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Selected Factors Associated with Dairy Farms Profitability of Chittagong District in Bangladesh

Swarup Barua[1*], Mohammad Jahangir Alam[2], Md. Mostafizur Rahman[1], Md. Shaikh Farid[1] and Subrata Koiry[3]

[1]Department of Agricultural Marketing and Business Management, Sylhet Agricultural University, Sylhet, Bangladesh.
[2]Department of Agribusiness and Marketing, Bangladesh Agricultural University, Mymensingh, Bangladesh.
[3]Department of Agricultural Finance and Banking, Sylhet Agricultural University, Sylhet, Bangladesh.

Authors' contributions

The work has been derived from author SB master's thesis and carried out in collaboration with supervisor author MJA and other authors. Author SB designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SB, MJA, MMR, MSF and SK managed the analyses of the study. All authors managed the literature searches, edited the manuscript, read and approved the final manuscript.

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ABSTRACT

The study was conducted to explore the management and institutional factors associated with dairy farms profitability in Chittagong district. The aim of the study was to determine the role of dairy farming in improving their lives, identifications of the problems of dairy cow rising and to provide suggestions for their improvement. A pre-tested structured questionnaire was used to collect data from the farmers during the months of August to September in 2015. From the regression analysis, three variables (two managements and one institutional factor) such as age of respondent, number of milking/dairy cows and search costs, were found to be significant and rest of the variables were insignificant but consistent with the expected signs. In addition to that, the highest ranked constraint of dairy farm operating and marketing was insufficient veterinary service and low price of milk.

**Corresponding author: E-mail: sbarua.ambm@sau.ac.bd;*

Despite several problems in regard to farm operation and milk selling, the dairy farming was profitable in the study area. So, If proper support could be taken by the government and private organizations and formal institutional arrangements could be established, the overall dairy operation could be improved which in turn would play a vital role to overcome the problems of low income, unemployment, under nutrition of the country.

Keywords: Management factors; institutional factors; profitability; dairy farm; Bangladesh.

1. INTRODUCTION

Agriculture consists of crop, fisheries, livestock and forest subsector continues to be one of the important sectors of Bangladesh economy. Livestock sector contributes 1.66% of GDP, out of the 14.77% contribution of the agriculture sector to the economy [1]. In this context dairying is the mixed and profitable farming system in Bangladesh which contributes as a potent tool to develop the micro-economy in villages [2]. Market-oriented dairies propagate more regular cash income and dairy production, processing and marketing create more employment per value added unit than crop production [3-7]. Production of livestock and livestock products has reportedly increased in Bangladesh in the last decade, though it is much more or less than the requirement. Small-scale dairying in Bangladesh has been practiced for a long time. Most of the owners have two or three cows which are used for dual purposes such as draught and milk production. In Bangladesh, cattle, buffalo, and goat are considered as dairy animals. According to the department of livestock services [8], there are about 23.1 million cattle, 1.39 million buffaloes and 24.2 million goats in the country. Among the total cattle population, about 6 million are dairy cattle of which about 85-90% are indigenous/local, and 10-15% are crossbred. There are some cross-breeding of local cows with Australian, Sahiwal, Holstein Friesian, Jersey, etc., Murrah, Nili-Ravi, Surti, and Jaffrabadi are often seen in the rural areas and also surrounding of Indian border [9,10]. Out of total milk production, about 90% is coming from cattle, 8% from goat and the remaining 2% from buffalo [11]. The annual growth of milk production during the last ten years (2002-2012) was 7.11 % [12]. [13] Also found that the total production of milk in Bangladesh in 2006-07 was 2.28 million tons which was increased to 6.09 million tons in 2013-14. Milk is considered as an ideal and a complete food for the people of the whole world. In Bangladesh, cross breed cows produce a higher production of milk and meat than the local breed. So, dairying is gradually proving to be a profitable business. In addition to that, the profitability of dairy farming varies across dairy farms. Many studies have conducted on the profitability of dairy cows [14-18] found that production management factors such as large farm size, high rate of milk production, and use of parlors rather than stanchion milking systems, had a positive impact on dairy farm profitability. [19] Found a weak link between an understanding of financial concepts and greater dairy financial returns. [20] Found that participation in extension activities and the use of extension agents were positively associated with dairy farm financial performance. Using a latent variable approach, [21] found that management of the dairy herd and herd size were more important determinants of farm financial success than financial or crop management. They concluded that increases in dairy managerial ability would have a greater relative payoff than increasing herd size, supporting the findings of [22] that efficiency was more important than farm size in reducing net production costs. [23] Found in Spanish dairy farms that observed diseconomies of size might be offset by sufficient increases in managerial ability, in which managerial ability is measured by technical efficiency. Recently, [24] found management and institutional factors such as feeding systems; breed type, gender, debt amount, debt assets ratio and trust were significantly related to dairy profitability. [25] And [26] found that, the contractual arrangement provides access to better quality of inputs like feeds, breeds, through artificial insemination, and veterinary services which are likely to make more positive contribution to productivity improvement and overall zooming up income even when such farms do not get any better price compared with other milk producers in the market. In Bangladesh, dairying is growing faster; but it also faces many problems of high input and low output prices. The condition leads to lower profitability in dairy farming. Inadequate veterinary services are one of the major constraints for livestock development in Bangladesh. Animal health service is important for maintaining the good productivity of animals [27]. [28] Also found that disease, unpredictable

milk market, high prices of drugs, feed concentrates and failure of artificial insemination were main constraints limiting to small-scale dairy production in Bangladesh. There are some milk pocket areas in the country where dairy farming has been traditionally an important and major component in mixed farming. These areas are particularly located in Pabna, Sirajgonj, Manikganj, Faridpur, Kishoreganj, Rangpur, and Tangail districts and now it is extended to Chittagong district, as one of the emerging dairy producing areas. According to a report by the Department of Livestock in Bangladesh, there are four hundred farms operating their activities in these areas and produces approximately sixty thousand liters of milk per day. The numbers of cross breed private dairy farms have been increasing in Chittagong region over the last few years. Therefore, development of this sub-sector may be considered as an important strategy of poverty alleviation in that region. To the best of our knowledge, no specific study on management and institutional factors associated with profitability is conducted in Chittagong district. So it is expected that findings of the study will contribute to the dairy farmers, milk traders, policy makers, extension workers and researchers with a view to taking further action for dairy development as well as for carrying out further research more particular to this region. Given the above backdrop, the study was undertaken on selected factors associated with dairy farms profitability in Chittagong District, Bangladesh. The specific objectives of the study are to identify the institutional and management factors and estimating the impacts of identified factors on the profitability of the dairy farming business and to trace out the constraints of the dairy farming business in Chittagong district in Bangladesh.

2. METHODOLOGY

On the basis of specific objectives of the study and taking into consideration with associated limitations, two Upazila (Patiya and Banshkhali) in Chittagong district were purposively selected as the study area because of the comparatively higher concentration of high yielding cross breed dairy cow. A sample of 55 milk producers was selected by using simple random sampling technique. The primary data were collected through a direct personal interview during the months of August to September 2015. The collected raw data were carefully checked to detect errors and omissions and to avoid irrelevant information. Then the data were transferred to excel sheet from the survey schedules in a systematic way for analysis. Finally, the tabulated data were analyzed by SPSS software on the basis of the study objectives.

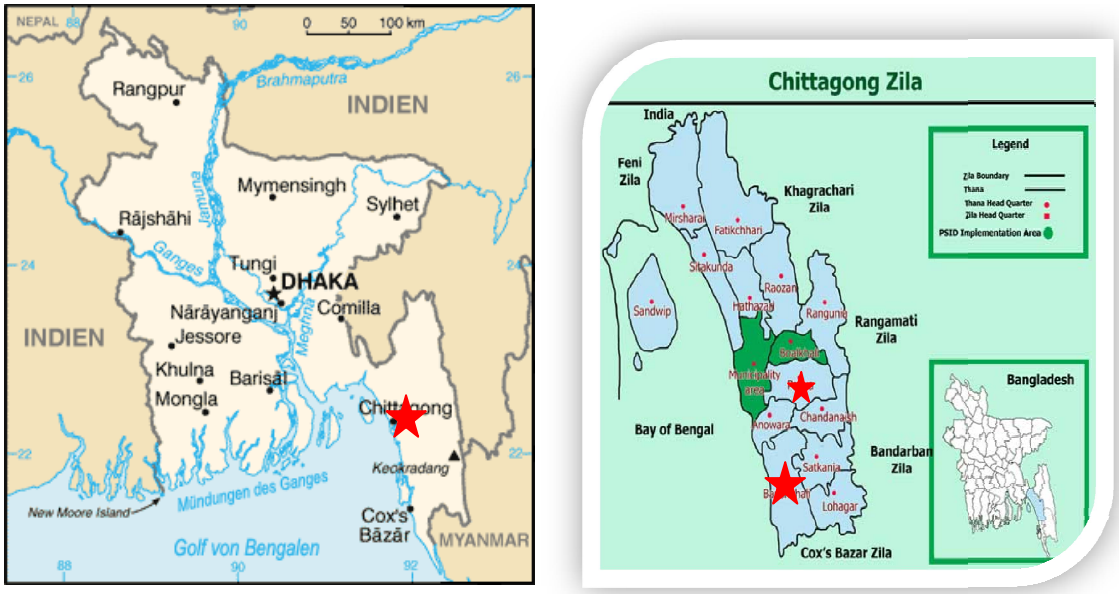

Fig. 1. Geographical location of the study area

N. B. ★ *Indicated the study areas*

2.1 Analytical Technique

In this study, following multiple regression models were used to analyze the management and institutional factors affecting profitability.

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 + b_8 X_8 + b_9 X_9 + b_{10} X_{10} + b_{11} X_{11} + b_{12} X_{12} + e$$

Where,

Y = Profitability
a = Intercept
bi = Coefficients to be estimated
X_1 = Age of the respondent (years)
X_2 = Gender of the respondent (0= female, 1= male)
X_3 = Education of the respondent (0= illiterate, 1= literate)
X_4 = Experience of dairy farming (years)
X_5 = Number of milking cows per farm
X_6 = Veterinary training (0= no, 1= yes)
X_7 = Buyers unit of measurement (0= others, 1= mug)
X_8 = Trust of information (0= mistrusted, 1= trusted)
X_9 = Trust on price (0= mistrusted, 1= trusted)
X_{10} = Trust on units on measurement (0= mistrusted, 1= trusted)
X_{11} = Search costs (Taka)
X_{12} = Market information (0=no, 1= yes)
e = disturbance term

2.2 Kruskal-Wallis One Way Analysis of Variance (ANOVA) by Ranks

Kruskal-Wallis ranking analysis was used to trace out farmer's perception of major sources of constraints in dairy farming business. This tool was used to measure the responses gathered from farmer's perception of sources of constraints associated with the dairy farming business.

The equation for estimating the ranks is outlined as follows:

$$H = \frac{12}{(N+1)} \sum_{i=1}^{ni} \frac{1}{ni} \frac{R_i - ni(N+1)^2}{2}$$

Where, R_i, is the sum of the ranks assigned to observation in the i-th sample and $\frac{ni\,(N+1)}{2}$, the expected sum of ranks for the i-th treatment [29].

3. RESULTS AND DISCUSSION

3.1 Demographic Characteristics of the Sample Household

Table 1 present the demographic and socioeconomic characteristics of the sample respondents. The total sample size of farm respondents handled during the survey was 55. Of the total sample respondents, the selected milk producers were grouped into four categories according to their ages. The highest number of milk producers (38 percent) came from the age group above 49 and the lowest of milk producers came from the group 25 years. It indicates that most of the sampled farmers belonged to active age range in human life cycle. In addition, a family size has been defined as the total number of persons living together and taking meals from the same kitchen under a head of the family. Family consisted of husband, wife, son, daughter, father, mother etc. The members of the family were classified into three groups. The table shows that the highest proportion of family size fell in the category medium family size (5-6 members). We know from the table 1 most of the farmers are illiterate. Due to the fact, that may be farmers are not conscious of their family planning. Furthermore, education plays an important role in accelerating agricultural development of a country in the sense that literate farmers tend to apply more modern technologies. Level of education of milk producers was categorized into four groups. Data revealed that 58 percent of milk producers are illiterate and 42 percent are literate. The study found that dairy farms are labor intensive. As a result, they are not being able to take proper educational facilities. On the other hand, agriculture (including dairy farming) was found to be a main occupation and the main source of income of milk producers in the study areas. Table 1 shows that agriculture was the main occupation of 78 percent milk producers, business and service were the main occupation only for 18 and 4 percent farmers respectively.

3.2 Management and Institutional Factors in Dairy Farming Business

Dairy farmers have different management characteristics which include farmers' education, training, age, experience in the dairy farming and herd size. The farmers face different institutional and management environments which include the transaction costs in milk marketing in terms

of searching for buyers and market information, trust and standard of measurement. These institutional and management factors influence the profitability of the farmer. The management factors determine the level of output of the farmer and cost of production. On the other hand, the institutional factors influence the marketing of milk and its products which consequently have a cumulative effect on the farmer's profit.

Table 1. Demographic and socioeconomic characteristics of samples

Variables	Items	Number (55)	Percent
Age group	Below 25	4	7
	25-39 years	11	20
	40- 49	19	35
	above 49	21	38
Family size	Small (1-4)	8	14
	Medium (5-6)	30	55
	Large (7 and above)	17	31
Education level	Illiterate	32	58
	Primary	9	16
	Secondary	13	24
	College	1	2
Occupation	Agriculture	43	78
	Business	10	18
	Service	2	4

Source: Field Survey (2015)

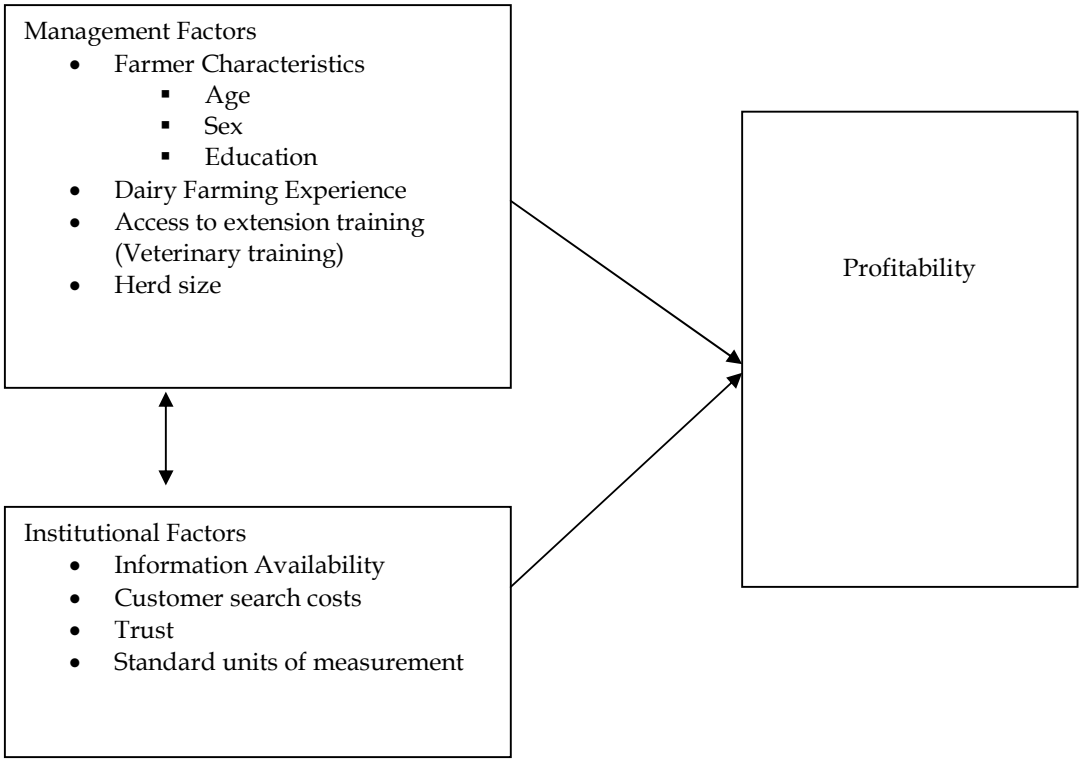

Fig. 2. Management and institutional factors
Source: Own compilation

3.3 Informal Contractual Arrangements

In milk marketing, milk producers had four types of informal contractual arrangements. These are spot, weekly, bi-weekly and monthly price. In the spot price arrangement, the producers sold milk and received the money immediately. The other types of price receive or informal contractual arrangements were the buyers collect milk and pay after a week, two weeks or a month. The pie chart (Fig. 3) shows that the weekly price constituted about 56% of farmers and bi-weekly accounted for 24% of the farmers thus being the most popular informal contractual arrangements. The reason is smallholder dairy farmers are cash constrained, and hence this income was their working capital in running the farms and also for meeting-up household consumption expenditure. The other plausible reason is that the contracts are not formally written and most of the farmers depended on mutual trust which in many circumstances has resulted in buyers defaulting on payments. Therefore credit sales arrangement was the least preferred arrangement.

3.4 Factors Influencing Profitability

In the course of identifying the institutional and management factors influencing the profitability of the dairy farmers, the main task was to exploring which factors potentially influence and how (the direction of the relationship) these factors are related with the farm`s profitability. Several institutional and management factors were hypothesized which influence the profitability of dairy farming. These are explained below:

3.4.1 Management factors

3.4.1.1 Age of respondent (Age)

Age of respondent was taken as one of the explanatory variables to understand the influence of age on the profitability of dairy farming. It is argued that the age of the respondent farmer is crucial for his or her decision making [30]. Young farmers are more entrepreneurial-minded than older farmers hence they find dairy farming is more profitable. The age of respondent is a continuous variable.

3.4.1.2 Sex of respondent (Gender)

Sex of respondent is also important management factors that influence the profitability of dairy farming [24,30]. A dummy variable taking zero if female and 1 if the male was one variable to be considered. It is expected to have either a positive or negative effect on the profitability of dairy farmers.

3.4.1.3 Education of respondent (Education)

It was hypothesized that the profitability of dairy farming might be positively associated with the level of education of milk producers [31]. Better education would allow them to acquire knowledge and skills about improved dairy production technologies quickly and their willingness to learn might also be higher [32]. It is a dummy variable measured in terms of whether the household has a formal education or not.

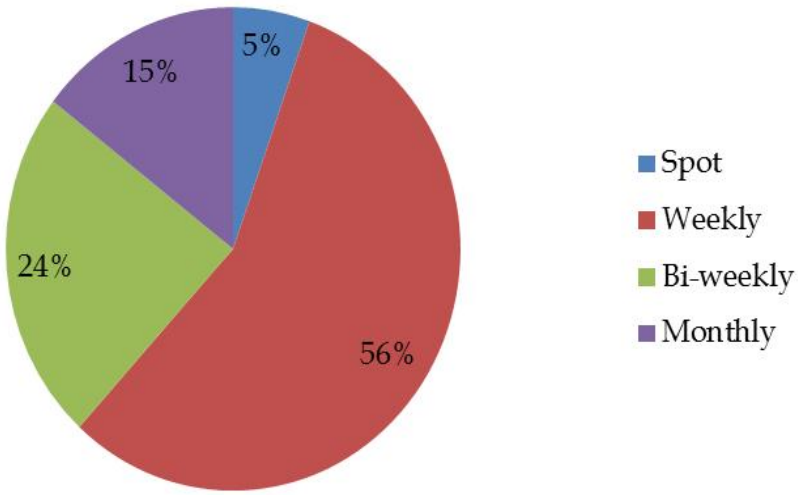

Fig. 3. Types of informal contract used by the farmer (Source: Field survey, 2015)

3.4.1.4 Experience of dairy farming (DEXP)

This continuous variable measured by number of years and was expected to influence the profitability of the dairy farming positively [33, 34]. As farmers got more experience in production and marketing, the probability of profitability of the dairy farming would be higher.

3.4.1.5 Access to extension services (veterinary training)

A dummy variable taking a value of one if milk producer household has access to extension service and zero otherwise and representing extension services as a source of information on technology. A number of extension visits improves the household's intellectual capitals, which improves dairy production, divert dairy production resources and also increase the profitability of dairy farming [33,35]. Therefore, this variable is hypothesized to influence the profitability of dairy farming positively.

3.4.1.6 Number of milking cows/herd size (NMC)

This variable is continuous and is measured in number of milking cows owned. The profitability of dairy farming is assumed to be positively influenced by the number of milking cows owned [30,32,36].

3.4.2 Institutional factors

Several institutional factors expected to influence the farms` profitability. These are presented below.

3.4.2.1 Market information (MI)

It is expected that this variable influences the profitability of dairy farming positively. The variable was considered as a dummy and was assigned one if a farmer received information and zero if not. Farmers marketing decisions are based on market price information, demand & supply and poorly integrated markets may convey inaccurate price information, leading to an inefficient product movement [36].

3.4.2.2 Search costs

This variable is continuous and is measured in Tk. "From a firm's perspective, even without an "investment" incentive, the effect of larger search costs on profits can be either positive or negative, because price competition is lower with higher search costs, but the probability of searching falls for larger search costs" [37].

3.4.2.3 Buyer units of measurement

It is a binary variable measured in terms of whether the producers sell their milk to the different buyer on the basis of a different unit of measurement (mug and others). It is expected to have either positive or negative effect on the profitability of dairy farming [24].

3.4.2.4 Trust

Trust is one of the important institutional factors that influence the profitability of the dairy farming business. Every business starts with trust. Trust included three variables such as trust on information, trust on price and trust on units of measurement. All variables are measured as a dummy (trusted =1, Mistrusted=0). It is expected to have either positive or negative effect on the profitability of dairy farming [24].

3.5 Description of the Dependent and Independent Variables

Fifty-five milk producers were selected and interviewed. The descriptive statistics are described in Table 2.

The standard deviation (σ) is a measure that is used to quantify the amount of variation or dispersion of a set of data values. A standard deviation close to 0 indicates that the data points tend to be very close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values. The more reliable of the standard deviation of the gender of household head is 0.26. The closer the standard deviation is to 0, the more reliable the mean is. Table 2 shows the descriptive statistics of the management and institutional variables. It shows that the average age of milk producers was 44 years, suggesting that the milk producers were relatively older. The average profit per farm per year was Tk. 49846.96 ($586.29), and the average number of milking cows per farm was 1.96.

3.6 Results of Factors Influencing Profitability

The regression method was used to estimate the factors that influence the profitability of dairy farming. The estimated coefficients indicate that the effect of a change in the independent variables on the dependent variable. Before estimating the parameters, multicollinearity tests

and autocorrelation were performed using appropriate test statistics. The test found that there is no multicollinearity problem since VIF values were less than 10.

Durbin-Watson (1.96) test was used to detect the autocorrelation. The result revealed that there is no autocorrelation problem. In Table 3, the results indicate that among the twelve hypothesized factors, three variables (two managements and one institutional factor) were found to be significant and rest of the variable were insignificant but were consistent with the expected signs. Three variables were age of respondent and number of milking/dairy cows and search costs. The coefficient of multiple determinations (R^2) was estimated at 0.82 and adjusted R^2value was 0.78. This means that 82% of the variation in the dependent variable is explained by the explanatory variables included in the model. Furthermore, the adjusted R^2 of 78% which is significant has further consolidated the goodness of the model (F=16.49***) hence, it is econometric significance and reliable.

Table 2. Descriptive statistics of dependent and independent variables

Variable	Types	Mean	Std. deviation	Std. error mean
Age	Continuous	44.04	10.94	1.47
Gender	Dummy	0.93	0.26	0.03
Education	Dummy	0.69	0.90	0.12
Experience of dairy farming	Continuous	13.42	5.09	0.68
Number of milking/dairy cows	Continuous	1.96	1.23	0.16
Veterinary training	Dummy	0.33	0.47	0.06
Buyer units of measurement	Binary	0.89	0.32	0.04
Trust on information	Dummy	0.11	0.32	0.04
Trust on price	Dummy	0.07	0.26	0.04
Trust on units of measurement	Dummy	0.91	0.04	0.29
Search Costs	Continuous	11.32	3.49	0.47
Market information	Dummy	0.91	0.04	0.29
Profit	Continuous	49846.96	57210.39	7714.23

Source: Field Survey (2015)

1 USD = BDT 85.02 (Bangladesh Bank, June 28, 2018)

Table 3. Results of OLS regression

Independent variable	Coefficients	t	Sig	VIF
Constant	-324.45	-2.71	.01	
Age	3.85**	2.19	.03	1.55
Sex	-30.79	-.49	.63	1.14
Education	10.05	.23	.82	1.79
Experience of dairy farming	-.96	-.21	.84	2.38
Number of milking /dairy cows	177.44***	8.68	.00	2.67
Extension training (Vet. Training)	36.82	.93	.35	1.46
Buyer units of measurement	69.95	1.18	.24	1.45
Trust on information	-15.29	-.27	.78	1.34
Trust on price	-11.09	-.17	.86	1.17
Trust on units of measurement	69.46	1.19	.24	1.21
Search costs	-9.32*	-1.79	.08	1.39
Market information	21.56	.36	.72	1.25
F-statistics	16.49***			
R square	0.82			
Adjusted R square	0.78			
Durbin- Watson	1.96			

Source: Field Survey (2015)

Dependent variable: Profit per day per farm (Tk.)

, **, * indicates significant at the level of 10%, 5% and 1% respectively.*

Table 3 summarizes the regression estimates of hypothesized factors that affecting the profitability of the dairy enterprise. These are discussed below.

3.6.1 Management factors

As the hypothesized age of farmer has a positive coefficient and statistically significant at 5% level. This means that this variable has an effect on the profitability of dairy farming, provided other variables held constant. All the farmers have equal chances of making a profit. However, a unit increase in age would lead to an increase in the profit of per day per dairy enterprise by Tk. 3.85. As handling of dairy farm is hard working, the aged producers are more capable to manage the dairy farm competently. As a result, their increasing age may contribute to their profit from the last years. [38] Found age was a negative coefficient but significantly associated with profitability. In addition to that, dairy cow herd size (milking cows) was statistically significant at 1% probability level. The coefficient of the dairy herd was positive meaning that a unit increase in the herd size of milking cows resulted in the increase of profit per day per dairy enterprise by Tk. 177.44, other variables held constant. This result is in conformity with the [39].

3.6.2 Institutional factors

As hypothesized search costs had a negative relationship and statistically significant at 10% level with profitability. This means that this variable has an effect on the profitability of dairy farming, provided other variables held constant. However, a unit increase in search costs would lead to a decrease in the profit per day per dairy enterprise by Tk. 9.32.

However, rest of the management and institutional factors were insignificant but were consistent with the expected signs. Although as hypothesized expected sign of experience of dairy farming usually positively related with the profitability, it was found negative. The reason behind, at the time of data collection milk producers, told that the market price of raw milk was fluctuating season to season, but the price of input costs gradually increase every year which affect producers profit. [40] Found that, this variable has a negative impact on dairy household market participation decision and was significant as 5% level of probability. His study also argued that the dairy household having longer experience in dairy production seemed to observe many bad impacts of fluctuation of the dairy cow during last decade. Furthermore, Gender of the farmer had a negative relationship but not statistically significant with profitability. This means profitability does not depend on the gender of the farmers. Though Dairy farming is laborious and female member's involvement can help male member at dairy management enterprise which might increase the profitability of the dairy farm but it was found in survey time that male members were also busy in extra non farming activities besides dairy farming which may affect the profit of dairy enterprise.

3.7 Farmers' Perception on Constraints of Operating Dairy Farming Business

The farmer's perception of major sources of constraints was summarized under two broad groups namely; production and marketing Constraint. By using Kruskal- Wallis One Way Analysis of Variance (ANOVA) by ranks, the major sources of production constraints as perceived by the respondents were ranked from 1-7 and the major sources of marketing constraints as perceived by the respondents were ranked from 1-4. The highest and lowest ranked sources of production and marketing constraints were shown respectively in Table 4.

Table 4. Summary of Kruskal-Wallis test for production constraints

Items	Production	
	Mean	Rank
Lack of grazing land	209	5
Insufficient veterinary service	58	1
High price and scarcity of feed and fodder	170	3
Insufficient supply of AI	175	4
Lack of technical knowledge	167	2
Lack of credit	260	6
Common disease	312	7
Chi-Square	175.27	
Degree of freedom	6	
Asymp. Sig.	0.00	

N.B.: 1 – 7: Highest to Lowest
Source: Field Survey (2015)

Table 4 shows that insufficient veterinary service (mean 58), lack of technical knowledge (mean 167) and high price and scarcity of feed and fodder (mean 170) were the highest ranked production or operating dairy farming constraints as perceived by the milk producers while insufficient supply of AI (mean 175), lack of grazing land (mean 209), lack of credit (mean

260) and Common disease (312) were perceived as the lowest ranked constraints by the milk producers. The Table also showed that all the sources of production were significant at all levels and that they are statistically different from one another. Similarly, [27] also found that the highest ranking constraint was the unavailability of a veterinarian in the farm area of Chittagong district.

Table 5. Summary of Kruskal-Wallis test for major marketing constraints

Items	Marketing	
	Mean	Rank
The low price of milk	37.42	1
No formal agreement between the buyer and seller	162.07	4
No facility of preserve milk	88.87	2
Sometimes milk is kept unsold in the local market	153.64	3
Chi-square	149.44	
Degree of freedom	3	
Asymp. Sig.	.00	

N.B.: 1 – 4: Highest to Lowest
Source: Field Survey (2015)

Table 5 reveals that low prices of milk (mean 37.42), and no facility of preserve milk (mean 88.87) were the highest ranked sources of marketing constraints as perceived by the sometimes `milk is kept unsold in local market` (mean 153.64) and milk producers while no formal agreement between the buyers and sellers (mean 162.07) were perceived as the lowest sources of marketing constraints. Similarly, as with the sources of production risk, this table also shows that all the sources of marketing constraints were significant at all levels and they are statistically different from one another.

4. CONCLUSION AND RECOMMENDATIONS

From the above findings, it can be highlighted that the twelve important variables were included to analyze the factors (management and institutional factors) influencing profitably of dairy farmers. These were age of the respondent, gender of the respondent, education of the respondent, the experience of dairy farming, number of milking/dairy cows, veterinary training, and buyer units of measurement, trust on information, trust on price, and trust on units of measurement, search costs and market information. Among them, three variables (two managements and one institutional factor) were found to be significant and rest of the variable were insignificant but consistent with the expected signs. Three significant variables were age, a number of milking/dairy cows and search costs. The dairy farming is a profitable business although it has been facing problems in relation to the dairy farm operating and selling of milk. In addition to that, it is also concluded that unavailability of veterinary service was one of the major constraints faced by the dairy owners. However, in the case of emergency, they depend mostly on veterinary hospitals of the Department of Livestock Services (DLS). High input costs such as medicine, vaccines etc. were the major problems due to not getting proper material support from government veterinary hospitals. Therefore, the Directorate of Livestock Services (DLS) should take steps to issue veterinary card to the registered dairy to ensure timely supply of veterinary services and medicine at reasonable prices. Furthermore, the Department of Livestock Services (DLS) and Non-government Organizations (NGOs) should emphasize on education and manpower training in dairy activities which lead to helping their standards of living. So, If proper support could be taken by the government and private organizations and formal institutional arrangements could be established, the overall dairy operation could be improved which in turn would play a vital role to overcome the problems of low income, unemployment, under nutrition of the country.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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