



A socioeconomic investigation on the cattle rearing farmers in selected areas of Bangladesh

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ABSTRACT

The present study was conducted to explore the present socioeconomic conditions of cattle rearing farmers as well as factors influencing the annual income of a farmers in Bangladesh. To achieve this objective a baseline survey was conducted using a pretested objective-based questionnaire in 9 districts and for this purpose, a total of 719 households were surveyed randomly. After data analysis using SPSS, it was observed that most of the farmers were educated as illiteracy rate was only 6.06% and agriculture (45.31% HHs) was their main occupation. Moreover, 92% of HHs reared cattle with an average herd size of 2.67 cattle/household. Among cattle keepers, the percentage of indigenous, crossbred, RCC and both (Indigenous+Crossbreed) were 58%, 22%, 12% and 8% respectively. Different factors such as family size ($p < 0.01$), education levels ($p < 0.001$), land size ($p < 0.01$), breed ($p < 0.05$) and number of cattle ($p < 0.001$) played a significant positive role on annual income of the household farmers. Furthermore, within breed, indigenous cattle represented negative significant impact ($p < 0.001$) on the annual income of the household. Consequently, farmers rearing crossbred cattle with a high investment made more profit compared to indigenous cattle rearer. Moreover, small-holder farmers can earn a substantial amount of profit by rearing Red Chittagong Cattle's compare to indigenous cattle by investing low inputs.

Keywords: Cattle keeper farmers, Socioeconomic status, Annual income

INTRODUCTION

Bangladesh is an agro-based country where livestock is playing an indispensable role in upholding human health and national economy of the country (Bag et al., 2010). In livestock, cattle play an important role because of most of the farmers (about 80 to 85 households) rear cattle as a source of income along with financial support during the crisis (Kamal et al., 2019). The farming system in Bangladesh is mainly commercial and non-commercial or traditional. In commercial farming, farmers are rearing crossbred cattle with high investment. However, in traditional cattle farming system, farmers are rearing mainly indigenous type cattle with minimum investment without evaluating annual production cost. On the other hand, Red Chittagong Cattle (RCC) is a valuable indigenous bovine genetic resource, Well adaptable in a traditional production system with low mortality and good prolificacy rate (8-10 calves in productive life) (Nahar et al., 2016). Moreover, RCC cattle are also familiar for early

sexual maturity, easy going for tillage operation and traction as well as adaptable in high temperature, rainfall and humid environment (Habib et al., 2003). Farmers at present are interested to rear RCC as an alternative of indigenous cattle.

Livestock development is influenced by many factors. Rahman et al. (2014) reported that in livestock development of Bangladesh, technical, institutional and social knowledge, capital, outbreak of diseases, inputs, credit, guaranteed and profitable markets are playing an important role. However, factors influencing household income are not properly studied. Ghosh et al. (2015) reported that gross return per cow per day in dairy cattle production is about 4 times higher and net return is about seven-times higher in crossbred cattle as compare to local cattle. Hence, the breed is an important factor in influencing farmer's household annual income. Like breed, many other factors are correlated with farmers economic conditions have not been addressed properly. Considering these facts objectives of this study is to explore the

present socioeconomic conditions of cattle rearing farmers along with identifying factors influencing the annual income of a farmer in Bangladesh.

APPROACH AND METHODOLOGY

Study Areas

A baseline survey was conducted in 14 upazilas of 9 districts (Bandarban, Chattogram, Jashore, Kurigram, Mymensingh, Rajshahi, Shariatpur, Sylhet and Tangail). The number of samples for the household survey was fixed as 50 for each of the upazilas. But, the actual numbers of samples covered for collecting quantitative and qualitative data in 14 upazilas were 719.

Development of Questionnaires

A questionnaire was developed according to the objectives of the baseline study. Then the questionnaire was pretested and after making necessary adjustment a final questionnaire was developed in a logical sequence.

Methods of Data Collection

Data were collected by visiting door to door on the farm and face to face interview which was performed by a group of trained enumerators. In this survey, households were selected randomly in the outside of the periphery of each upazila, because peoples of the rural areas rear cattle more than the people of urban areas. A total number of 719 households from 14 upazilas in 9 districts of Bangladesh were taken under direct interviewing for this survey.

Data Input, Processing and Analysis

After completing the survey, data were intensively processed, synthesized and analyzed in the light of the scope of the study. Data were analyzed using appropriate econometric models and descriptive statistics by using MS Excel and SPSS 20.0 software.

RESULTS AND DISCUSSION

The Education Level of Household Head

Education plays an important role in the socioeconomic status of the peoples in terms of attitude, lifestyle, culture, income level and so on. Considering district wise education from Table 1, it was observed that in the case of below primary education, Sylhet was the highest and Bandarban was the lowest. However, in the case of Jashore, most of the farmers were educated and had at least primary education. Considering highest education it was observed that Kurigram was the highest, although there was no higher educated person in Bandarban and Sariatpur. Getting all as shown in Table 1, it was observed that about 54.06% of the household heads were having education level of pre-primary to master's level. The education level of about 15.81% of household heads was SSC and above. There were about 26.29% household heads who could sign only and about 13.59% of household heads who could read and write. Moreover, about 6% of household heads were found uneducated or illiterate. Therefore, the major drop-out has occurred at the school level.

Main Occupation of the Household heads

Table 1: Education Level of Household heads.

District	Illiterate	Can sign	Can read-write	Pre Primary	Primary	JSC	SSC	HSC	Graduate	Masters
Banderban	0.00%	0.00%	3.92%	3.92%	25.49%	29.41%	19.61%	17.65%	0.00%	0.00%
Chattogram	12.37%	34.71%	11.68%	3.78%	13.75%	11.34%	6.53%	4.12%	1.03%	0.69%
Jeshore	0.00%	0.00%	0.00%	0.00%	6.98%	48.84%	30.23%	11.63%	2.33%	0.00%
Kurigram	0.00%	15.69%	27.45%	27.45%	3.92%	1.96%	5.88%	5.88%	11.76%	0.00%
Mymensingh	9.09%	52.73%	3.64%	0.00%	10.91%	16.36%	5.45%	0.00%	0.00%	1.82%
Rajshahi	0.00%	12.50%	16.67%	2.08%	25.00%	39.58%	0.00%	2.08%	2.08%	0.00%
Shariatpur	0.00%	3.92%	45.10%	15.69%	19.61%	9.80%	5.88%	0.00%	0.00%	0.00%
Sylhet	0.00%	46.94%	10.20%	20.41%	10.20%	4.08%	4.08%	2.04%	2.04%	0.00%
Tangail	0.00%	23.68%	10.53%	7.89%	7.89%	28.95%	10.53%	2.63%	5.26%	2.63%
Grand Total	6.06%	26.29%	13.59%	7.24%	13.88%	17.13%	8.42%	4.73%	2.07%	0.59%

The occupation of an area is based on the educational qualification and farming conditions of the people of that particular area which also indicates the annual income as well. Among the surveyed data, it was observed that some households had only one occupation and some had more than one (secondary) occupation. From Table 2, it was observed that agriculture was the major occupation as 45.31% HHS members were engaged in this activity. Agriculture was found as primary occupation followed by labor and business in a ru-

ral area of Mymensingh district (Bhuiyan, 2016). After agriculture, the second most popular occupation was livestock farm and 20.00% HHS were engaged with it. Subsequently, laborer (14.83%), business (11.89%), service (employment) (5.73%), fisheries (0.28%), remittance (0.42%) and others (0.84%) was observed as a secondary occupation among the sample group.

Age of Household heads and Family Size

Table 2: Main Occupation of the Household heads.

District	Agriculture	Livestock farm	Laborer	Business	Job	Fisheries	Remittance	Others
Banderban	71.15%	21.15%	1.92%	3.85%	1.92%	0.00%	0.00%	0.00%
Chattogram	47.95%	9.93%	16.10%	16.78%	7.53%	0.00%	1.03%	0.68%
Jeshore	26.42%	73.58%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Kurigram	41.18%	15.69%	7.84%	9.80%	21.57%	3.92%	0.00%	0.00%
Mymensingh	37.29%	8.47%	30.51%	8.47%	1.69%	0.00%	0.00%	6.78%
Rajshahi	48.15%	50.00%	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%
Shariatpur	73.08%	26.92%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sylhet	5.88%	5.88%	52.94%	29.41%	5.88%	0.00%	0.00%	0.00%
Tangail	45.10%	13.73%	15.69%	17.65%	5.88%	0.00%	0.00%	0.00%
Grand Total	45.31%	20.00%	14.83%	11.89%	5.73%	0.28%	0.42%	0.84%

From Table 3 it was observed that irrespective of the district, ages of members of households ranged between 18 years and 90 years where the average age was found as 47.11 years. Thus, it has been envisaged that HHS constitutes a higher number of middle-aged group. Considering the family size, it was observed that among the survey group family

size were between 2 to 19 and the average family size was 5.27. Moreover, the highest family size was observed in Mymensingh (6.00) as well as the lowest was in Bandarban district (4.29). Hence, HHS belonged to a large family size.

Land Type and Size

Table 3: Age of Household head and Family Size.

District	Age (years)			Family size (number)		
	Minimum	Maximum	Average	Minimum	Maximum	Average
Banderban	24	56	40.79	3	8	4.29
Chattogram	18	75	47.69	2	19	5.53
Jeshore	32	70	47.04	3	9	5.08
Kurigram	31	66	47.88	4	7	5.27
Mymensingh	25	65	48.25	3	17	6
Rajshahi	32	90	48.27	2	8	5.22
Shariatpur	27	70	48.28	3	9	5.22
Sylhet	30	60	46.06	3	9	4.78
Tangail	22	75	48.96	2	9	4.75
Grand Total	18	90	47.11	2	19	5.27

The living status of the household largely depends on the size of land ownership. From the Table 4, it was observed that among the survey population, most of the farmers had cultivable land (with average 67.37 decimal) and the average value of it was six-time higher than homestead (with average 12.16 decimal). However, less land was used for fodder production (average 11.95 decimal). Moreover, among the survey farmers in Bandarban, Rajshahi and Kurigram, no land was used for fodder production. Furthermore, land used for gardening and pond was 13.42 and 9.86 decimal, respectively. Average abandoned land was 8.21 decimal and highest abandoned land was observed in Tangail (33.33 decimal). Hence, there was a huge opportunity for increasing fodder production as well as profit generation from livestock

by proper utilization of abandoned land. Earlier, a report of BLRI (2017) investigated the utilization of land from seven districts of Bangladesh and estimated an average land of 12 decimal used as homestead, which agrees well with this study. However, in that study, it was found that about 86 decimal lands were used for crop cultivation, which is higher than this study. Further, in that report, an average of 20 decimal lands was used for fodder cultivation, 19 decimal for gardening and 18 decimal in remained abandon, which were also higher than this study. Utilization of land depends on the cultural and socioeconomic status of the HH families.

Farmers Keeping Different Livestock Species

In the survey areas among HHs members, it was investigat-

Table 4: Land Type and Size (Decimal).

District	Homestead	Cultivable	Fodder	Garden	Pond	Abandoned	Other	Total
Banderban	4.98 (52)	46.95 (41)	-	16.48 (25)	7.5 (02)	13.0 (05)	-	55.46 (52)
Chattogram	11.86 (287)	64.70 (188)	9.5 (04)	10.57 (07)	7.67 (42)	4.59 (17)	20.0 (02)	56.17 (287)
Joeshore	5.64 (53)	78.79 (48)	8.3 (10)	9.22 (23)	10.0 (07)	7.47 (19)	127.0 (01)	88.96 (53)
Kurigram	6.78 (51)	51.12 (25)	-	19.20 (25)	13.75 (24)	6.31 (26)	5.0 (01)	51.04 (51)
Mymensingh	11.08 (55)	60.63 (27)	50.0 (01)	8.5 (04)	10.0 (03)	13.0 (02)	-	43.39 (55)
Rajshahi	10.07 (54)	60.37 (51)	-	3.6 (05)	6.25 (04)	5.15 (13)	-	69.13 (54)
Shariatpur	6.62 (50)	58.40 (50)	18.0 (03)	16.68 (22)	8.58 (12)	9.12 (17)	-	75.58 (52)
Sylhet	14.29 (51)	47.09 (45)	4.0 (01)	2.23 (32)	1.71 (07)	5.72 (44)	2.0 (01)	62.53 (51)
Tangail	35.46 (52)	13.77 (44)	10.0 (01)	36.18 (11)	27.8 (05)	33.33 (09)	-	168.33 (52)
Grand Total	12.16 (705)	67.37 (519)	11.95 (20)	13.42 (154)	9.87 (106)	8.21 (152)	34.8 (05)	68.34 (707)

#Figures in the parenthesis are number of households

ed that among all livestock, cattle were the most preferable species as 91.93% of farmers kept cattle (Table 5). Moreover, chicken, duck, goat, pigeon, buffalo and sheep were also popular and the percentage of keeping of this livestock was 41.45, 21.28, 20.72, 14.74, 7.51 and 6.82% respective-

ly. Furthermore, the layer was more popular than broiler.

Cattle Genotypes Kept by the Farmers

Table 6 shows that 58% of the respondents had been rearing

Table 5: Farmers Keeping Different Livestock Species.

District	Cattle	Buffalo	Goat	Sheep	Chicken	Layer	Broiler	Duck	Pigeon
Banderban	100.00%	5.77%	25.00%	17.31%	28.85%	-	-	3.85%	34.62%
Chattogram	88.01%	1.71%	20.21%	1.37%	46.23%	0.68%	-	25.68%	17.47%
Jeshore	100.00%	-	5.66%	45.28%	16.98%	-	-	28.30%	16.98%
Kurigram	90.20%	-	21.57%	1.96%	13.73%	5.88%	7.84%	17.65%	9.80%

Mymensingh	96.72%	3.28%	29.51%	-	77.05%	-	1.64%	27.87%	9.84%
Rajshahi	88.89%	70.37%	1.85%	5.56%	27.78%	5.56%	-	9.26%	-
Shariatpur	86.54%	1.92%	46.15%	15.38%	51.92%	13.46%	1.92%	25.00%	15.38%
Sylhet	98.04%	1.96%	11.76%	-	35.29%	-	-	21.57%	11.76%
Tangail	96.23%	7.55%	26.42%	-	47.17%	9.43%	3.77%	11.32%	5.66%
Grand Total	91.93%	7.51%	20.72%	6.82%	41.45%	2.78%	1.11%	21.28%	14.74%

local breed which was the major reason for poor yield and income from livestock. However, local breeds were known to be better at coping with the heat, walking long distances and surviving with feed shortages in the dry season. Moreover, around 22% of respondents kept crossbred cattle. On the other hand, around 8% of respondent reared both indigenous and crossbred cattle. RCC cattle were reared by around 12% farmers, mainly in Chattogram and adjacent districts. Besides, the highest numbers of RCC (57.63%) were found at a selected community in Mymensingh district. This was because; in Mymensingh, Bangladesh Agricultural University (BAU) was working for increasing RCC cattle breed through artificial insemination. It should be noted here that the purpose of that survey was to estimate the RCC population dynamics in Bangladesh. For that instance, the survey in Mymensingh district was conducted in the community who were rearing RCC cattle. Bhuiyan et al. (2017) reported that from 2009, a community-driven farmer-participatory indigenous (Red Chittagong) cattle conservation and pure breeding program is still in operation with the technical

support from the Department of Animal Breeding and Genetics, BAU, Mymensingh and with the financial assistance of USDA and an international organization, World Vision Bangladesh. Jabbar et al. (2005) found that around 63% of the cows in the herd were crossbred and the rest 37% were indigenous cows. Khan et al. (2013) found that dairy cow holds around 50% share among the total cattle in the herd and among the milk cow, 14.5% was local breed cow and 85.5% was crossbred in the farm, whereas the present study found that around 88% milking cows were crossbred. This was because Sirajganj is famous for milk pocket areas in Bangladesh and most of the farmers keep crossbred cattle for producing higher milk. Other than this, the variations of types of cattle kept by the farmers among different authors could be due to the difference of objective and location of study or sample size taken for study among different authors.

Population Size of Cattle Kept by the Farmers

The population size of different breeds of cattle has been

Table 6: Cattle Genotypes Kept by the Farmers.

District	Indigenous	Crossbred	Both	RCC
Banderban	48.08%	40.38%	7.69%	3.85%
Chattogram	75.90%	8.84%	0.40%	14.86%
Jeshore	-	100.00%	-	-
Kurigram	56.52%	23.91%	13.04%	6.52%
Mymensingh	37.29%	3.39%	1.69%	57.63%
Rajshahi	8.33%	33.33%	58.33%	-
Shariatpur	71.11%	22.22%	6.67%	-
Sylhet	96.00%	2.00%	2.00%	-
Tangail	66.67%	15.69%	17.65%	-
Grand Total	58.19%	22.05%	8.12%	11.64%

presented in Table 7. It was observed that the highest numbers of indigenous cattle population per HH were found at Rajshahi district which was about 7 cattle per HH. But in Jashore district no indigenous cattle was observed in any surveyed HH. The highest numbers of RCC cattle population per HH were found at Mymensingh district which was about

6 RCC cattle population per HH. The highest numbers of crossbred cattle population per HH were found at Jashore (11.53 cattle per HH) and Rajshahi district (about 12 cattle per HH) and the lowest at Mymensingh district (about 2 cattle per HH). On the other hand, BLRI (2017) reported an average of 2.35 cattle per HH in seven districts of Bangladesh,

which was lower than this study, and the variation could be due to difference of location of the study or sample size.

Moreover, village people rear more cattle than urban people.

Table 7: Cattle Population per Household in Different Districts.

District	Indigenous	RCC	Crossbred	RCC
Banderban	6.32 (28)	4.00 (03)	5.77 (26)	3.85%
Chattogram	2.63 (202)	2.36 (39)	3.17 (35)	14.86%
Jashore	-	-	11.53 (53)	-
Mymensingh	5.19 (32)	6.33 (41)	2.33 (09)	6.52%
Kurigram	2.85 (34)	2.56 (03)	4.65 (17)	57.63%
Rajshahi	7.39 (33)	-	11.93 (45)	-
Shariatpur	3.08 (36)	-	3.67 (12)	-
Sylhet	1.00 (02)	-	4.33 (49)	-
Tangail	4.93 (45)	3.33 (03)	5.59 (17)	-

#Figures in the parentheses are the number of households

Socioeconomic Predictor Variables Influencing the Annual Income of the Household

Table 8 shows the socioeconomic predictor variables' influencing annual income of the household. It was observed that age of household head, occupation of the household head, type of household (farmer vs. non-farmer) and farm type (cattle vs. non-cattle keeper) were not influencing factor for HHs annual income and were found statistically non-significant. On the other hand, predictor variable like the family size of the household, education level of household head

and land size possessed by the household were influencing factors of income of the households and were found statistically highly significant. The large family size had more earning members in the HH family, resulting in higher annual income of those families. Education level influenced annual income as because higher educated family had more capacity to earn much income either from business or agriculture. Besides, most of the higher educated peoples were service holder who had more income than a farmer. Further, higher landlord HHs had more opportunity to earn more income from their land.

Table 8: Socioeconomic Predictor Variables Influencing the Annual Income of the Household.

Predictor variables	Regression coefficients	Standard error of estimates	P-value	Sig.
Age of household head	-1061.36	628.55	0.092	NS
Family size of the household	9135.7	3332.21	0.006	**
Education level of household head	32420.86	6882.28	0	***
Occupation of the household head	-2173.28	3890.47	0.577	NS
Land size possessed by the household	182.25	70.43	0.01	**
Type of household (farmer vs. non-farmer)	-53904.59	42850.85	0.209	NS
Farm type (cattle vs. non-cattle keeper)	58214.17	34185.2	0.089	NS
Constant	160005.93	45505.74	0	***
Co-efficient of determination (R ²)	0.07	145688.97	0	

NS-Not significant ($p > 0.05$); ***-significant ($p < 0.001$); **-significant ($p < 0.01$);

Type, Breed and Population Size Influencing Annual Income of the Household

Table 9, shows the factors responsible for annual income of the household. Table 9 shows that type of cattle (dairy, beef and both) did not significantly ($p > 0.05$) influence the annual income of the HHs. On the other hand, predictor variables like breed of cattle (indigenous, crossbred and both) and

number of cattle head per HH had a significant effect on the income of the household. From this study, it was revealed that income of cattle keeper HHs did not depend on animal, no matter what the types of cattle were; beef, dairy and both. However, crossbred cattle keeper HHs earned more income than indigenous cattle keeper HHs. Further, the higher the number of cattle, the higher the income of the HHs.

Table 9: Type, Breed and Population Size Influencing Annual Income of the Household.

Predictor variables	Regression coefficients	Standard error of estimates	P-value	Sig.
Type of cattle (dairy, beef and both)	-6707.74	8538.69	0.432	NS
Breed of cattle (indigenous, crossbred and both)	28613.19	12043.47	0.018	*
Number of cattle possessed by the household	8034.24	1472.1	0	***
Constant	143348.86	19878.94	0	***
Co-efficient of determination (R ²)	0.12	146540.71	0	

NS-Not significant ($p > 0.05$); ***-significant ($p < 0.001$); *-significant ($p < 0.05$);

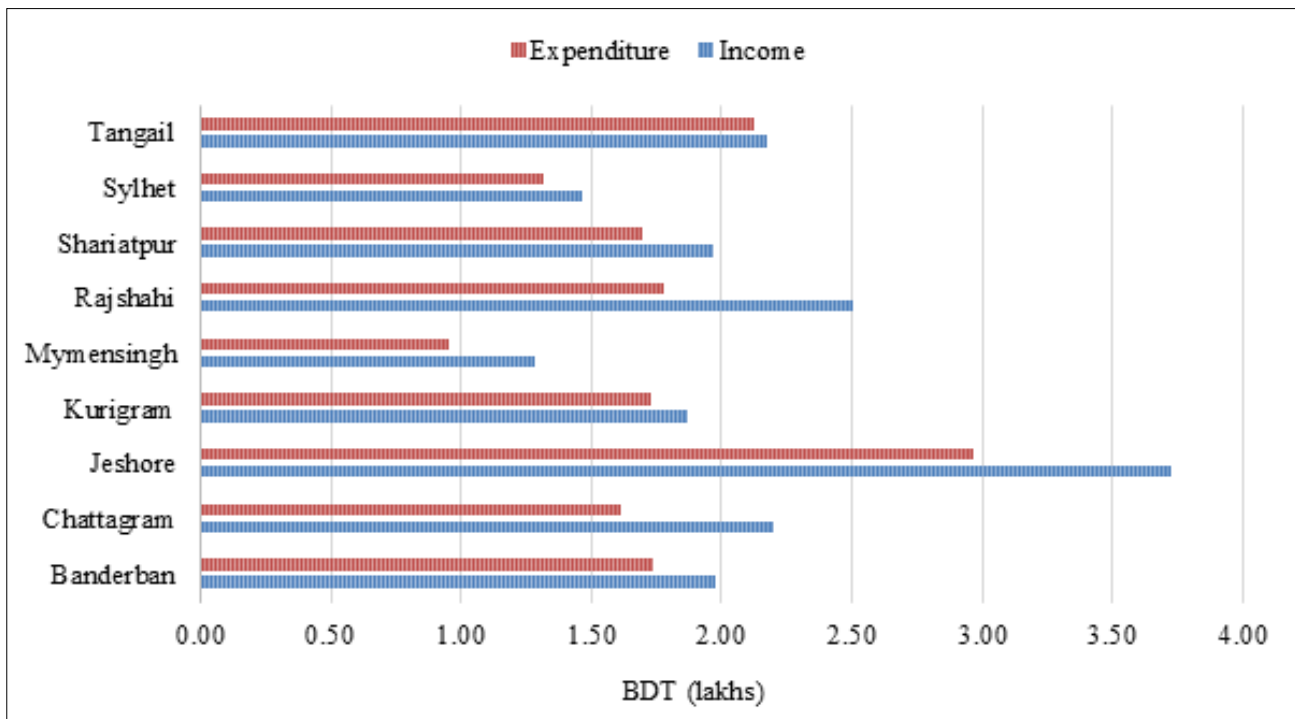


Figure 1: Annual Income and Expenditure.

Income and Expenditure of the Household

Figure 1 shows the annual income and expenditure of the HHs in different studied areas. It was observed that the highest annual income and expenditure were found in Jashore district, which was BDT 3.75 lakhs per HH. This may be due to rearing crossbreed cattle. Rearing crossbreed cattle required high investment with higher profit. Mondal et al. (2010), reported that in the case of rearing crossbreed cattle, the total cost per cow is two times higher, although return per cow is six times higher than indigenous cattle. Moreover, in Tangail, Sylhet, Kurigram farmers were making less profit compared to other area. From Table 6, it was observed that local cattle were predominating in those areas. Consequently, profitability was less due to the higher number of local cattle. However, in Mymensingh district, farmers were making a profit with less investment. In Mymensingh, RCC cattle was predominant, which performed well in poor management condition. In that report, annual average expenditure was estimated as 1.76 lakhs which was more or less similar than this study. The variation of household income between works could be due to changes in the value of money over time.

CONCLUSION

Based on the household's survey conducted in different areas, it was concluded that the average family size of the household in the study areas is capable enough to increase family income. Most of the households have average family members of five, which may facilitate them for a good condition in rearing cattle. Agriculture is the main occupation, where farmers have diversified occupations such as livestock, fisheries, business, day labors, etc. may be helpful for them to run the agro-based farming. Most of the households have their land with the good cultivable condition for production of feeds and fodder for their cattle that can lead to ensure spontaneous supply of feeds to the cattle. Almost all households have been keeping cattle and most of them were deshi/indigenous cattle for milk and calf production. Among different predictable variables played to increase family income, family size, education level, land size and breed showed a positive impact on the annual income of the household. On the other hand, indigenous cattle, predominant in all surveyed areas, showed a negative impact on annual income of the household, but alternating indigenous cattle with RCC cattle rearing may help to create positive impacts on the annual income of the households. Hence, the government may take necessary steps for adopting RCC cattle for small-holder farmers.

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