting the research topic, inspiring scholastic guidance, simultaneous inspiration, constructive criticism, enormous suggestions and sympathetic at every step right from research synopsis to final manuscript writing.

Finally, the author expresses his deepest sense of gratitude and sincere thanks to all of his well-wishers, friends, kith and kins for their blessing throughout the academic life.

THE AUTHOR

September 2018