



PRESENT STATUS OF DAIRY FARMS UNDER DINAJPUR DISTRICT IN BANGLADESH

M. A. B. Siddque* and M. N. Amin

Department of General Animal Science and Nutrition, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh.

Received 15 December 2010 , revised 15 April 2013 , accepted 16 April 2013

ABSTRACT

This study was conducted to know the present status of dairy farms in some selected areas of Dinajpur district. The parameter examined were dairy farm owners occupation, monthly income, land size, educational level, owners training, breed choice for artificial insemination, housing system, feed choice for dairy cattle, feeding system, milk production, selling place of milk, credit facilities, prevention and treatment strategies and general problem face in herd management. In the selected area (from 100 dairy farms) the major occupation of dairy farmers was agriculture 50%. The most of the dairy farmer's monthly income was above 5 thousand (55%). 38% dairy farm owners have land size above 5 acre. The average number of animal was increase with the increase of owners land size. About 43 numbers of farms had 4-8 herd sizes. The average numbers of animal also increase with the increasing level of education. 72% farm owners had taken training and 28% did not take any training. Percent of profitable farm that had taken training was 88% and looser 12%. Farmers that did not take any training, 78% were profitable and 22% non profitable. Housing system in this area were building 10%, half building 41%, tin shed 42% and straw shed 7%. The most of the farm owners were cultivate Napier grass (53%) for their livestock. The main problem for fodder production was seed/cutting scarcity 66%. About 58% farm owners practice stall-feeding and 42% stall+grazing feeding system. The average milk production for crossbred cows were 5.91 ± 0.35 and for indigenous cows were 2.03 ± 0.59 . The average milk price among four thanas were 23 ± 2 Tk and daily average milk production/farm 29.5 ± 7.68 liters. Prevention and control strategies for all disease were not available. Anthrax vaccine was available and FMD vaccine had great shortage. For management cases Diseases and conception problem is highest (96%).

Key word: Dinajpur, dairy, farms, present status

INTRODUCTION

Cattle are an integral part of the existing smallholder subsistence farming of Bangladesh. In our country major portion of milk is produced by the rural households. Although milk produced by the rural household is little but it play a greater role to develop a healthy nation. Commercial dairy farming is a new gesture in our country. Recently large number of dairy farms has developed throughout the country due to increasing demand of milk and meat. Huge amount of milk is imported every year due to little production of milk in our country. So we have to increase our milk production. Our dairy farming faces a lot of problem. To overcome this problem more research is needed. Large number of dairy farms also develops in the area of Dinajpur district recently. Hence, the present study was undertaken with the following objectives:

1. To determine the socio-economic characteristics of private dairy farms.

2. To analyze the profitability of dairy farming.
3. To identify the major technical and socio-economic constraints for dairy development and probable measure to overcome these problems.

MATERIALS AND METHODS

The study was conducted under 4 thanas in Dinajpur District, namely Dinajpur sadar, Phulbari, Chirirbandar and Nawabganj, during January to June 2010. Total 100 dairy farms of which 25 from each selected thanas were randomly surveyed according to objectives. A list of registered dairy farms of Dinajpur District was collected from District Livestock Office, Dinajpur. The data were collected through direct interviewing to the farm owners. To attain accurate and reliable data, care and caution were taken in the course of data collection. Data

*Corresponding author: Md. Abu Bakkur Siddque, Department of General Animal Science and Nutrition, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh, e-mail: nurul.amin51@yahoo.com Phone: +88-01719470547,

collected from the farmers were compiled and tabulated. Tabulated data were arranged as percent value for easy understanding, analyzed and to have definite conclusion.

RESULTS AND DISCUSSION

The results were discussed on the basis of three aspect such as socio-economic aspect, feed and fodder attributes and milk production related parameters of private dairy farms.

Socio-economic aspect of private dairy farms: The result had shown that among the four thanas the average distribution of occupation agriculture 50%, business 27%, service 17% and other 6%. It appears that in Dinajpur sadar, Phulbari, Chirirbandar and Nawabganj thana in Dinajpur district majority of private dairy farmers occupation were agriculture that is 48%, 52%, 44% and 56% respectively. Salim Khan (1996) found that average distribution of occupation agriculture 36%, business 41%, service 15% and other 8% in the study area. Rahman (1993) conducted an economic study of dairy enterprise in two selected areas of Bangladesh. The study found that agriculture was the main occupation of farmers keeping milch cows in the study areas. This is agreed to some extend with present findings.

Monthly income of private dairy farmers in four thanas of Dinajpur district was 0-3 thousand (9%), 3-5 thousand (37%), above 5 thousand (55%). Monthly income of private dairy farmers in Dinajpur sadar, Phulbari and Chirirbandar had more than five thousands and the number of respondent for this was 52%, 68% and 64% respectively. In Nawabganj thana 56% farmers had 3.5 thousand taka income per month. Salim Khan (1996) found that average distribution of monthly income of private dairy farmers was 0-3 thousand (24%), 3-5 thousand (43%), above 5 thousand (33%) in his study area. Rahman (1993) found that average annual income for all area was found to be Taka 43780 and 20043 for Kalihati and Takerhat areas respectively. It was also found that 82% dairy cow owners belonged to income group of taka up to 25000 for Takerhat area.

The average percent of land size of private dairy farms in four thanas of Dinajpur district was 0-0.5 acre (6%), 0.5-1 acre (14%), 1-2 acre (14%), 2-5 acre (28%) and above 5 acre (38%). Salim Khan (1996) found that average land size of private dairy farms was 0-0.5 acre (1%), 0.5-1 acre (14%), 1-2 acre (36%), 2-5 acre 28% and above 5 acre 21%. The Dinajpur sadar, Phulbari and Chirirbandar thana dairy farmers posses more than 5 acre land that is 36%, 36% and 56% respectively. According to survey only 36% farmer's posse's 2-5 acre land in Nawabgonj thana. Rahman (1993) found that it was estimated the average land size was 0.72 and 0.76 hectares for Kalihati and Takerhat areas respectively.

This result does not contradict with the present results.

The average distribution of literacy among four thanas was Illiterate 5%, Primary level 11%, class six to ten (16%), S.S.C (21%), H.S.C (21%) and graduate (26%). Salim Khan (1996) found that average distribution of literacy was Illiterate (4%), Primary level (8%), class six to ten (29%), S.S.C (15%), H.S.C (13%) and graduate (18%) in his study area. Among four thanas 10% farmers had building, 41% farmers had half building, 42% farmers had tin shed houses, 7% farmers had straw shed houses, Un paved floor was 50% and paved floor was 50%. Salim Khan (1996) found that 4% farmers had building, 37% farmers had half building, 53% farmers had tin shed houses, 6% farmers had straw shed houses, 60% had unpaved floor and 40% had paved floor in the study area.

The total number of dairy cows in the survey area was 636, pregnant cows 237, dry cows 166, bullock 56 and bull 30. After analysis of table among average number of adult cattle of private dairy farmers, irrespective of thanas were 0.56 bullock per farm, 0.30 bull per farm, 6.36 dairy cow per farm, 1.66 dry cow per farm and 2.37 pregnant cow per farm. Salim Khan (1996) found that average number of adult cattle of private dairy farmers, irrespective of district were 0.67 bullock per farm, 0.36 bull per farm, 5.42 dairy cow per farm, 1.10 dry cow per farm and 2.78 pregnant cow per farm. In the table the average distribution of male calves 0-1 ages were 401 and 1-2 years 130. The female calves belongs age group of 0-1 years were 248 and 195 for 1-2 years age group in four thanas of Dinajpur district. Salim Khan (1996) found that male calves belong to age groups 0-1 ages were 401 and 1-2 years 130. The female calves belongs age group of 0-1 years were 254 and 158 for 1-2 years age group in the study area. The average number of animal per farm with the land size 0-0.5 acre was 2.25, 0.5-1 acre was 6.5, 1-2 acre was 9.32 and 2-5 acre was 12.27. The highest (16.62) average number of animal per farm was found within the land size of above 5 acres. It expresses that with the increase of land size the average number of animal per farms also increase. Salim Khan (1996) found the same finding in his study area. Considering four thanas of hundrade private dairy farms 43% farms had 4-8-herd size, 6% farms had 0-3 herd size, 37% farms had 9-15 herd size, 9% farms had 16-30 herd size, and only 5% farms had above 30 herd size.

According to Salim Khan (1996) 45% farms had 4-8-herd size, and only 2% farms had above 30-herd size. Rahman (1993) conducted a study that found on an average Kalihati and Takerhat area was in possession of 3.62 and 2.66 animals per household respectively.

Illiterate people had average number of animal per farm was 1.50, Primary level had 7.5, Class 6-10 had 10.80, SSC level had 12.65, HSC level had 13.40 and Graduate level had 15.25. There is a significant relationship between education level and herd size. With the increasing level of education, herd size also increase. Salim Khan (1996) found his study area that highest herd size observed 14.11 in above graduate level of education and lowest herd size observed 5.55 in illiterate group. Relationship between profit and loss on training and non-training groups of private dairy farmers were shown in Table 3. Only 70-90% farmer in four thanas had taken training and 10-30% farmers had no training. Salim Khan (1996) found his study area that 22% farm owners had training and 78% had no training. In different thanas who had training on farms, 85-95% farmers were profited and the percentages of looser were 10-20%. He also found that the farm owners who get training were more benefited and who had no training they were less benefited. According to Kabir (1995) training on dairy management animal health care, sanitation and marketing techniques would be profitable for private dairy farmers.

Feed and fodder attributes of private dairy farms:

Types of different fodder production for private dairy farms among four thanas in Dinajpur district. Among Napier grass, Para grass and maize fodder; Napier grass, Para grass and Maize cultivated 32-80%, 4-20% and 8-32% respectively. Salim Khan (1996) found that Napier grass was cultivated 81%, Para grass was cultivated 27% and maize was cultivated 30% by the farmers in the study area. Problem related to fodder production of private dairy farms among different thanas in Dinajpur district was shown in Table 3. Among different Problems land scarcity was 52-72%, seed/cutting scarcity 56-76%, lack of knowledge 44-80% and others were 32-52%. Salim Khan (1996) found that land scarcity was 57%, seed/cutting scarcity 49%, lack of knowledge 53% and others were 30%. Feeding system of private dairy farms among different thanas in Dinajpur district was shown in Table 3. Stall-feeding was 32-80%, stall and grazing system was 20-68%. Stall-feeding was the highest in Chirirbandar thana, because all of the grazing land are taken under cultivation. In this area crops produce thrice in a year. So there is less chance of grazing in this land. Secondly in Dinajpur sadar 72% farm owners chose stall-feeding due to city area and shortage of available land.

Milk production related parameters in private dairy farms: Milk production related parameters of private dairy farms among four thanas in Dinajpur district are shown in Table 1. The lactation period (day) ($P < 0.05$) and average milk production ($P < 0.01$)

of crossbred cows show significant difference among four thanas of Dinajpur district. Highest and lowest milk production/cow of crossbred cows showed insignificant difference among four thanas of Dinajpur district ($P > 0.05$). On the other hand highest milk production, lowest milk production/cow ($P < 0.05$) average milk production/farm, daily milk production/farm ($P < 0.01$) was showed significant difference among four thanas of Dinajpur district. Milk price/liter found insignificant difference among four thanas. Lactation period was within the range of 268 ± 72.4 to 285 ± 38.5 days in crossbred cows. Whereas indigenous cows was 205 ± 28.91 to 235 ± 39.21 days in four thanas. The findings express that lactation period for crossbred cows higher than that of indigenous cows. Salim Khan (1996) found that lactation period was within the range of 285.6 ± 40.2 days w in crossbred cows. Whereas indigenous cows was 221.25 ± 21.95 days in four thanas. Highest milk production per day in cross bred cow was 8.21 ± 1.34 to 11.78 ± 1.32 liters, whereas indigenous cow it was 2.01 ± 0.41 to 3.95 ± 0.56 liters. Lowest milk production per day in crossbred cow was 1.15 ± 0.97 to 2.98 ± 0.69 liters, whereas in indigenous cow it was 0.5 to 0.81 liters in four thanas. Average milk production per day crossbred cow was 1.94 ± 0.67 to 9.83 ± 1.65 liters, whereas in indigenous cow it was 0.613 to 2.96 ± 0.56 liters in four thanas. Daily milk production per farms in different thanas was found within the range of 23.7 ± 5.24 to 35.8 ± 13.21 liters. Salim Khan (1996) found that highest average milk production per day in crossbred cow was 10.15 ± 1.70 liters, whereas indigenous cow it was 3.62 ± 0.39 liters. Lowest milk production per day in crossbred cow was 1.78 ± 0.37 liters, whereas in indigenous cow it was 0.52 to 0.14 liters in different districts. Average milk production per day crossbred cow was 6.02 ± 1.16 liters, whereas in indigenous cow it was 1.88 ± 0.25 liters in different district. These result in-agreements with the result of different author (Rajapurahit, 1979; Halim, 1992; Sarkar, 1995; Alam, 1995). Price per liter of milk was 21 ± 2 to 25 ± 2 taka in different thanas of Dinajpur district. These findings differed with the findings of Salim Khan (1996). He found 16.6 ± 0.82 taka per liters in different district. Number of milking was two per day and time of milking at 7.30 AM and 4.30 PM in different thanas. Choice selling place of milk in four thanas were depend on availability of facilities to preserved milk. About 32-64% farmers selling their milk in local market, 12-60% farmers in broker/milk-vita and 4-16% farmers to home service. Salim Khan (1996) found 53% farmers selling their milk in local market, 48% farmers in broker, 38% farmers to home service and 27% to sweet makers in the study area. Artificial inseminations of cow by

Table 1. Milk production related parameters in private dairy farms among different thanas in Dinajpur

Parameters	Categories	Name of the Thanas				Percentage among four thanas	P-Value	Level of Significance
		Dinajpur sadar	Phulbari	Chirirbandar	Nawabganj			
Crossbred cow	Lactation period (day)	279 ± 43.3	272 ± 41.6	285 ± 38.5	268 ± 72.4	276 ± 48.95	0.02	*
	Highest milk production/cow (liter)	10.85 ± 1.36	8.47 ± 2.56	11.78 ± 1.32	8.21 ± 1.34	9.83 ± 1.65	0.56	NS
	Lowest milk production/cow (liter)	2.12 ± 0.65	1.15 ± 0.97	2.98 ± 0.69	1.5 ± 0.38	1.94 ± 0.67	0.193	NS
	Average milk production/cow (liter)	6.5 ± 0.94	5.32 ± 1.28	6.68 ± 0.96	5.14 ± 0.35	5.91 ± 0.88	0.001	**
Indigenou s cow	Lactation period (day)	221 ± 30.12	215 ± 22.38	235 ± 39.21	205 ± 28.91	219 ± 30.16	0.001	**
	Highest milk production/cow (liter)	3.56 ± 0.32	2.31 ± 0.65	3.95 ± 0.56	2.01 ± 0.41	2.96 ± 0.49	0	**
	Lowest milk production/cow (liter)	0.62	0.51	0.82	0.5	0.6125	0	**
	Average milk production/cow (liter)	2.23 ± 0.32	1.85 ± 0.65	2.5 ± 0.98	1.52 ± 0.42	2.03 ± 0.59	0.06	*
Price/liter(Tk)		25 ± 2	23 ± 2	23 ± 2	21 ± 2	23 ± 2	0.866	NS
Daily milk production/farm (liter)		33.5 ± 5.96	25 ± 6.32	35.8 ± 13.21	23.7 ± 5.24	29.5 ± 7.68	0.041	*
Number of milking		2	2	2	2	2		
Time of milking		7.30 A.M 4.30 P.M	7.30 A.M 4.30 P.M	7.30 A.M 4.30 P.M	7.30 A.M 4.30 P.M	7.30 A.M 4.30 P.M		

[Figure indicate the Mean ± SD; * Significant (p<0.05), ** Significant (p<0.01), NS (Not Significant); Figures with similar superscripts mean did not differ significantly among respective figures with dissimilar superscripts mean differed significantly as per DMRT]

Table 2. Prevention by vaccine and medicine of private dairy farm among four thanas in Dinajpur

Parameters	Categories	Name of Thanas				Percentage among four thanas	P-Value	Level of Significance
		Dinajpur sadar	Phulbari	Chirirbandar	Nawabganj			
Vaccine	Anthrax	25	25	25	22	97	0.0325	*
	Black quarter	21	19	23	17	80	0.0022	**
	Hemorrhagic septicemia	14	12	17	8	51	0.0001	**
	Foot and mouth disease	11	8	18	7	44	0.0003	**
Medicine	Round worm	25	22	25	20	92	0.0059	**
	Liver fluke	25	25	25	21	96	0.0017	*

Table 3. Profit and loss in private dairy farmers among four thanas of Dinajpur District

Parameters	Name of Thanas				Total	Average profit or loss/month among four thana
	Dinajpur sadar	Phulbari	Chirirbandar	Nawabganj		
Number of profitable farm	23	21	24	22	90	
Profit/farm/month(Tk)	3523.03	2710.40	5289.66	2016.21	13539.3	3384.83
Number of loser farm	2	4	1	3	10	
Loss/farm/month(Tk)	2880.91	2209.25	3019.52	1811.10	9920.78	2480.20

[* Significant (P<0.05), ** Significant (P<0.01); Figures with similar superscripts mean did not differ significantly among respective figures; figures with dissimilar superscripts mean significantly as per DMRT.]

Table 4. In general Problem related to private dairy farm among four thanas in Dinajpur District

Parameters	Name of the Thanas								Percentage among four thanas
	Dinajpur sadar		Phulbari		Chirirbandar		Nawabganj		
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage	
Disease	24	96	22	88	23	92	25	100	94
Adult mortality	7	28	5	24	8	32	12	48	32
Calf mortality	18	72	11	44	13	52	19	76	61
Medicine	23	92	24	96	25	100	25	100	97
Vaccine	15	60	17	68	13	52	22	88	67
Conception	24	96	22	88	24	96	25	100	94
Artificial Insemination	17	68	17	68	15	60	22	88	71
Deficiency of hi-breed	20	80	21	84	15	60	23	92	79
Low milk production	17	68	22	88	15	60	25	100	79
Milk processing	10	40	12	48	5	20	15	60	42
Insurance	8	32	5	20	13	52	5	20	31
Skill labour	13	52	7	28	15	60	5	20	40
Security	7	28	9	36	8	32	10	40	34
Environment	12	48	8	32	13	52	5	20	38
Chi-Square(P-value) test	0.005		0.001		0		0		
Level of Significance	**		**		**		**		

different breed of private dairy farms among four thanas in Dinajpur District were practice. The semen of Friesian bull was used 62%, Local bull semen was used 24% and Shahiwal bull semen was 14%. It was concluded that Friesian bull was first priority to

private dairy farmers for using artificial insemination purpose and the second one is local bull. Reason for using Friesian bull perhaps availability of semen and the high milk production. Salim Khan (1996) found the semen of Friesian bull was used 66%, Sindhi bull

semen was used 2% and Shahiwal bull semen was 14% and only 1% used Jersey bull semen in the study area.

Problem and prospect of private dairy farms:

Complexity regarding bank loan of private dairy farms among four thanas in Dinajpur District were also found. Among hundred dairy farmers in four thanas 74% farmers were taken bank loan and 26% farmers were not taken bank loan. According to respondent 72-92% farmers faced problem in banking loan and only 8-28% farmers had not faced any problem for taking bank loan. Salim Khan (1996) found that 57% farmer taken bank loan and 43% were not taken bank loan. 79% farm owner faced problem in taking bank loan and 21% not faced any problem. Rahman (1993) state problems regarding bank loan. Government service in terms of credit, training, technical co-operation and in bonus form wanted by private dairy farmers in four thanas. About 20-40% farmers wanted credit, 16-32% farmers wanted training, 20-36% farmers wanted technical co-operation and 8-28% farmers wanted bonus. Credit was the highest demand and next technical co-operation, training and bonus in four thanas in Dinajpur district. Salim Khan (1996) found that 60% farmers wanted credit, 48% farmers wanted training, 67% farmers wanted technical co-operation and 26% farmers wanted bonus in the study area. Treatment facilities of private dairy farm in four thanas were not available. Only 36-76% farmers get treatment facilities from veterinary surgeon on the other hand 16-56% farmers get treatment facilities from quack and 8-16% farmers get treatment facilities from other sources. The respondent identified few causes' lack of treatment facilities or veterinary services from veterinary surgeon that was highly honorarium demanded by doctors, distance of farm and doctors not available in the station. Salim Khan (1996) found that 42% farmers get treatment facilities from veterinary surgeon, 57% from quack and 25% other sources.

Vaccination and medication facilities of private dairy farms in four thanas were shown in table 3. Prevention by vaccination and medication of private dairy farm was significant difference among four thanas of Dinajpur district ($P < 0.05$), ($P < 0.01$). Among hundred farmers anthrax vaccine were used 88-100%, B.Q. vaccine used in 68-92% farmers, H.S. vaccine used in 32-68% farmers, FMD vaccine used in 28-72% farmers, round worm anthelmintic drugs 80-100% farmers and for liver fluke anthelmintic drugs 84-100% farmers. Different vaccines are used by private farmers according to Olluzzaman and Islam (1992).

Profit and loss in private dairy farmers among four thanas of Dinajpur District were shown in Table 3. Among hundred private dairy farmers 90 farms were profitable and their average profit per month was

3384.83 taka and only 10 farms were loser and their average loss per month was 2480.20 taka. According to Alam *et al* (1995) average profit per farms was 2939 taka.

General problems regarding private dairy farms had shown in table 4. The table shows a significant difference among four thanas of Dinajpur district ($P < 0.01$) about different problems. Disease problem in general was 88-100%, adult mortality was 20-48%, calves mortality was 44-76%, medicine problem was 92-100%, vaccine problem was 52-88%, conception problem was 88-100%, artificial insemination problem was 60-88%, hybrid problem was 60-92%, low milk production problem was 60-100%, milk processing problem was 20-60%, insurance problem was 20-52%, skill labour problem was 20-60%, security problem was 28-40% and environmental problem was 20-52%. This related with the findings of Islam (1986), Islam (1992), Ahmed (1991), Rahman and Rahman (1991), Halim (1992), Sarkar (1995), Islam (1987), Kabir (1995), Rahman (1993) and Salim Khan (1995).

CONCLUSION

Although a lot of problem dairy farm have a great opportunity to develop in the Dinajpur District. Without government help dairy farm cannot solve their problem. Government should take some important steps immediately like subsidy on animal feed, cultivation of fodder, providing milk marketing facilities and financial support, expansion of veterinary service, ensure reasonable price of milk, giving managerial training of farm owners etc. for improvement of small dairy farms. Dairy cattle rearing can be recommended as an income generating activity at the farmer's level of Bangladesh.

REFERENCES

- Alam J, Yasmin F, Sayeed MA and Rahman SMA. 1995. Economics of Mini Dairy Farms in selected area in Bangladesh Animal Sciences, 8(1), 17-22. Cited from World Agriculture Economics Rural Society Abstracts, June 1995, vol. 37, No. 6, P 487.
- Ahmed N. 1991. Problems and prospects of livestock in Bangladesh. A paper presented in annual meeting-cum-workshop on Livestock development in Bangladesh held at Bangladesh Livestock Research Institute, Savar, Dhaka, Bangladesh on 16-18 July, 1991.
- Halima MA. 1992. A Comparative Economic Analysis of local and Cross-Bred Dairy cows in a Selected Areas of Dhaka District. Master's Thesis, Department of Agricultural

- Economics, Bangladesh Agriculture University, Mymensingh.
- Islam MN and Oliuzzaman. 1992. A study on the existing distribution pattern, rearing practices and some economic productive and reproductive dairy characters of indigenous cows in some selected areas of Mymensingh district. Annual report BAURES No. 7(A).
- Islam SMM. 1986. Economics dairy cows under milk shed area of Pabna district. M.Sc.Thesis Department of Agricultural Economics. Bangladesh Agricultural University, Mymensingh.
- Islam MN. 1987. Artificial insemination problem confrontation of the farmers in two selected unions of Modupur upazilla under Tangail district. M.Sc. Thesis Department of Agricultural Extension. Bangladesh Agriculture University, Mymensingh. PP.85-87.
- Kabir MH. 1995. An economic study of subsidized private dairy farming in selected area of Bangladesh. M.Sc.Thesis Department of Agricultural Economics. Bangladesh Agricultural University, Mymensingh. PP. 129-134.
- Rahman MM. 1993. Rearing improved variety of cattle: farmers view Bangladesh Journal of Animal Science. 22 (1-2): 69-79.
- Rajapurahit AR.1979. Cross-breeding of Indian cattle –an evaluation. Economic and political weekly, vol, XIV, No. 12-13, review of Agriculture, PP. 9-24.
- Salim K. 1996. Study on status of private dairy farms among different Districts in Bangladesh. M.Sc. Thesis Department of Dairy Science. Bangladesh Agricultural University, Mymensingh.
- Sarker MA. 1995. Economic analysis of dairy cattle enterprise and its pattern of contribution to farm income in a selected area of Bangladesh. M.Sc. Thesis Department of Agricultural Economics. Bangladesh Agricultural University, Mymensingh.