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Bangladeshi Dairy Farmers' Conditions under Milk Vita

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Summary

The purpose of this study was to investigate Milk Vita member dairy farmers' profitability in the selected study area. The study was conducted in three villages of Bagabarighat under the Shahjadpur Upazila in Sirajganj District in Bangladesh. With this view, the empirical data were collected to identify the member dairy farmers' profitability. The findings of the study were as follows. First, regardless of farm size, dairy farming under Milk Vita is profitable and farmers' income ranged between the middle and higher income group in the country. Second, all the sample farmers' number of milking cows and profit also increased significantly after becoming a member of Milk Vita.

1. Background and Objectives

In recent years the dairy industry is rising as a potential sector in Bangladesh. There are about 24.5 million cows in Bangladesh, of which about 10 million are breeding cows (Khan and Rashid [9]). Huge cattle population grasps a large potential for dairy development in Bangladesh. However, like other developing countries, the present situation of dairy industry is not healthy. As the land is very limited for cultivation of crops, many farmers rear dairy cow as supplementary income source on a small piece of land. Generally, most of the farmers in rural area are poor, thus; their daily income from sales of milk helps them to maintain their family consistently.

In general, it is evident from the world dairy history that the demand for milk and milk products increases with an increase in income growth and urbanization in a country. This common scenario is also prevailing in Bangladesh recently. With increasing population, income growth and rapid urbanization, the demand for marketed milk and dairy products is being created by households who do not have the time, land or fondness to produce milk.

Bangladesh Milk Producers' Cooperative

Union Limited (BMPCUL) known as Milk Vita is the largest and oldest dairy cooperative in Bangladesh.¹⁾ Since the independence in 1971, the government of Bangladesh has been trying to enhance the milk production in the country to fight against the malnutrition of Bangladeshi people. Milk Vita was formed under the cooperative fold according to the cooperative ordinance of 1984. It provides various services to the dairy farmers, like milk collection facilities, veterinary services, artificial insemination services, balance cattle feed, loan for cattle purchase, etc., as a part of their milk production enlargement and milking animal improvement.

Milk Vita institutes primary cooperative in the village level for collecting milk from the dairy farmers and responsible for its activities. Any farmers can become a member of primary cooperative by buying a share and committing to sell milk. It is the apex body of 1,053 primary cooperatives. These primary cooperatives are engaged in milk collection from the member dairy farmers. There are 101,000 dairy farmers under these primary cooperatives in 2005. Thus, it has some responsibilities to continue its activities for the dairy development in the country where farmers and consumers will be benefited regularly.

Here, farmers' motivation regarding milk production is directly related with the performance of Milk Vita. If Milk Vita makes a regular profit then it will be able to serve more comprehensively to its member farmers. On the other hand, Milk Vita's financial performance also depends on the farmers' activities. At this point, there is a strong interrelationship between the members of dairy farmers and Milk Vita. Here, both the members of dairy farmers and Milk Vita need to make a profit, not only to survive but also to grow for the dairy development in the country. Therefore, it is important to identify the conditions of the members of dairy farmer under Milk Vita, whether it is performing well enough for its future survival as well as for the betterment of dairy industry in Bangladesh.

The objective of this study is to investigate Milk Vita's member dairy farmers' profitability in the selected study area. A number of literature and research exists on the subjects of economics and the effect of credit system of dairy farming in general (e.g., Hemme, Garcia and Khan [7]; Halim [4]; Habibullah [5]; Paul [11]; Rashid [12]; Akhter [1]). However, as far as we know, no study has focused on Milk Vita's member dairy farmers' profitability in our selected study area.

The study was conducted in three villages of Bagabarighat under the Shahjadpur Upazila in Sirajganj District in Bangladesh. With this view, the empirical data were collected to identify the member dairy farmers' profitability.

2. Dairy Farming in Bangladesh

In general, dairying in Bangladesh is practiced as a part of mixed crop farming system where most of the rural household keep cow in order to cultivate land and also to produce milk for family consumption. Cows are reared in very primitive way. It is seen from the history that, milk may not have been sold in many parts of Bangladesh where production was mainly aimed at subsistence consumption.

In Bangladesh, most of the cow (about 80%) is

owned by smallholder households (Saadullah [13]). In terms of small farmers, dairy production is a family operation. Some poor farmers who used to sell their excess milk were considered as a low class segment of the society. The rapid growth of population, poverty, inequality and lack of employment opportunity has forced farmers to start selling milk.

Recently in Bangladesh, almost rural households rear dairy cows as their supplementary income. There are many families in Bangladesh they do not have any land for cultivation, but they have nearly 2 or 3 milking cows for their livelihood (Kobir [10]). During the last three decades the agricultural farming system of Bangladesh has changed and dairy farming is getting popularity as a new farming venture. However, there are not enough available dairy infrastructures in the village level.

Generally, regardless of size, most of the dairy farms seen in the Bangladesh are not well organized. As lack of the well organized markets for selling milk in rural areas, dairy farmers have to depend on the middlemen for selling their produced milk. In general, in rural areas milk is sold through different types of middlemen where farmers are being deprived and exploited by these middlemen groups in many ways such as; they do not give fair milk price and sometimes cheat them in weight.²⁾

In some cases, middlemen provide loan to the farmers with extremely high interest rate and force repayment through sale of milk in full. There are also some villages where there is no market; therefore farmers have to travel some distance to sell their produced milk. Although they travel some distance to sell their milk, sometimes they cannot sell their produced milk even at low price.

There were not many commercial dairy farms in Bangladesh. The commercial dairy farming in Bangladesh was started mainly after the Chernobyl disaster in former Soviet Union. Imports of dairy products from European countries were banned temporarily by the Bangladesh government in 1987. As a result, a number of dairy farms have grown

up in private initiatives under incentive bonus program and dairy loan program that have been taken by the government (Paul [11]). In general, most of the commercial dairy farms are operating their activities under cooperative system in Bangladesh.³⁾

Most of the cows found in Bangladesh are *Bos Indicus* (Zebu) type, which are generally small in size (180 kg). They have low yields (1.5-2.5 litres /day), short lactation periods (on average 180 days) and long calving interval on average 2.5 years (Jahan and Rahman [8]). Despite the low productivity, indigenous cows have some positive characteristics, such as low maintenance cost, strong adaptability to the local environment and resistance power to local diseases. Recently, through the use of artificial insemination, there have been remarkable genetic improvements of cow in some part of Bangladesh.

3. Investigation of Dairy Farmers under Milk Vita

1) Description of the Study Area

To recognize the dairy farmer profitability and farming condition under Milk Vita, field survey was conducted twice December 2004, and March 2005 in three villages of Shahjadpur Upazila in Sirajganj District. Three villages namely, Potazia, Tatiarkanda and Shalachapri were selected.

Bagabarighat is located in Shahjadpur Upazila under Sirajganj District. Sirajganj has an area of 2,498 km² which including riverine areas, which is 1.7 % of the total area of Bangladesh. Summer begins in mid-April and lasts up to mid-June. Winter normally lasts from November to late February. The monsoon (rainy) season commences towards the end of June and continues to September. The level of rainfall is highest during the monsoon and the lowest in March (Hemme, Garcia and Khan [7]).

Bagabarighat is basically a river port, situated in the northern side of Dhaka-Bogra highway. It is 60 km far from Sirajganj District and 185 km from capital city of Dhaka. It has good communication network with the whole country through road and river way. It is considered as a largest milk produc-

ing area in Bangladesh. Most of the villagers (about 70%) depend on agriculture. Their other main occupations are weaving, business, fisheries and service etc. Historically, dairy farming is widely practiced in this area. The land of this area is experiences flood every year.

Generally, farms under Milk Vita are well organized and adopted in hygienic milk production. As Milk Vita provides all the necessary facilities regarding dairy farming to the farmers, therefore, milk production, transportation, selling patterns are different than the other parts of Bangladesh that was described in section two.

Feeding and grazing system in the study area were two categories such as Bathan (pasture land) feeding (November to June) and stall feeding (July to November). Bathan is like a strip of sandy land rising out of a river bed, where large areas of grazing land (about 600 hectares) is available for seasonal legume production. Different kind of quality grasses and legumes are available here such as Napier, Gambo, Durba, Carpert, Khesari (*Lathyrus spp*), Matikalai (*Vigna spp*) etc. that helps to increase the quality and milk yield.

Milk Vita owns Bathan and cultivates different kind of seasonal legumes for its member farmers. During the Bathan feeding, feed costs are very low because farmers do not need to buy extra feed for cows. A farmer lease Bathan from Milk Vita and grazes their cows in Bathan from November to June.

Throughout the Bathan feeding, cows are kept in the field and all the activities are managed by the cow boys (hired labor). Usually, farmers build temporary cow shed for this purpose, which is made of bamboo, tin and straw. Generally, farmers graze their cows 6-8 hours every day in Bathan where concentrate feed is provided two times in a day such as at 11 am and 3 pm. The main concentrate feed provided to cows were paddy straw, rice bran, wheat bran, pulse bran, oil cake, molasses and salt. Paddy straw is chopped and mixes with the other above-mentioned feed materials.

Usually, in the beginning of July Bathan starts to go under water because of flood.⁴⁾ Flood water remains in Bathan for 2 or 3 months. Therefore, farmers take their cows to their farmhouse and maintain them. Generally, from July to November cattle stay in farmers' farmhouse yard and stall feeding is done. Feed costs get higher during these four months (July to November); because of non-availability of natural grass and other legumes. At the time of stall feeding straw is the basal diet along with concentrate mixtures which is given three times a day. Mostly rice bran, wheat bran, pulses, and admixture of different oil cakes are offered to the cows. During this period all categories of family members are involved in the feeding and cleaning activities of cows and cow shed.

In the present study area, the entire sample farm reared dairy cows in the commercial manner. Cross-bred cows were the main types of dairy animals for the three types of farms. The head of the family is in charge of the management of the farms. The average milk production per cow ranged from 1,710 to 2,633 kg milk per year. It was observed that, all the farmers milked their cows manually twice a day. Generally farmers use traditional equipments for their milking operation. In the study area the farmers use cow dung for various use, most of the farmers use cow dung as organic fertilizer for their agricultural purpose and some farmers dry the cow dung and use as fuel for cooking where, a number of farmers have a bio-digester in order to use gas for cooking purpose.

In respect of cow shed, farmers provided building for their dairy cows, which is made of concrete, tin and bamboo. As regard of floor type of cowshed, paved flock (with brick) was used with proper ventilation and drainage system. Usually farmers clean their cow shed regularly. In terms of cattle treatment, primary cooperative provides this service to the farmers free of charge.

In respect of labor utilization, as cows are kept in Bathan from November to June, therefore, during this time hired labor (cow boys) does almost all

the related jobs for the farm. On the other hand, when the cows are maintained in the farmers' house yard, the contribution of family labor is seen. Cow boys are hired for one year contract monthly salary basis.

2) General Information of Sample Farms

Table 1 shows the farm size and distribution of sample.⁵⁾ Different size of dairy farms exists in these villages, therefore, farm size was categorized into small, medium and large size according to advice of General Manager of Milk Vita and samples were selected. The farm having 0-5 milking cows was considered as small farm, 5-10 milking cows as medium farm and 10- above milking cows as large farm respectively. In selecting the sample it was ensured that, the respondent is a member of primary cooperative and possessed at least two milking cow during the study period and run their dairy farm on commercial basis.⁶⁾ Small farm represents a rural household with average 3.9 cross-bred milking cows and 2.1 acres of land. Medium farm is also a rural household comprising average 8.4 cross-bred milking cows with 2.6 acres of land. Large farm has 4.1 acres of land and keeps average 19.9 cross-bred milking cows represent a quite rare household in the study area.

Table 1 Distribution of sample farms

	Small farm (0-5 milking cows)	Medium farm (5-10 milking cows)	Large farm (10- milking cows)
Potazia	3	3	3
Shalachapri	3	3	3
Tetiarkanda	3	3	3

Source: Field survey, 2005.

The general information of sample farmer in the study area is presented in Table 2. Table 2 shows that, 51.9 % farmers are between 31-45 years of age and 44.4 % farmers are 18-30 years of age. It was also observed that 81.5 % of the farmers had taken dairying as a main business. About 44.4% of the farmers had just primary education.

Farmers were further categorized based on land holding. The highest percentage (59.3%) of farmers posses 2-5 acres of land. All farmers had training

Table 2 General information of sample farmers

	No. of farmers	Share
Owner's age		
18-30	12	44.4%
31-45	14	51.9%
46-60	1	3.7%
Above 60	0	0.0%
Owner's occupation		
Dairy farming	22	81.5%
Crop farming	0	0.0%
Business	2	7.4%
Service	3	11.1%
Labor	0	0.0%
Education level		
Illiterate	5	18.5%
Primary	12	44.4%
Junior high school	4	14.8%
High school	4	14.8%
Graduate and above	2	7.4%
Land holding (acre)		
0-0.5	0	0.0%
0.5-1.0	0	0.0%
1-2	9	33.3%
2-5	16	59.3%
Above 5	2	7.4%
Dairy training received		
Yes	27	100.0%
No	0	0.0%
Source of fund		
Own source	17	63.0%
Bank loan	4	14.8%
Both	6	22.2%
Monthly income (Thousand Tk)		
0-5	0	0.0%
5-10	8	29.6%
10-15	2	7.4%
15-20	6	22.2%
Above 20	11	40.7%

Source: Field survey, 2005.

Table 3 Average herd size of sample farms (head)

	Small farm	Medium farm	Large farm	All farms
Milking cow	3.9	8.4	19.9	10.7
Dry cow	1.7	1.9	4.1	2.6
Heifer	2.2	2.4	5.2	3.3
Calf	3.7	8.4	15.4	9.2

Source: Field survey, 2005.

on the dairy farm management. For establishing dairy farms, 14.8% of dairy farmers were dependent on bank loan, 63% on their own sources and 22.2% on bank loan and own source. The monthly income of the owners were 5-10 thousand, 10-15 thousand, 15-20 thousand and above 20 thousands Tk for 29.6, 7.4, 22.2 and 40.7 % respectively.

Table 3 describes the distribution of cows according to the farm size. The average herd size for small farm consists of 3.9 milking cows, 1.7 dry cows, 2.2 heifers and 3.7 calves. In terms of medium

farm, the average herd size comprises 8.4 milking cows, 1.9 dry cows, 2.4 heifers and 8.4 calves. In the same way, the average herd size of large farm includes 19.9 milking cows, 4.1 dry cows, 5.2 heifers and 15.4 calves.

Table 4 shows the distribution of milk production by consumption and sale. It is appeared from the Table 4 that, all the farmers sell their produced milk (above 95%) to the Milk Vita. As the farm size gets bigger the production and family consumption also increase. Table 4 also shows that, average milk production was 8,952.6, 1,8708.4 and 49,482.7 for small, medium and large farms respectively.

Table 4 Distribution of milk production by consumption and sale in 2004 (litre)

	Average Milk production	Average family consumption	Average milk sold to Milk Vita
Small farm	8,952.6 (100.0)	374.1 (4.2)	8,578.4 (95.8)
Medium farm	18,708.4 (100.0)	667.9 (3.6)	18,040.6 (96.4)
Large farm	49,482.7 (100.0)	1,386.6 (2.8)	48,096.1 (97.2)
All farms	25,714.6 (100.0)	809.5 (3.1)	24,905.0 (96.9)

Source: Field survey, 2005.

The average milk consumption was 374.1, 667.9 and 1386.6 for small, medium and larger farms correspondingly. Small farm sold 8,578.4 litres of milk which is 95.8% of produced milk, medium farm sold 18,040.6 litres of milk which represents is 96.4% produced milk, and large farms sold 48,096.1 litres which embodies 97.2% of produced milk. Therefore, it can be said from the Table 4 that, above 95 % milk was sold by the farm owner during the study period.

3) Costs and Revenue of Sample Farms

Table 5 shows the cost difference of producing 100 kg ECM (energy corrected milk).⁷⁾ There is a variation of milk production costs 891, 965 and 728 Tk / 100 kg ECM for small, medium and large farm respectively. It is appeared from the Table 5 that, among the costs item feed, labor and depreciation costs are the biggest items. Here, the main reason of the costs difference is hired labor cost.

Table 5 Production costs and revenue of 100 kgECM(Taka / 100kgECM, %)

	Small farm		Medium farm		Large farm	
	Cost	Percent	Cost	Percent	Cost	Percent
A. Variable costs						
Feed cost	383	43.0	437	45.3	378	51.8
Labor cost (hired)	161	18.1	192	19.9	88	12.1
Veterinary cost	12	1.3	10	1.0	8	1.1
Electricity charge	19	2.2	16	1.7	8	1.2
Miscellaneous	4	0.4	2	0.2	1	0.2
B. Total variable costs	579	65.0	658	68.2	483	66.4
C. Fixed costs						
Cow shed (housing)	40	4.4	32	3.3	19	2.6
Interest on the value of land	11	1.2	15	1.6	10	1.3
Cost of capital	72	8.0	74	7.7	66	9.1
Depreciation of cow	130	14.6	135	14.0	121	16.6
Opportunity cost of family labor	41	4.6	29	3.0	15	2.0
Interest on the operating capital	19	2.1	21	2.1	15	2.1
D. Total fixed costs	312	35.0	307	31.8	245	33.6
E. Total costs (variable and fixed) (B+D)	891	100.0	965	100.0	728	100.0
F. Revenues						
Value of milk	1,665	77.7	1,676	78.5	1,689	80.8
Value of home consumption (milk)	73	3.4	62	2.9	49	2.3
Value of cowdung	83	3.9	65	3.0	44	2.1
Bonus	105	4.9	106	5.0	107	5.1
Change in inventory	217	10.1	226	10.6	201	9.6
G. Total revenues	2,144	100.0	2,134	100.0	2,090	100.0
H. Profit (G-E)	1,253		1,169		1,362	

Source: Field survey, 2005.

Note: 1 US\$ = 66 Taka, January, 2006.

As all the farms graze their cows in same Bathan, therefore, feed cost difference has occurred due to the concentrate feed offered by the farm.

The costs of milk production for medium farm were higher than small and large farm which was caused by the type of cow and by hired labor cost. In terms of feed cost, there was not huge difference between small and large farm, because both farms reared Jersey, and indigenous cross-bred cows. However, for medium farm, feed cost was higher because most of the large farm reared Holsteins and indigenous cross-bred cows. In terms of small farm, the feed cost was almost same as large farm but the hired labor cost was higher due to the small size of herd structure. At this point, the large farm is taking the advantage of economies of scale and reducing its labor and feed costs. For large farm the hired labor cost was very low comparing with other two types of farm. The fixed costs were very similar for three type farms. It is also seen from the Table 5 that, the economies of scale are

working for large farm.

In respect of revenue it was very similar for the three types of farm. As all the farms uses the same production, transportation and marketing system provided by the Milk Vita, therefore, their production costs and revenue structure was very similar. All the three types of farm covered their production costs from the profit and loss account and produce a positive profit.

According to the previous study (Hemme, Garcia and Khan [7]) the costs of producing 100 kg of ECM in Sirajganj District of Bangladesh lay around US\$ 22⁹⁾. However, in the present study area the average cost of 100 kg ECM was US\$ 13.5⁹⁾. In our study area, the cost of producing 100 kg ECM was much lower than that in Sirajganj. This low cost may have achieved for using Bathan offered by Milk Vita.

Table 6 Comparison between profit and no. of cows before and after becoming a member of Milk Vita

	Before member of Milk Vita estimated profit / year (Taka)	After member of Milk Vita profit / year (Taka), 2004	Ratio	Before member of Milk Vita no. of cows	After member of Milk Vita no. of cows, 2004	Ratio
	A	B	B/A	C	D	D/C
Small farm	15,944	112,178	7.0	2.56	11.44	4.5
Medium farm	28,778	218,748	7.6	5.22	21.22	4.1
Large farm	42,222	673,724	16.0	8.00	44.67	5.6

Source: Field survey, 2005.

4. Influence of Dairy Farming under Milk Vita

1) Contribution of Milk Vita to the Dairy Farmers

Table 6 shows the comparison between profit and number of cows in sample farms before and after becoming a member of Milk Vita. It appears from the Table 6 that, regardless of farm size the profit from dairy farming of each farm increased from 7.0 to 16.0 times after becoming a member of Milk Vita, whereas the number of cows also increased from 4.1 to 5.6 times. Cattle purchase loan may have helped to increase the number of cows for each farm. With the increase of cattle population of each farm, normally the profit level has increased. Therefore, it can be said that, member farmers of Milk Vita are benefiting from the services it provides which is also contributing to the country to enhance milk production.

2) Income Distribution of Sample Farms

Table 7 shows the income (from dairy farming) distribution in the different farm size. It can be said from the Table 7 that, all the farmers' income (from dairy farming) was fairly high and ranged between the middle and higher income group according to

Table 7 Comparison between national household income and dairy income

Income group (Taka)	National population (%)	Sample farmers	
		No. of farms	percent
< 1,249	6.0		
1,250-2,499	22.6		
2,500-4,999	37.8		
5,000-7,999	17.6	2	7.4
8,000-12,499	9.3	6	22.2
12,500-19,999	3.9	8	29.6
20,000-	2.9	11	40.7
Total	100.0	27	100.0

Source: Field survey, 2005 and BBS [3].

Note: Income range is modified considering the purpose of the study.

the national level household income. Therefore, dairy farming under Milk Vita was profitable and farmers have a higher financial status in the society.

Under the income level of 5,000-7,999 Tk, the number of farmer was 7.4%, 8,000-12,499 Tk 22.2%, 12,500-19,999 Tk 29.6% and above 20,000 Tk 40.7% respectively. All the farms income is above the middle income group 2,500-4,999. A higher percentage of farm (40.7%) falls into the higher income group of 20,000 Tk and above.

3) Household Milk Consumption of Sample Farms

The per capita milk availability in Bangladesh is just 13.5 kg per year (BBS, 2002). Table 8 shows that, the per capita availability of milk is 62.4, 101.9 and 180.9 kg per family member per year for small, medium and large farms respectively. The average per capita milk availability in the study area was 115.0 kg, which was much higher than the per capita milk availability in the country. Table 8 also shows that, there was a positive relationship between the milk production and consumption. Therefore, it can be said that, through dairy farming, farmers do not only make profit, but their family members also benefit by consuming a moderate amount of milk, which may helps them to maintain good and sound health.

Table 8 Per capita milk availability of sample farmers family member and national level (kg)

National level	Our survey			
	Small farm	Medium farm	Large farm	All farms
13.5	62.4	101.9	180.9	115.0

Source: Field survey, 2005 and BBS [3].

5. Conclusion

Present study examines the Milk Vita's member dairy farmers' profitability level. To fulfill the objectives field survey was conducted twice (December, 2004 and March, 2005). Primary and secondary data were used for the study purpose. The present study was conducted in three villages of Bagabarighat namely Potazia, Tetiarkanda and Shalachapri under Shahjadpur Upazila in Sirajganj District. Bagabarighat was purposely selected for the study, because the largest plant of Milk Vita is located here.

Dairy farming under Milk Vita is profitable regardless of farm size. Each of the farms made a profit. The cost of milk production in the study area was lower than the other parts of Bangladesh. Farmers' income from dairy farming was compared with the national level household income, where it was found that, most of the dairy farmers' income was fairly high and ranged between the middle and higher income group. It was also observed from the results that, each farms regardless of size, profit level increased seven to sixteen times and the number of cows increased four to five times after becoming a member of Milk Vita. It is also seen from the results that, through diary farming, farmers' family members could consume a sizable amount of milk comparing with the national level per capita availability.

Finally, it can be said that, the profitability of dairy farming under Milk Vita has attracted the farmers to become its members, which ensures dairy farmers better economic life.

There are some limitations of the present study. The study only investigated the dairy farmers' condition under Milk Vita. Due to the lack of time and budget, the present study investigated only 27 sample farmers under Milk Vita in a selected study area. However, Milk Vita operates its activities some other parts of Bangladesh too. Therefore, for the next study, other milk-shed area of Milk Vita should be included in the study and sample should be increased. To differentiate the advantage and

disadvantage of member farmers and non-member farmers of Milk Vita, it is essential to identify the non-member farmers' condition.

Appendix Definitions of Costs and Revenues

The objectives of this appendix are to define all the costs and returns related factors regarding dairy farming in the study area for the year 2004. In this study cost items includes feed, labor, cow shed (housing), veterinary service and medicine, electricity, miscellaneous, land use, cost of capital, depreciation of cows, opportunity cost of family labor and interest on the operating capital. Revenue from dairy farming comprises return from sale of milk, cow dung, bonus and change in the inventory of animals and value of home consumption. The number of milking cow was considered in calculating costs and revenues per year of the farm. The details are explained below.

Variable Cost

Variable costs include feed cost, labor cost (hired), veterinary cost, electricity charge and miscellaneous cost.

Fixed Cost

Fixed costs of dairy farming are considered as cow shed (housing) cost, interest of the value of the land, cost of capital, depreciation cost of cows, opportunity cost of family labor and interest on the operating capital.

Feed Cost

Feed costs encompass paddy straw, green grass, rice bran, wheat bran, pulses bran, oil cake, salt, molasses and rice kani (broken rice).

Labor Cost

Labor cost includes family labor cost and permanent hired labor cost. Family labor cost was calculated on the basis of the principle of opportunity cost (market price 80 Tk / 8 hours). Hired labor cost was calculated on the basis of the labor employed

at the local market price.

Veterinary Cost

Veterinary cost includes the cost of medicine for cows and veterinarian charge for the study period.

Electricity Cost

This cost includes the lighting cost of cow shed. At night cow shed needs electricity for taking care of cows.

Miscellaneous Cost

This cost item encompasses some minor cost such as ropes, pot, detergent etc.

Cow Shed Cost (Housing)

The cow shed cost consists depreciation cost, repairing cost and interest rate on the average value of cow shed. Straight line method was used for calculating the depreciation cost of cow shed. Interest rate was considered 6 % per year.

Interest on the Value of Land

Dairy farmers use some land for dairy farming. It was considered that, if the farm owners had put the money of land value in a bank it would create some interest for the farmer. Interest was calculated 6 % per year. The value of land was charged to calculate the interest on the value of land.

Cost of Capital

In the present study cost of capital was computed by interest on the average value of the dairy cows. Interest rate was assumed to be 6 %.

Depreciation Cost

Depreciation cost was calculated according to the average price of cow. On the average value of cow, depreciation rate was assumed at 10% rate that is practiced by the cooperative members in the researched area.

Opportunity Cost of Family Labor

It was assumed that, if a person works for other people they will receive some wage / salary. Family labor cost was calculated on the basis of the principles of opportunity cost. Regardless of men and women, one day labor cost was considered 80 Tk, where 1 man day = 8 hours. This calculation was used in the study area.

Interest on Operating Capital

This cost was calculated on the average variable cost including feed cost, labor cost, veterinary cost, electricity cost and miscellaneous cost. The interest on operating capital was calculated at the rate of 6 % per annum.

Revenue from Dairy Farming

Returns from dairy farming consisted return from value of milk (Tk 17.38 / kg), value of cowdung (Tk 0.35 / kg), value of home consumption, change in inventory and bonus (Tk 1.10 / per kg milk sold) received from primary cooperative. Here, change in inventory indicates the difference between beginning stock value and ending stock value.

Net Profit

Net profit was calculated by subtracting total production costs (fixed plus variable costs) from gross revenue.

Notes

- 1) Most of the Bangladeshi people know BMPCUL as Milk Vita; therefore, in this study we will use Milk Vita instead of BMPCUL.
- 2) In Bangladesh, the middleman who deals with the raw milk in informal sectors doesn't have good image for their cheating and unfair behavior.
- 3) Here commercial dairy farming means, cow is only reared for milk production and the farm sales above 80% of their produced milk.
- 4) Generally Bangladesh experiences flood every year and Bathan goes to under water.
- 5) We surveyed the same number of sample on each farm size and each village. Therefore, the distribution

of sample farms might be different from that of the real population.

- 6) This study deals with the commercial dairy farmers, therefore, sample farmers have to have at least two milking cows.
- 7) Adjustment of milk into ECM: The milk output per farm is adjusted to 4 percent fat and 6.3 percent protein.
- 8) Sirajganj is one of the major milk producing districts in Bangladesh.
- 9) This study has also conducted in Sirajganj District.

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