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Present feeding management practices and socio-economic conditions of dairy farmers in selected areas of Bangladesh

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A field survey was conducted with a total of 540 dairy farmers interviewed personally to collect data on their socio-economic condition and feeding management practices of dairy farmers from 6 Upazila under 3 divisions of Bangladesh. As result, a maximum of the respondents (43%) belonged to the secondary level of education whereas only (3%) of the illiterate farmer was involved with dairy farming. Farmers of patiya owned the highest amount of land (253.5 decimal/household) whereas the lessened in Munshiganj (76.4 dec). Intensive farming was preferred mostly by half of the respondents rather than extensive (34%) and mixed (8%) farming. Crossbred genotypes were preferred most (86%) to rear for dairying than deshi animals (14%). Each farm had 4.0 no's lactating cows irrespective of the area but the maximum was found in munshiganj (7.0 nos/ farm). The average daily milk production scenario was 9.15±4.54 liters for cross and 3.26±1.01 liters for deshi cows. Farmers preferred grass-based feeding systems for dairying supplemented with straw and concentrate. The study also revealed that the annual income from dairy businesses ranged between 305235 to 1223369 BDT in the areas considered under this study.

Key words: Cattle genotypes, farming system, feeding management, milk production, annual income.

INTRODUCTION

The economy of Bangladesh is based primarily on agriculture, and livestock is an essential component of the rural economy. About 20% of the total population is engaged in full-time employment and 50% is in part-time employment in the livestock sector (Rahman et al., 2014). The livestock population in Bangladesh is currently estimated to comprise 24.7 million cattle, 1.508 million buffaloes, 26.772 million goats and 3.752 million sheep (DLS, 2022). The contribution of livestock to the overall agricultural GDP and national GDP was 16.52 and 1.9% respectively, at a constant price during 2021-22 with an annual GDP growth rate of 3.1% (DLS, 2022). The

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subsidy of livestock in foreign currency earnings was 2.49% which is 1.01 billion US dollars during 2018-19. In Bangladesh, the key performance indicator of dairy farms is only milk and about 90% of the produced milk in the country comes from cows, 8% from goats, and the remaining 2% from buffalo (DLS, 2013). More than 70% of dairy farmers are smallholders and produce around 70-80% of the country's total milk whereas smallholding producers dominate the dairy sector in Bangladesh (Uddin et al., 2012). It is estimated that there are about 1.4 million dairy farms with an average herd size of 1-3 cows (Hemme et al., 2008). Among the total of 6 million milking cows, 85-90% of them are indigenous and 10-15% are crossbred (DLS, 2013).

Dairy farming is marginally profitable and farmers have ample opportunities to increase output by using more of aggregate feed and hired labor inputs (Sikder et al., 2001). The priority of milk in the diet is widely recognized and it has a very high elasticity of demand as compared to other food item (Jabbar and Raha, 1984). Generally, dairy farmers in Bangladesh prefer semi-intensive feeding systems, around 59% of them fed their cattle (Quddus, 2013), even if they feed concentrates only to the lactating animals (Khan et al., 2009) rather than provide all the cows. In Bangladesh, there is a requirement of 70 million metric tons of green grass for cattle feed in a year but produced only 24 million metric tons. Thus, there is a deficit of animal feeds of about 60%, which is hampering livestock development to a great extent (Daily Prothom Alo, 2008). The scarcity of feeds and fodder for livestock production is a major problem in Bangladesh (Rahman, 2011) and the situation is mostly aggravated during the lean period. The main constraint to forage production for feeding ruminants is the scarcity of land. Usually, farmers do not want to spare cultivable land for fodder production instead of crop production (Sayeed et al., 2008). But, at present people are getting interested to rear dairy animals as their neither main profession nor aside profession. A report in the Daily Star (2018) stated that many educated youths have started cattle farming for milk and meat production in the last five years which results in doubling the milk production rather than last five years back. This incidence also increases the production of cattle now which crosses the population rate of the neighboring country like India, Nepal and Myanmar. Though feeding is a major management issue for livestock farming and the least cost quality ration urges more to get the maximum benefit so an improved feeding management system needs to be prioritized first. In this context present study was designed aiming to picturise the current dairy cattle production scenario and the socio-economic impact of dairy farmers in different areas of Bangladesh.

MATERIALS AND METHODS

A household survey was conducted at six Upazila (Jashore Sadar, Jhikargacha, Manikganj Sadar, Munshiganj Sadar, Nahikhongchari and Patiya Upazila) of five different districts under three divisions (Khulna, Dhaka and Chattrogram) of Bangladesh. For this purpose, a structured questionnaire was prepared considering the project objective and pre-tested first. Then enumerators randomly visited respondents' houses from door to door for direct interviewing with the structured questionnaires. In the HHS, questionnaires were mostly formed by close-ended questions (answer either 'yes' or 'no' or from multiple answers or multiple-choice questions) which may be described statistically. The number of surveyed households from each area was 90 and all the respondents were involved in dairy farming.

During an interview, the research objective was clearly explained to all respondents before starting and their verbal consent was taken. The data on this area was socio-economic (family, education, occupation, income and land having or not) and farming (animal number, their genotype, management system, production level and feed resources used, income from animal farming) was taken and recorded accordingly.

All the questionnaires filled by the enumerators were checked and cross-checked by the experts and then all data were imputed in an MS excel worksheet and analyzed by pivot table for frequency analysis. Further statistical analysis was performed by SPSS.

RESULTS AND DISCUSSION

Socioeconomic status of the farmers

Level of schooling

The level of schooling of the farmers ranged from primary to graduate. The education levels of the respondent farmers in different survey areas are illustrated in Table 1. The respondents were classified into four categories, Primary, SSC, HSC and Graduate based on their level of education. The rates of education in rural areas are comparatively lower than in urban areas.

In this study, it was found that the highest about 43% of respondent farmers had a secondary level of education, followed by primary (29%) and vocational (15%). These findings were not similar to the findings of (Begum et al., 2007; Sarker et al., 2017). Where they reported education levels of farmers in the primary, secondary and higher secondary were 63, 30 and 7%, respectively and 20% of farmers were illiterate, and primary, secondary and above the secondary level of education were 40, 30 and 10%, respectively. However, only about 3% of them were uneducated and about 10% graduated. It is assumed that people having secondary education are involved more in the dairy sector and innovative than those illiterate and they could perform better in livestock production.

Landholding farmers

Most of the people interviewed in this study were marginal, small and medium land-owing farmers. They had very limited cultivable and homestead land. Average cultivable land has significant variations between Upazila.

Table 1. Level of schooling based on a different location.

Location	Level of schooling (%)				
	Uneducated	Primary	Secondary	University	Vocational
Jashore	0.00	17.05	40.91	11.36	30.68
Jhikorgacha	0.00	26.19	39.29	3.57	30.95
Manikganj	4.65	27.91	43.02	12.79	11.63
Munshiganj	8.89	41.11	36.67	6.67	6.67
Nikhongchari	3.61	44.58	40.96	4.82	6.02
Patiya	0.00	20.22	55.06	17.98	6.74
Grand Total	2.88	29.42	42.69	9.62	15.38

Table 2. Land owing status of the farmer.

S/N	Location	Land (decimal)
1	Jashore	154.56±30.23
2	Jhikorgacha	125.64±21.65
3	Manikganj	170.01±37.12
4	Munshiganj	76.38±17.32
5	Nikhongchari	210.69±56.76
6	Potiya	253.51±65.98
	Average	165.13±62.38

Table 2 demonstrates the land owing status of the respondent farmers which shows that the highest land is owned by farmers in patiya (average 253.51±65.98 decimal/household) and the lowest is in Munshiganj (76.38±17.32 dec). Irrespective of location, the average land owned by the farmers was about (165.13±62.38) decimals per household. Sarker et al. (2017) stated that the total land of farmers was 750.00 decimal in their study which was not in the present study. The land size distribution of rural Bangladeshi livestock owners is more or less similar in the whole country. Rahman et al. (2014) also reported that landless, marginal, small, medium and large farm families owned an average of 0.07, 0.62, 1.85, 2.90 and 7.90 acres of land including homestead, pond/ditch, cultivable land and fallow land, respectively which was more or less similar with the present study.

Farming system based on locations

Table 3 show the production or farming system followed by the farmers, which represents that 50% of farmers followed an intensive management system, 34% extensive management system and 8% both traditional and mixed farming systems, irrespective of location. However, production systems in different survey areas are elaborately explained in Table 3. From the comparative study of different locations, Munshiganj shows the highest intensive farming system and naikhongchhari is the lowest intensive farming system followed by manikganj, patiya, jhikargacha and jashore and the highest extensive farming was shown in naikhongchhari followed by jashore, jhikargacha, manikganj, munshiganj and lowest in patiya. The findings were more or less similar to (Amin et al., 2020) who found that farmers used half-grazing (39.97%), full grazing (33.63%), and stall-feeding (26.40%) cattle-rearing systems.

Cattle genotypes and their rearing systems in study areas

The types of cattle reared by different farming systems are depicted in Table 4. As shown in Table 4 that crossbred cattle are reared in an extensive system by about 73% of farmers, while about 25% of farmers reared deshi cattle in the same system. On the other hand, about 86% of farmers reared crossbred cattle by an intensive management system and about 14% of farmers reared deshi cattle in that system. About 95% of farmers reared deshi cattle in a mixed farming system and 63% in the traditional system.

Table 5 illustrates the types of cattle genotypes reared by the farmers in different survey areas. In Munshiganj, 85% of farmers reared crossbred cattle. On the other hand, about 37% of farmers in Naikhongchhari reared crossbred cattle. Besides, highest about 61% of farmers in Naikhongchhari reared deshi cattle.

Very few farmers reared both types of cattle at a time

Table 3. Farming systems in selected areas.

Location	Extensive (%)	Intensive (%)	Mixed (%)	Traditional (%)
Jashore	38	46	15	1
Jhikorgacha	35	47	0	18
Manikganj	31	59	6	4
Munshiganj	28	72	0	0
Nikhongchhari	51	23	0	27
Patiya	22	53	25	0
Grand Total	34	50	8	8

Table 4. Rearing system for a different type of cattle.

Genotypes	Percent (%) of rearing system			
	Extensive	Intensive	Mixed	Traditional
Crossbred	73.1	86.06	5.13	36.59
Deshi	25.15	13.55	94.87	63.41
Both	1.75	0.4	0	0

Table 5. Genotype of cattle based on locations.

Location	Crossbred cow (%)	Deshi cow (%)	Both crossbred and deshi (%)
Jashore	68	28	3
Jhikorgacha	80	15	5
Manikganj	76	20	4
Munshiganj	85	10	5
Nikhongchari	37	61	1
Patiya	45	55	0
Overall	65	32	3

as shown in Table 5.

Farm size in selected areas:

Table 6 demonstrates the population size of different types of cattle in different survey areas, which shows that the numbers of lactating cows were more than other types (dry cow, pregnant cow, bull, bullock, and calves). On average each respondent had 10.55±0.91 lactating cows on their farm.

Table 6 further reveals that the highest number of lactating cows was found in Munshiganj (15.65±2.21 nos /farm) and the lowest in Nikhongchari (5.78±0.22 nos/farm).

Milk production

The milk production status at the farm and each cow level are represented in Table 7. The highest farm-level milk was produced in Munshiganj (64.51±1.32 liter/farm), which was due to the highest number of cattle reared in that area. In Nikhongchari, only (3.33±0.55) liter of milk was produced per farmhouse, which was due to rearing deshi cattle in that area. In Jhikorgacha, the average milk production per cow obtained the highest at 11.18±0.76 liters per day per cow for having genetically improved crossbred, while the lowest was at 2.19±0.30 liters per day per cow in Nikhongchari for more concentration of deshi/ local cow.

The milk production performance of crossbred and deshi cows is shown in Table 8. As shown in Table 8 the milk production performance of crossbred cows was higher than that of deshi cows, which was due to the difference in the genetic potentiality of cattle genotype. The average daily milk production of the crossbred cow was observed as 9.15±4.54 liter with a peak daily yield of 13.84±3.85 liters and sustained for about 254.70±12.10 days. While in the counterpart those were 3.26±1.01 and

Table 6. Farm size based on location (*Mean±SD*).

S/N	Location	Dairy cattle	Non-dairy cattle
1	Jashore	7.69±0.58	8.24±0.78
2	Jhikorgacha	10.37±1.05	7.48±0.83
3	Manikganj	10.28±0.77	7.14±1.30
4	Munshiganj	15.65±2.21	10.2±1.02
5	Nikhongchari	5.78±0.22	5.62±0.22
6	Patiya	13.56±0.87	13.21±1.16
	Average	10.55±0.91	8.64±0.88

Table 7. Milk production based on location (*Mean±SD*).

Location	Milk production per farm/cow (liters)	Milk production per cow/ day (liters)
Jashore	14.72±1.26	5.40±0.84
Jhikorgacha	45.60±2.85	11.18±0.76
Manikganj	38.74±1.36	8.72±0.85
Munshiganj	64.51±1.32	10.22±0.67
Nikhongchari	3.33±0.55	2.19±0.30
Patiya	25.76±1.22	8.14±0.76

Table 8. Milk production based on cattle genotype (*Mean±SD*).

Cattle genotype	Milk production per cow (liters)	Max. milk yield (liters)	Lactation period (day)
Crossbred cow	9.15±4.54	13.84±3.85	254.70±12.10
Deshi cow	3.26±1.01	6.66±1.27	221.36±4.25

6.66±1.27 liter and 221.36±4.25 days for deshi cow. (S.M.J Hossain et al., 2021) reported that in crossbred cows, the daily average milk yield was higher (8.62±0.15 liters) followed by RCC/deshi (2.77±0.22 liters) and in indigenous (2.26±0.10 liters) cows which were more or less similar to the current study. Alam et al. (2008) reported that in indigenous and crossbred cows it was 1.7±0.6 and 6.3±1.20 respectively which is lower than the current finding because breed up-gradation and management improvement may occur.

Feed supply to cattle

Cattle are fed mainly green roughage, straw, and concentrate mixture. As shown in Table 9 a farmer in Munshiganj supplied the highest amount of green grass to cows (18.36±3.36 kg/day/head) and the lowest (10.80±2.25 kg/day/head) by farmers in Jashore. Irrespective of location, the highest daily 6.10±1.34 kg straw per cow was provided by the farmers in Jashore and the lowest (2.95±1.16 kg/day/head) by the farmers in Munshiganj.

Concentrate feeds play an important role in the production of cattle which was supplied the highest amount of 6.00±1.00 kg per cow per day by the farmers in Jhikorgacha and the lowest (2.60±1.28 kg/day/head) by the farmers in Patiya.

Table 10 illustrates the amount of roughage and concentrate feeds supplied to crossbred and deshi cattle, which shows that amount of feeds provided to the crossbred cows was higher than the amount provided to the deshi cows.

This is because of the higher body size and production of crossbred cows as compared to deshi cows. The supply of green grass, straw, and concentrate in crossbred was 17.10±3.98, 6.04±2.12, and 6.14±2.54 kg chronologically and for the deshi cattle, this was 11.21±1.27, 3.08±1.54 and 2.43±1.01 kg respectively.

Income of the households

The study reveals that the highest total annual income was found in Munshiganj (BDT 1223369) because they earn more money from livestock farming (72.96%) and

Table 9. Supply of roughages and concentrate feed based on location (*Mean±SD*).

Location	Fresh grass (kg/cow/day)	Straw (kg/cow/day)	Concentrate (kg/cow/day)
Jashore	10.80±2.25	6.10±1.34	4.83±1.24
Jhikorgacha	15.68±2.68	3.76±1.10	6.00±1.00
Manikganj	14.95±2.94	4.91±1.40	4.70±1.33
Munshiganj	18.36±3.36	2.95±1.16	4.28±1.51
Nikhongchari	11.92±2.16	4.61±1.78	3.62±1.10
Patiya	13.54±2.51	5.15±1.70	2.60±1.28
Overall	14.21±2.72	4.58±1.10	4.34±1.15

Table 10. Supply of Roughages and concentrate feed based on cattle genotype.

Type of cows	Fresh grass (kg/cow/day)	Straw (kg/cow/day)	Concentrate (kg/cow/day)
Crossbred cow	17.10±3.98	6.04±2.12	6.14±2.54
Deshi cow	11.21±1.27	3.08±1.54	2.43±1.01

Table 11. Annual income of the livestock households.

District	Annual income from livestock farming (BDT)	Annual income from other sources (BDT)	Total annual income/ year (BDT)	Share of livestock income (%)
Jashore	414321	144932	559253	74.08
Jhikoregacha	844209	150238	994447	84.89
Manikganj	421983	235363	657346	64.19
Munshiganj	892595	330774	1223369	72.96
Naikhongchari	149914	155321	305235	49.11
Patiya	737614	448261	1185875	62.20

the lowest income was found in naikhangchori (BDT 305235) for minimum income from livestock (49.11%) (Table 11). Dipu et al. (2019) found that the highest dairy income contributing Upazilla is Boalkhali (46.9%) and the lowest dairy income contributing Upazilla is Raojan (26.4%). In total, 52.9% of the peri-urban dairy farmers of the selected area rely on non-farming and non-agricultural sources for their income which was more or less similar with our study.

The findings of this study are similar to Kamal (2014) who stated that the monthly income for the top 10% of people was BDT 120000.00. Annual income in the livestock sector accounted for nearly 32 and 46%, respectively (Suresh et al., 2007) which was more or less similar to our findings. So, efforts should be made to strengthen the occupations of livestock farmers, increasing their awareness of scientific practices and improving their risk-taking ability so that their income levels are raised with livestock activities.

The results conformed to that of Ravikumar (2007) and Jagadeeswary (2009).

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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