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Small Scale Dairy Farming Practice in a Selective Area of Bangladesh

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Abstract: The present study was assigned to determine the present status including general information, feeding breeding housing milking etc. and costs & returns of small dairy farms, to compare the productive and reproductive performance of crossbred and indigenous cows and to make recommendation for development of small scales dairy farm. With this view, the empirical data were collected by using protested questionnaire. The study was conducted at 8 thanas in Rangpur district, and four months-long survey was diminished on thirty small dairy owners. It appeared from the study that 57% farm owners belong to business class and remaining 43 per cent to different categories. Fifty three per cent took dairying as a side-business whereas only 47 per cent took it as a main business enterprise. Major percentage of farm owner education level that was Higher Secondary level (60%) and the average number of animal per farm was 13.01. The average monthly income of farm owners found in the study area was Tk. 4387. It was observed that farm owners had 85.4% crossbred (like Friesian cross and Jersey cross) and was 14.6% indigenous cattle, and 87% farmers used artificial insemination and rest used both artificial and natural services. Daily milk yield/cow/farm was 4.27 and 1.78 liters for a crossbred and indigenous dairy cow, respectively. It was estimated that the rearing cost of dairy cow was Tk. 67.5/cow/day and return from rearing dairy cow was Tk. 85.2/cow/day. The net return was Tk. 17.7/cow/day from crossbred in the study area and cost benefit ratio was 1: 1.26. The study showed that there were significant (P<0.01) differences within the dry period, service per conception, calving to first service, highest and lowest milk production and lactation period of crossbred and indigenous dairy cows. The study also showed non-significant differences within calving interval for crossbred and indigenous. Incase of small dairy farming, the farms were facing a lot of problems such as scarcity of feeds and fodder, high price of concentrate and lack of technical knowledge. Although the dairy cow owners face problems, the study observed that there were potentials particularly for the small dairy farmers. The small farmers by keeping 8-10 crossbred cows could earn a modest living by adopting small dairy farming as a profession.

Key words: Cost and return, crossbred, dairy farming, indigenous, performance

Introduction

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).

Bangladesh suffers from an acute shortage of livestock products like milk, meat and eggs. The domestic demand for milk has been rising faster than the domestic production of milk. Hence Bangladesh Government has given the priority on the development of dairying at farmers level to increase the supply of milk from small dairy farms.

In Rangpur district area, small and large scale dairy farms have been increasing day by day. Specially 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 management aspects of small dairy farms.

ii) To compare the productive and reproductive performances of crossbred and indigenous cows reared in small dairy farms.

iii) To determine the costs and returns of small dairy farms.

Materials and Methods

The study was conducted at the eight thanas (namely Rangpur sadar, Mithapukur, Pirganj, Cawnia, Badarganj, Taraganj, Gangachara and Pirgacha) of Rangpur district in Bangladesh. Data were collected by a designed survey schedule according to objectives from February to May, 1999. 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. A total of thirty small dairy farms out of which 9 from sadar thana and 3 from each of the rest 7 thanas were randomly surveyed for this purposes. The data regarding productive and reproductive parameters of 112 crossbred cows and 19 indigenous dairy cows were collected. 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. Collected data from the farmers were compiled and tabulated. Tabulated data were arranged as percent value. The data regarding productive and reproductive performance were analyzed by the CRD described by Steel and Torrie (1980).

Results and Discussion

General information of small dairy farm owners: The general information of dairy farm owners in Rangpur district are presented in Table 1. The results showed that the highest percentage (57%) of the farmers had business as the principal occupation and the rest job seekers, agriculture etc. It was observed that 53% of the farmers had taken dairying as a main business and the rest as side business. Highest percentage (60%) of the farmers had higher 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 house holds 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 (57%) of farmers posses 1-2 acres of land and lowest percentage (7%) of farmers posses 0.5-1 acres of land. It was found that 16.7% farmers had training on dairy farms and 83.3% farms had no training on dairy farm management. For establishing dairy farms, 7% of dairy farmers were dependent on bank loan, 10% on their own sources and 83 % on bank loan and own source. The average capital investment was Tk. 45,000 to 2,50,000.

It was observed that the highest number of farm 9 and 14 was in 4-8 and 9-15 herd size respectively. Khan (1996) conducted a study in different districts and found that out of 100 farms 45 farms had 4-8 herd size and only two farms had above 30 herd size. It was revealed that monthly income of the owners were 0-2 thousand, 2-4 thousand, 4-6 thousand and above 6 thousands taka for 20, 43, 13 and 20 per cent respectively.

Number of dairy cattle: The dairy farms under study area consisted of different types of cattle, the percentage of which is present in Table 2. It was observed that the percentages of milch indigenous and crossbred cows were 14.6 and 83.4 respectively and the average numbers of cows in the farms were 1.89 and 11.1 for indigenous and crossbreed, respectively.

Housing management: Only 10 percent of the farmers provide half building and rest 90% of the farmers used tin shed and straw shed to house their cattle (Table 3). Highest percentage of farmers (80%) provided open house, 13% provided closed and rest used semi-closed house. On the basis of floor type, 65% of farmhouse was found with pacca (with bricks) and the rest had unpaved floor. In another region of the same district, Hossain *et al.* (2004) observed that 63% farmers provided closed house and 63% farmers used paved floor.

Feeding management: There were two systems of feeding, which are practiced by the dairy owners to feed their cattle. Sixty three percent farmers followed stall-feeding and 37% farmers followed both stall and grazing system (Table 3). All calves were fed milk by suckling. No farmers was found using bottle to provide milk to calves. The main livestock feed at the study area was rice straw. Most of the farmers (80%) used untreated straw. It was noted that 20% and 40% farmers cultivated napier and maize, respectively and rest of the farmers did not cultivate fodder. Most important constraints regarding fodder cultivation are scarcity of land, scarcity of seed/cutting and lack of knowledge.

Breeding system: It was observed that 87% cows were inseminated artificially and 13% both naturally and artificially (Table 3) which is similar to the observation by Hossain *et al.* (2004), who found 93% cows were inseminated artificially. For artificial insemination, the majority of the farmers preferred Friesian semen.

Table 1: General information of farm owners

Variables	No. of farms	Percen-tage (%)
Owner's occupation		
Service holder	2	7
Business	17	57
Job seeker	5	17
Agriculture	3	10
Others	3	9
Dairy farming		
Main business	16	53
Side business	14	47
Education		
Class 6-10	3	10
Secondary school level	5	17
Higher secondary level	18	60
Above higher secondary level	4	13
Land size (acre)		
0-0.5	2	7
0.50-1.0	5	17
1-2	17	57
2-5	4	13
Above 5	2	7
Training received		
Yes	5	17
No	25	83
Source of fund		
Bank loan	2	7
Own source	3	10
Both	25	83
Herd size (Number)		
0-3	2	7
4-8	9	30
9-15	14	47
16-30	4	13
Above 30	1	3
Monthly income (Thousand)		
0-2	6	20
2-4	14	47
4-6	4	13
Above	6	20

Overall management system: It was observed that 100% farmers milked their cows manually. Most of the farmers (77%) used traditional equipments and 53% farmers milked their cows hygienically (Table 3). The source of water in most of the farms was direct water supply by local authority and the supply was adequate in 80% farms. Majority of the farmers cleaned their cattle house regularly with the help of pipe. During milking, normal water was used to wash the udder by 67% farmers.

Maximum farmers did not maintain preventive register to record the preventive or treatment status and did not keep their cattle isolated while sick. Only 17% farm owners stored milk by freezing. Few farmers (7%) appointed skilled labors in their farms. Thirty percent owners disposed their milk by home delivery and 30% farmers sold milk from their own selling center. Some farmers also sold their milk in local market, sweet makers and broker. Among the farmers, 73% sold out the cow dung to the owner of fish pond and agricultural land and others who use cow dung as fuel. In the study area, Veterinary Surgeon was available when needed. It was found that all farmers dewormed their cattle according to schedule, and most of the farmers did vaccination against important diseases to keep the cattle free from disease outbreak. Eighty percent of the farmers faced difficulties to get loan from bank.

Productive and reproductive parameters of crossbred and indigenous cows:
Dry period: The average dry period for crossbred and indigenous cows were 98.5 and 140 days respectively (Table 4). There was a statistically significant variation (P<0.01) 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 and 428 days, respectively (Table 4). Statistically non-significant variations existed between the length of calving interval crossbred and indigenous cows. 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 of crossbred and indigenous cows were 3.10 and 1.95, respectively (Table 4), which were significantly different (P<0.01). This 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.

Calving to first service: Table 4 shows that the average calving to first service for crossbred and indigenous were 116 and 137 days, respectively, which were significantly different (P<0.01). This results were in agreement with the information of Ali *et al.* (2000) who observed that average calving to first service for crossbred and indigenous were 124 and 114 days, respectively.

Table 2: Different categories of dairy cattle in the farms

Type of animal	Indigenous animal		Crossbred animal		Average No. of indigenous/ farm	Average No. of crossbred/ farm	Average No. of cattle/ farm
	No.	%	No.	%			
Milch cow	19	4.87	112	28.72	0.63	3.74	4.37
Dry cows	7	1.79	23	5.90	0.23	0.77	1.0
Pregnant	6	1.54	29	7.44	0.20	0.97	1.17
Heifer	13	3.33	36	9.23	0.43	1.20	1.63
Yearling bull	5	1.28	21	5.38	0.17	0.70	0.87
Bull calf	4	1.03	68	17.44	0.13	2.27	2.4
Heifer calf	3	0.77	44	11.28	0.10	1.47	1.57
Total	57	14.61	333	85.39	1.89	11.12	13.01

Highest and lowest milk production: It was revealed from Table 4 that the highest milk production from crossbred and indigenous cows were 10.4 and 2.40 litres/day, respectively, and lowest milk production from crossbred and indigenous cows were 2.29 and 0.72 litres/day, respectively.

Milk yield per lactation: Milk yield per lactation for crossbred and indigenous were 1210 and 358 litres, respectively. The difference in milk production between crossbred and indigenous cows was highly significant (P<0.01). 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 crossbred and indigenous cows was 283 and 207 days, respectively, which differ significantly (P<0.01). 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 5). Item wise cost are discussed below.

Feed cost: Cost of feed included expenses on paddy straw, green grass and concentrate etc. 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 5 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. 10.00.

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. 2.85.

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. 1.80.

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 15 % per annum. Table 5 shows that the interest on capital (average value of cow operating capital) per day per cow was Tk. 4.22.

Returns from rearing crossbred dairy cows/day/cow in the study area: The return from diary cow consisted return from milk yield, cowdung, 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.

Table 3: Housing system, feeding system, fodder cultivation, breeding system and overall management system

Information		Percentage	Information		Percentage
Housing system	**Type of cow shed**			**Washing of udder by**	
	Half building	10		Warm water	43
	Tin shed	40		Normal water	67
	Straw shed	50		**Dairy equipment**	
	Pattern of housing			Traditional	77
	Open	80		Modern	-
	Closed	13		Semi-modern	23
	Semi closed	7		**Preventive register**	
Feeding System	**Types of feeding system**			Maintained	7
	Stall	63		Not maintained	93
	Stall + Grazing	37		**Storage of milk**	
	Grazing	-		Freezing	17
	Others	-		Not stored	83
	Types of calf feeding			**Isolation of sick cattle**	
	Suckling	100		Kept isolated	7
	Bottling	-		Not kept isolated	93
	Milk starter	-		**Causes of disposal**	
Fodder cultivation	**Types of grasses**			Unproductive	30
	Napier	20		Infertility	70
	Maize	40		**Labor type**	
	No grass cultivation	40		Skilled	7
	Constraints of fodder cultivation			Non skilled	93
	Scarcity of land	43		**Place of selling**	
	Scarcity of seed/cutting	50		Broker	17
	Lack of know hedge	7		Local market	13
	Types of roughage			Sweet maker	20
	Treated	20		Home service	20
	Untreated	40		Own selling center	30
Breeding system	**Breeding methods**			**Disposal of manure**	
	AI	87		Sold out	73
	AI and natural	13		As manure	20
	Natural	-		As fuel	7
Overall management system	**Milking**			**Sanitizer used**	
	Hygienically	53		Phenyl	70
	Unhygienically	47		Potas	23
	Milking system			Phenyl+Potas	50
	Manual	100		Bleaching powder	10
	Mechanical	-		**Treatment by**	
	Water source			Veterinary surgeon	90
	Water supply	77		Locally trained person	10
	Tube well	13		**Vaccination and de-worming**	
	Pond	10		Black quarter	70
	Water supply			Hemorrhagic Septicemia	60
	Adequate	80		FMD	100
	Inadequate	20		De-worming	100
	Cleaning done by			**Complexity of bank loan**	
	Pipe	77		Yes	80
	Bucket	23		No	20
	Cleaning				
	Regularly	72			
	Irregularly	28			

Table 4: Productive and reproductive performances of dairy cows

Parameters	Crossbred	Indigenous	Level of Significance
Dry period (days)	98.5±16.9	140±10.4	**
Calving interval (days)	419±11	428±24.7	NS
Service per conception	3.10±0.82	1.95±0.44	**
Calving to first service (days)	116±25.8	137±7.76	**
Highest milk production (Li/d)	10.4±1.79	2.40±0.51	**
Lowest milk production (Li/d)	2.92±0.72	0.72±0.25	**
Milk yield (Li/lactation)	1210±57.8	358±27.1	**
Lactation period (days)	283±14.5	207±13.7	**
Average milk production (Li/lactation)	4.27±0.52	1.78±0.13	**

** = Significant at 1% level of probability. NS = Non significant

Table 5: Costs of rearing crossbred dairy cows per days per cow in the study area

Items	Quantity (kg)	Total cost (Tk.)
Feed cost		
Paddy straw	7	5.25
Green grass	12	7.20
Concentrates	3.75	27.19
Labour cost	-	10
Housing cost	-	2.85
Veterinary cost	-	5.50
A.I. cost	-	1.80
Others		
Transport	-	1.50
Tools and equipments	-	2
Interest on capital	-	4.22
Total		67.51

Table 6: Returns from rearing per dairy cow per day in the study area

Return items	Unit	Quantity	price (Tk/liter)	Total (Tk.)
Milk	Liter	4.27	18	76.86
Return from calf	-	-	-	3.50
Value of cowdung	-	5	-	4.50
Empty gunny bag	Tk	-	-	0.30
Total	-	-	-	85.16
Gross cost	-	-	-	67.51
Net return	-	-	-	17.65
Cost benefit ratio				1: 1.26

Returns from milk, cowdung and calf: It is evident from Table 6 that on an average returns from milk were Tk. 76.9 per day in the study area. The table reveals that on an average per day returns from cowdung was Tk.4.50. Value of calf was considered as the approximate market value of calf after a year. Although most of the farmers did not sell their calves but they were able to estimate in approximate local market value of the calves possessed by them, which was considered as the value of the calves. However, from the annual returns figures, the returns per day were calculated on per day basis (Table 6) and an average per day return from cow was Tk. 3.50.

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. 0.30 per day basis.

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. 17.65 and Cost Benefits Ratio of dairy enterprises, which is on an average 1: 1.26.

Table 7: Economics study

Condition	Percentage
Profitable	70
Less Profitable	20
Balance	10

Most of the farmers (70%) said that dairy farming was profitable, 20% said less profitable and 10% said balance.

From the above discussion, it may be concluded that the present management condition of small dairy farms in Rangpur 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.

The following recommendations may be suggested as broad guidelines for successful operation of small dairy farm in the study area:

1. Private sectors should be given priority to establish small-scale cattle feed industry providing financial support by the government and these feed industries will sell the feed to the registered dairy farms in a fixed price recommended by government time to time.

2. The shortage of feeds and fodder may partially be overcome by introducing HYV fodder cultivation. The government and non-government organizations should play a vital role in disseminating the technology of HYV fodder cultivation in rural areas.

3. Good quality semen should be preserved centrally and distribute to the AI centres for further use as and when required basis.

4. Veterinary care and services to the small farm owners should be strengthened.

5. Regular short training programme on different management of dairying should be arranged for the farm owners and short term institutional loan or credit should be given to actual farm owners and to be checked regularly.

6. The price of milk should be fixed at a reasonable level and milk-marketing system should be improved through the intervention by the government.

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