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PRODUCTION AND CONSUMPTION ASPECTS OF MILK IN SOME SELECTED AREAS OF MYMENSINGH

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ABSTRACT

The study was conducted to know the profitability of dairy farming, milk consumption pattern and marketing system of the dairy owners. Net return of dairy milk in commercial region was significantly higher than other regions due to rear cross breed cows and feeding them high quality food. Net return from dairy enterprise was 69 per cent of the gross cost and this figure was highest in semi-urban region (75%). The positive values of marginal value products indicate that addition of dry fodder, capital investment and labour would add positive returns through milk production. The regression coefficients using Cobb-Douglas production functions of dry fodder, capital investment, labour involved and breed dummy were positive and significant. Average per capita daily milk consumption by the dairy owners of different income classes and different regions were significantly different. Milk consumption function was higher for the dairy owners in commercial villages and for higher income classes. Education level, farm size, income and milk yield of respondents had positive and significant impact on milk consumption. Significant production elasticity was observed in rural areas whereas significant income elasticity was observed only in riverside village. Dairy enterprise may contribute to economic development of the country by increasing income of dairy owners, number of crossbred cows and extent of commercial farming. Lack of adequate market facilities, poor market infrastructure and low price of milk were the major marketing problems of the dairy owners.

I. INTRODUCTION

Livestock contributes about 6.5 per cent to GDP and provides employment of about *20* per cent of the rural population (Rahman *et al*, 1999). Dairy products like milk, butter, ghee and cheese have high nutritive values and contain all ingredients required by the human body in appropriate proportions. The country produces only 12.8 per cent of the total requirement (Alam, 1995) and per capita production of milk remained almost stagnant at around 11 kg in spite of an increase in the total production of milk (Alam, 1996). During 1993 the Government of Bangladesh introduced a subsidy for the establishment of mini dairy farms and hence a number of farmers have come forward for setting up dairy farms in the private sector (Alam, 1999). The per capita availability of animal protein from domestic livestock source declined from an average 2.03 gm per day to 1.82 gm per day over the period 1977 to 1993 (BBS, 1995). Investment in the livestock sector may be considered as an important strategy of poverty alleviation. All over the world, dairying is a profitable business. Moreover, dairy industry is diversified and is a stable business in many countries of the world. Due to agro-climatic features of Bangladesh, dairy could be an effective instrument for increasing

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income and employment in her rural and urban areas. Despite substantial importance,, attention has been attached to the development of milk production by policy makers and state of knowledge about the economics of dairy production and milk consumption beha

Many people of Bangladesh are suffering from malnutrition because of con unbalanced diet. Consumption plays the key role the guiding an economy to the produc goods and service that they demand. In a developing economy like Bangladesh, the consumption behaviour of household is expected to undergo a change with arise in ag income. Information regarding consumption pattern and the factors that influence it, wo helpful to the government to adopt appropriate policy in situation of milk price and i change (Kabir, 1995). This will also assist government to estimate the requirement of the coming year and on that basis export and import policy will be formulated. Unfortu excepting household expenditure survey at national level in limited form, no attempt has made from any corner to generate adequate data/information on this aspect. The i consumption relationships through income elasticity and production consu relationships through production elasticity have also been estimated for milk consumption can be of great strategic importance in the formulation of planning policies.

Marketing includes all the activities involved in the flow of goods from the po initial production to the consumers. An efficient marketing system is essential for producers as well as the intermediaries. Efficient marketing system will encourage pr by ensuring reasonable price for their produce and satisfy consumers through sup product at reasonable price. The production of milk in villages takes place on a very scale numerous scattered holdings, which makes the task of collection, transportation distribution difficult. Good roads do not connect many villages, no facilities for cooling no rapid transport facilities are available. To the best of the researcher's knowledge, t few in depth studies, particularly covering marketing aspects of milk productioo Bangladesh. The different Thanas in Mymensingh districts were the supply hinterla milk for Mymensingh town. The existing marketing systems of milk in these areas were well organized but no attempt is made to improve the milk marketing system in this area.

The present study was undertaken to provide guidelines for recognition of dairying the overall improvement of Bangladesh. This type of information helps to planners for decision on dairy improvement programme. Thus, an attempt was made to accounts socioeconomic characteristics of the dairy owners, profitability of dairy farming, f affecting milk production, the behabiour and affecting factors of dairy milk consumption nature and problems regarding milk marketing.

II. METHODOLGY

Sampling Technique and Data Collection

Three upazillas out of 12 of Mymensingh district was selected on the basis of comm village, riverside village and semi-urban area and they were Fulbaria, Trisal and Mymen Sadar respectively. Four villages were selected in the same locality from each of the sel upazillas. One hundred dairy households were selected at random from each of the locality

Data were collected from each of the selected households through a questionnaire. Statistical measures such as frequency count, percentage distribution, mean and some statistical tests were used to explain the findings of the research properly. Cobb-Douglas milk production function, marginal value product, benefit-cost ratio, milk consumption function and income/production elastic ties were estimated and the detailed procedures are given bellow.

Cobb-Douglas Production Function

Cobb-Douglas Production function is a relatively "efficient user" of degrees of freedom (Heady and Dellon, 1972) and such efficiency is important in the contest of agricultural production and was used to explore the input-output relationship of milk production. The general specification of model can be shown as follows

$$Y = aX_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_5^{b5}X_6^{b6}X_7^{b7}X_8^{b8}X_9^{b9}e^u$$

$$\text{Or, } LnY = Lna+b_1LnX_1+b_2LnX_2+b_3LnX_3+b_4LnX_4+b_5LnX_5+ b_6LnX_6+ b_7LnX_7+ b_8LnX_8+ b_9LnX_9+ U_j$$

Where Y = milk production in litre per cow per day

X_1= quantity of green fodder per cow per day (kg)

X_2= quantity of dry fodder per cow per day (kg)

X_3= quantity of concentrates per cow per day (kg)

X_4= interest of capital investment per cow per day (Tk)

X_5= labour per cow per day (hours)

X_6= age of the cow (years)

X_7= number of lactation

X_8= month of the lactation

X_9= breeds = 0 for local breed

= 1 for cross breed

b_1 to b_9 are the respective coefficients. U is the random disturbance term.

Marginal Value Product (MVP) and Benefit Cost Ratio (BCR)

MVP is obtained by taking resources dry fodder (X_2), concentrate (X_3), capital investment (X_4) and labour (X_5) al well as return (Y) at their geometric means (Dhawon and Bansal, 1977).

$$MVP_{(Xi)} = b_i \frac{\bar{y}(GM)}{\bar{X}_i(GM)}$$

Benefit cost ratio is the ratio of net return to total cost of the dairy farms by using the farm business analysis technique (Singh, 1977)

$$BCR = \frac{\text{Net return per cow per year}}{\text{Total cost per cow per year}}$$

Milk Consumption Function

Based on the comparisons, double-log was selected as the appropriate functional form. Initially, the following milk consumption function was fitted for this study.

$$LnCON = a + b_1 LnED + b_2 LnHM + b_3 LnPC + b_4 LnFS + b_5 LnMC + b_6 LnIN + b_7 LnMY + b_8 D_1 + b_9 D_2 + b_{10} D_3 + b_{11} D_4 + U$$

Where,

CON = Per capita per day consumption of milk
a = Constant
ED = Education of household head (year)
HM = Number of household member
PC = Proportion of children to total members
FS = Farm size (ha)
MC = Number of milch cow in a household
IN = Per capita income
MY = Milk yield per capita per day.
D1 = Dummy for region based on commercial village
D2 = Dummy for region based on riverside village
D3 = Dummy for profession i.e. 1 for agriculture and 0 for other
D4 = Dummy for breed i.e. 1 for cross breed and 0 for local breed
b_i 's are the coefficients
U = Error term

Output of the computer analyses showed that significant level of the variable, proportion of children and two dummies D3 and D4 i.e. profession and breed were very high. Therefore, another double-log model was fitted by excluding these three variable and dummies. The output of this new model showed more convenient results than the results of former model. Thus, finally, the following model was used.

$$LnCON = a + b_1 LnED + b_2 LnHM + b_3 LnFS + b_4 LnMC + b_5 LnIN + b_6 LnMY + b_7 D_1 + b_8 D_2 + U$$

III. RESULTS AND DISCUSSION

Socioeconomic Characteristics of Sample Households

The socioeconomic characteristics of the sample household members affect their milk consumption behaviour. It will therefore, be worthwhile to know the background information of the respondent and their household members. The main characteristics are presented in Table 1. In rural areas, agricultural farming was the main occupation of the majority household heads, while service and business were the dominant occupation in semi-urban areas. Eighty per cent household heads of this region involved different occupations other

than agriculture. About 43 per cent of the entire sample household heads belonged to agriculture as a main occupation. About three-fifth of the household heads were literate.

The average family size was 5.8; which was higher in riverside village (6.1) and lower in semi-urban area (5.3), which means that family size was more controlled in semi-urban area than rural areas. On an average, sample households owned 0.417 ha of land of which 0.332 ha were under crop cultivation, 0.063 ha under homestead and 0.021 ha under ponds. The highest cultivated and homestead land holdings were in the commercial villages and the lowest in semi-urban area. There were no ponds in the semi-urban location. The average per capita per month income of the farm households was Tk.1150; which was highest in commercial village (Tk.2050) and lowest in riverside village (Tk.615). About 23 per cent of the household's monthly income was below Tk.2000, 34 per cent of them was Tk.2000-4999, 29 per cent of them was Tk.5000-9999 and the remaining 14 per cent of them was Tk.10000 and above. Higher percentage (75%) of households in commercial village belonged in higher income groups (Tk.5000 and above). On the other hand, higher percentage (78%) of households in riverside village belonged in lower income groups (below Tk.5000); even, 41 per cent of them belonged to below Tk.2000.

Table 1. Socioeconomic characteristics of sample households in the study area.

Particulars	Commercial village	Riverside village	Semi-urban area	Overall
Main occupation (%)				
Agriculture	56	54	20	43
Other than agriculture	44	46	80	57
Education Level (%)				
Illiterate	50	28	40	39
School level	34	67	55	52
SSC and Above	16	*05*	*05*	09
Family Size (Number)	5.9	6.1	5.3	5.8
Land Holdings (ha)	0.527	0.495	0.221	0.417
Homestead	0.085	0.070	0.034	0.063
Cultivable	0.431	0.371	0.195	0.332
Pond	0.011	0.054	-	0.021
Income per capita per month (Tk)	2050	615	765	1150
Income Group (%)				
Below Tk 2000	04	41	25	23
Tk 2000 - 4999	21	37	43	34
Tk 5000 -10000	41	17	28	29
Tk 10000 and above	34	05.	04	14
Number of Milch Cow				
1	53	54	50	52
2	41	38	34	38
Above 2	06	08	16	10
Breed (%)				
Local	30	76	38	48
Cross	70	24	62	52

The number of milch cow of the sample households was 1 to 4 and on, an average 1.6. About 52 per cent of them had single milch cow, 38 per cent had 2 milch cow. There was no

significant difference between three regions on the basis of number of much cow_ households in commercial village reared mainly cross breed cows (70%) whereas ho in riverside village reared mainly local breed cow (76%). Most of the households in n village reared local breed dairy cow as they belonged to lower income classes. Se households also reared higher number of cross breed cow (62%).

Profitability of Milk Production

Economics of milk production, cost and returns per milch cow are presented in The average cost of interest on fixed capital, feed and gross cost for a cow was the hi commercial rural region, followed by semi-urban and riverside rural region. The overall per cow per year was Tk.16820.00 and per cow per day was Tk.46. In the overall maintenance, interest of fixed capital accounted for more than 10 per cent per cow per and feed cost 67 per cent (approximately). Feed cost (70.5%) as well as variable cost (was the highest in commercial rural region whereas labour cost was higher in semi-urban riverside regions. To determine the gross returns from dairy cows, returns from milk value of cow-dung and value of calf were added. On the basis of the three sources of returns there was no major difference between the three regions. The overall returns i that milk yield provided 86 per cent of the total gross returns and cow-dung and calf pro 1 and 13 per cent returns respectively. Ne t return from dairy enterprise was Tk.11591 per that is 69 per cent of the gross cost. Net return in commercial region was more than than that in riverside region because local breed is reared and less amount of concentrate i.e. low food cost is given in the riverside region. The overall net return was Tk.32 per per day. The BCR was highest (0.75) in semi-urban region and was significantly higher riverside (0.56) region. The overall BCR was 0.69. The results indicate that for hundr investment in semi-urban region earn profit 75 Taka. This figure will help to analyse financial status of the farms. Rahman et al. (1999) found BCRs 0.59, 0.46 and 0.37 for median and large dairy farms respectively.

Table 2. Cost and return of raising dairy cows (in Taka).

		Commercial	Semi-urban	Riverside	Overall
A.	Interest on fixed capital	1971 (9.5)	1865 (10.6)	1405 (11.5)	1770 (10.5)
B.	Variable cost				
	Feed cost	14600 (70.5)	11366 (64.5)	7665 (63.0)	11315 (67.3)
	Labour cost	4132 (20.0)	4398 (24.9)	3103 (25.5)	3735 (22.2)
	Total of variable cost	18732 (90.5)	15764 (89.4)	10768 (88.5)	15050 (89.5)
C.	**Gross cost**	**20703 (100)**	**17629 (100)**	**12173 (100)**	**16820 (100)**
D.	Return				
	Value of milk	31273 (87.5)	26791 (87.0)	15522 (81.9)	24444 (86.0)
	Value of cow-dung	280 (0.8)	340 (1.1)	295 (1.6)	305 (l.l)
	Value of calf	4200 (11.7)	3650 (11.9)	3135 (16.5)	3662 (12.9)
E.	Gross return	**35753 (100)**	30781 **(100)**	**18952 (100)**	28411 **(100)**
F.	Net return /year	15050	13152	6779	11591
G.	Net return /per cow /per day	41.23	36.03	18.57	31.76
H.	**Benefit Cost Ratio (BCR)**	**0.73**	**0.75**	**0.56**	**0.69**

* Figures in the parentheses are the percentages

Factors Affecting Milk Production

The estimated coefficients of milk production function for all the milch cows incorporating breed dummies is presented in table 3. The input variable green grass was excluded as most of the commercial dairy farms did not fed green grasses to the milch cows. The Cobb-Douglas production function was considered to be the best fit. The R^2 value of log-linear function was 0.91 implying that the induced variables explained 91 per cent variation in milk yield. The F- value (132.45) measures the overall significance of estimated regression implying that all the explanatory variables were important for explaining the variation of milk production. The resource variables, paddy straw (X_2), capital investment ($X4$), labour (X5) were the important ones having positive impact on milk production with significant regression coefficients. The results suggest that the coefficient of dummy variable for the breed was significant and positive. It confirms that the milk yield was much higher for the crossbreed cows as compared the local breed. The estimated coefficients of milk production function for the local and crossbreed cows are also presented in Table 3. F-values interpret that all the explanatory variables were important for explaining the variation of milk production both for local and crossbreed cows. The estimated regression coefficients interpret that capital investment and labour involved were the significant ones for local breed and all cows whereas only capital investment was significant for cross breed cow. The MVPs were estimated for those inputs whose regression coefficients were significant. The estimated MVPs were found

positive for all the cases (Table 3). It indicates that at the present level of resource use, an additional unit of investment in the corresponding inputs would add positively to the returns through milk production. The comparison of MVPs (of the inputs whose coefficients are significant) with unity revealed that in all the situations except for capital investment were very poor. It may therefore, be referred that the farmers were quite rational and efficient in using these resources.

Table 3. Estimated coefficients and related statistics of Cobb-Douglas production function.

Independent Variables	All cows		Local		Cross-bred	
	Coefficient	MVP	Coefficient	MVP	Coefficient	MVP
Intercept	-1.070		-1.046		-0.540	
Paddy straw (X_2)	0.112* (0.056)	0.055	0.146 (0.088)		0.022 (0.039)	
Concentrate (X_3)	0.040 (0.037)		0.076 (0.054)		-0.033 (0.029)	
Capital investment (X_4)	1.018** (0.090)	0.653	0.912** (0.142)	0.522	1.150** (0.070)	0.902
Labour (X_5)	0.190** (0.062)	0.261	0.219* (0.093)	0.235	0.072 (0.050)	
Age of cow (X_6)	0.077 (0.064)		0.103 (0.087)		-0.089 (0.061)	
No. of Lactation (X_7)	0.063 (0.044)		0.095 (0.069)		0.028 (0.029)	
Month of Lactation (X_8)	-0.018 (0.035)		-0.053 (0.064)		0.025 (0.024)	
Breed (X_9)	0.184* (0.079)	-	-		-	
R^2	0.910		0.668		0.910	
F-values	132.451**		19.968**		54.518**	

* Figures in the Parentheses are the value of standard errors
* Indicates significant at 5% level and ** indicates significant at 5% level

Milk Consumption Behavoiur

Own consumption of dairy milk per capita daily was 86 ml. The results of analysis of variance (Two-way classified data) implies that average per capita daily milk consumption by the dairy owners of different classes was significantly different ($p<0.01$) and that of different regions was borderline different (0.10). This figure was highest in commercial village (104 ml) and lowest in semi-urban area (70 ml). Per capita milk consumption was increased with increase of income classes of the households. The households having income Tk.10000 and above consumed 117 ml of milk per capita daily whereas the households having income below Tk.2000 consumed 62 ml of milk per capita daily (table 4). This may be due to higher per capita income and availability of more milk yield. Per capita daily milk yield was 718 ml;

which was highest in commercial village (955 ml) and lowest in riverside village (585 ml) and it was lower level in semi-urban area (616 ml) than overall milk yield. Ali (1999) estimated average milk yield per cow per day 1.7 litres and Makoni (2001) estimated 1.5 litres. The reasons for such low productivity in the study area may be due to genetically low producing indigenous local cow and inadequate feeding management.

The highest sale of milk was 4.03 litres per household and 2.52 litres per cow in the commercial rural region. These figures were lowest in riverside region and the overall figures were 3.0 litres and 1.88 litres respectively. The average consumption cost of milk per household per day was Tk.11.70 and this figure was the height (Tk.13) for commercial rural region. Ratio of milk consumption compare to total food consumption of the studied dairy owners was 10.2 per cent. This figure was 12.6 for the commercial rural farmers, 9.4 for semiurban farmers and 8.6 for riverside farmers. About 75% of the studied households had nutritional knowledge.

Table 4. **Pattern of milk disposal and consumption** by the **dairy owners.**

	Commercial	Riverside	Semi-urban	Overall
Milk yield per day (litre)	0.955	0.584	0.616	0.718
Milk Consumption per day per capita (ml)	104	083	070	086
Below Tk.2000	084	069	046	062
Tk.2000 - 4999	098	084	058	076
Tk.5000 -10000	095	107	104	100
Tk.10000 and above	120	109	100	117
Sold (in litre)				
Per household	4.03	1.88	3.07	3.00
Per cow	2.52	1.22	1.84	1.88
Consumption cost of milk/ household/day (Tk)	13.00	9.60	12.00	11.70
Ratio of Milk consumption to total food cost (%)	12.6	8.6	9.4	10.20
Having knowledge about milk-nutrition (%)	75	70	80	75

Milk Consumption Function

The estimated coefficients of milk consumption function for regional dummy are presented in table 5. The consumption function was considered to be the best fit. The R^2 value of double-log function was 0.377 implying that the induced variables explained 37.7 per cent contribution of milk consumption. The significant F-value (132.45) interpret that all the explanatory variables were important for explaining the variation of milk consumption.

Most of the socioeconomic factors e.g. education, number of household member, farm size and number of milch cow were significantly affecting the milk consumption. It indicates that with the increase of socioeconomic factors increases the consumption of milk. Estimated coefficients implies that milk consumption could be increase 6 per cent by doubling the farm size keeping other variables same. Similarly, dairy owners could increase milk consumption by 17 per cent with the increase of education level to 100 per cent. Increase in number of household members and milch cow decrease the milk consumption.

Income influenced milk consumption at 10 per cent level of significance whereas yield influenced at 1 per cent level of significance. Estimated coefficients also inte 100 per cent increase of income of the dairy owners will increase 8 per cent consumption. On the other hand, 100 per cent increase of milk yield will increase 25 milk consumption. Regional dummy i.e. the region based on both commercial and n villages were significant at 5 per cent level of significance; means that per capita daily consumption by the dairy owners of both commercial and riverside villages were su higher than semi-urban area.

Table 5. Estimated coefficients and related statistics of double log consumption function.

Explanatory variables	Coefficients	Standard Error	t-value	Significant Level
(Constant)	2.807	.454	6.185	.000
LNED	0.172	.068	2.552	.012
LNFM	-0.231	.099	-2.330	.021
LNFS	0.061	.028	2.181	.031
LNMC	-0.192	.084	-2.292	.023
LNIN	0.083	.046	1.780	.077
LNMY	0.252	.050	5.085	.000
D1	0.248	.100	2.472	.014
D2	0.178	.091	1.948	.053

Dependent Variable: LNCON, $R^2 = 0.377$

Elasticity for Milk Consumption

The estimated coefficients using double-log model can be directly read as the e values. For convenience of illustration the key parameters such as income elasticity production (milk yield) elasticity for different regions and income classes are se presented in table 6. Milk yield contributed 27.3 per cent consumption in the commercial village. Comparatively higher elasticity was appeared in this region also. The less el specially, in the semi-urban region is observed most probably because of influence of i

Income elasticity for all the regions are positive of which riverside village significant ($p<0.10$) elasticity because consumption is higher in relation to income co to other regions. Income elasticity for income classes below Tk.2000 and Tk.5000-1 negative and for other two classes are positive. The highest and significant income el for income class Tk.2000-4999 implies that per capita milk consumption is superior f dairy owners of this income classes with respect to their income and these dairy o consider milk as an essential food item. Regarding milk production elasticity, consumption is highly significant in rural areas whereas non-elastic in semi-urban Compared to different income groups' lowest income class (below TK.2000) shows production elasticity implies that their milk consumption is higher with respect to production. Production elasticity is significant ($p<0.10$) for highest income class and is significant for other income classes.

Table 6. Production and income elasticity.

	Income elasticity	Production elasticity
Region		
Commercial village	0.018	0.273***
Riverside village	0.086*	0.249***
Semi-urban	0.126	0.168
Income classes		
Below Tk.2000	-0.177	0.492***
Tk.2000-5000	0.487**	0.320***
Tk.5000-10000	-0.315	0.218***
Tk.10000 & above	0.101	0.226*
Overall	0.086*	0.252***

Marketing System of Dairy Milk

Milk marketing systems in the study were unorganized and inefficient. Producers either sell milk directly to the ultimate consumers termed as direct marketing channel, or a number of intermediaries (milk traders) are involved in the transaction process termed as indirect marketing channel. Some of the dairy farmers performed the job of milking and carried to the local market or sold at farm gate to the milk traders. Sometimes the milk traders (goala) performed the job marketing and purchased milk at farm-gate on condition of monthly payment or paying in advance. The goala carried the milk to the urban market and sold to the sweetmeat shop, tea-stall or to the final consumers. A sketch of milk marketing channels for the study areas is shown in figure 1. In the study areas, buying, selling, payment procedures, storage, transportation and pricing were the marketing functions performed by different market participants. In the market place, buyers and sellers fixed the milk price in cash by direct bargaining on the basis of the kind and quality of milk. Dairy farmers sold milk quickly to the buyers due to lack of preservation facility. Milk is highly perishable product and hence preservation is necessary for its marketing.

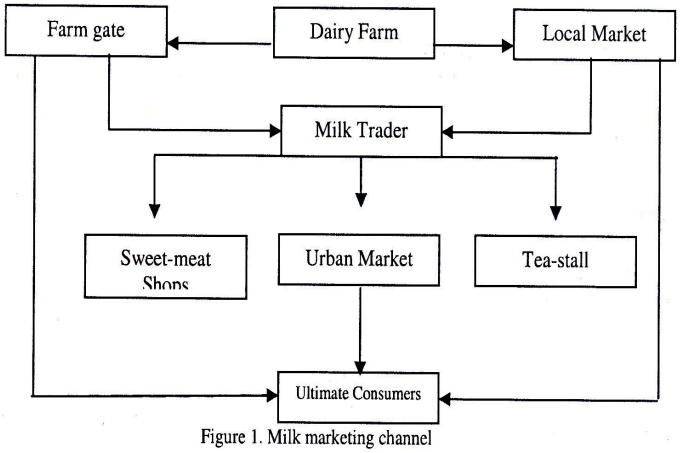

Figure 1. Milk marketing channel

About 9.5 per cent of the total production were consumed in the family, 88 per cent was sold at farm gate or to market and the rest 2.5 per cent used as other consumption purposes. About 31 per cent owners of the selected dairy farms sold their produced milk at farm gate, 42 per cent at local market and 27 per cent to the ultimate consumers directly (Table 7). Only the owners in the semi-urban region carried milk to the ultimate consumers. Mostly rural owners carried milk to the local market. According to Rahman et al. (2002) 52 per cent farmers directly sold their fluid milk to the milk traders and 17 per cent sold to the market. Most of the selected dairy farm owners (68%) carried their milk to the local market or to the direct consumers on foot. Rest of the owners' i.e. 23 per cent of them carried milk by by-cycle and 9 per cent of them by rickshaw or tempo.

Table 7. Place of milk sale and mode of transportation.

Particulars	Commercial village	Riverside village	Semi-urban area	Overall
Selling place				
At farm gate	41	30	22	31
At local market	59	70	7	42
To consumer	0	0	71	27
Mode of transportation				
On foot	70	88	47	68
By-cycle	15	12	41	23
Rickshaw/Tempo	15	0	12	9

Problems Regarding Milk Marketing

The most important problems were lack of road connection, inadequate transportation facility, poor market infrastructure, lack of adequate market facility, low price or price fluctuation and lack of storage facility. The extent of these problems according to different regions and overall ranks on the basis of the farm owners' response are shown in Table 8.

Forty seven per cent producers faced transportation problem. Table 8 shows that 68 per cent respondents claimed this problem of which commercial village faced comparatively higher extent may be due to higher amount of milk production. The farmers in the semi-urban (78%) and riverside village (83%) mostly faced this problem. Besides poor infrastructure, inadequate market facilities such as absence of drainage system and water supply and unhygienic market conditions etc were the second highest problem of the milk sellers.

Lack of storage facility was one of the main problems of milk marketing in the study area and they sell it as soon as possible and hence they got low price. Table 8 shows that 63 per cent of commercial village, 54 per cent of riverside village, 69 per cent of semi-urban area and overall 62 per cent of the dairy owners claimed that storage facilities for produced milk should be developed.

The low price of milk reported by eighty five per cent dairy owners and this low price was rank 1 problem of milk marketing in the study area (Table 8). The selected dairy farm owners claimed that the main cause of low price of milk in the study area was the import of

powder milk and milk products. However, milk prices in different regions were more or less stable which tends to indicate the competitive structure of the market.

Table 8. Problems faced by the milk producers (in per cent).

Problems	Percentage of response				
	Commercial Village	**Riverside** village	**Semi-urban**	**Overall**	**Rank**
Lack of storage facilities	*63*	*54*	*69*	*62*	*5*
Lack of road connection	*13*	*81*	*0*	*47*	*6*
Lack of transportation facilities	*74*	*61*	*69*	*68*	*4*
Poor market infrastructure	*58*	*83*	*78*	*73*	*3*
Lack of adequate market facilities	*65*	*88*	*87*	*80*	*2*
Low price of milk	*91*	*72*	*92*	*85*	*1*

IV. CONCLUSIONS

Literacy rate of the sample milk producers was good though their main occupation was agriculture. The households of upper income classes reared mostly crossbred milch cows. The dairy owners of income class Tk.2000-4999 considered milk as an essential food item and their consumption rate was superior. Both milk yield and consumption rates were higher for commercial dairying. Consumption rate was higher also for the owners of higher income class.

Per capita demand for milk would increase substantially with the increase in per capita income and milk yield. Education level of the household head and farm size of the households also influenced milk consumption to some extent. Commercial dairy farming was more effective in production, consumption and source of income compared to non-commercial (both rural and semi-urban) farming. Therefore, income of dairy farmers and high yielding cow i.e. crossbred cow should be increased and farmers should be motivated to commercial farming to raise the level of milk production leading to economic development.

The study reveals that milk production was an economically viable and profitable enterprise in the studied areas. Milk consumption rate was higher for commercial dairying households and milk yield has less influence to consume milk. The dairy owners of middle income class considered milk as an essential food item and their consumption rate was superior. Milk yield and consumption rates were higher for commercial dairying. Consumption rate was higher also for the owners of higher income class.

Milk price could be maintained reasonable by minimizing feed price and marketing cost. Development of connective roads of villages and villages to market places and milk collection centre may reduce the marketing problem to some extent. Appropriate policy and institutional support could improve the situation to a great extent.

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