Practice, preference and performance of cattle under peri-urban dairy management system in Mymensingh

NU Siddiquee[1], SMA Rahman[1], MSA Bhuiyan[1], AKMA Rahman[2], MR Amin[3], AKFH Bhuiyan*[1]

[1]Department of Animal Breeding and Genetics; [2]Department of Medicine, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh; [3]Faculty of Agro Based Industry, University Malaysia Kelantan, Malaysia

Abstract

The objective of this research was to assess the status of cattle in respect of breeding system, quality of breeding services, their production, reproduction, health status, management system and marketing system using an in-depth baseline survey. The mean of homestead land owned by the farmers was 36.17± 32.94 decimal and most of them (48.3%) own very low homestead land (11-50 decimal). Average cultivable land owned was found as 101.52±61.044 decimal and a considerable number of farmers have medium (51-150 decimal) to high (151 onward decimal) land area. From the collected data, it is clear that most of the households have cattle and chicken. But among cattle owners, about 77.62% have lower number (1-3). Most of the farmers 69.8% use locally available grass and only 3.2 % fed exotic grass to their cows. Milk sale and consumption (52.13%) was found as main objective behind cattle rearing. Semi-intensive method of rearing was found most acceptable (77.62%) among the peri-urban farmers. Disease problem was quite high because of lack of routine vaccination where vaccination was found to be practiced by only 38.46% farmers. Indigenous cattle are of high preference among the farmers (52.45%) because of its easy management and high resistance to disease, 41.2% percent farmers preferred crossbred cattle. Main reasons behind preference for Deshi cattle were easy management (24.48%) and lower feed requirement (12.59%) whereas, reason behind crossbred preference (35.66%) was higher milk production. Artificial Insemination (AI) was preferred (61.06%) over natural service (38.94%). For artificial insemination, semen of Holstein Friesian (43.07%) was preferred where Deshi was the second most choice (32.12%). Most of the farmers (82.9%) have no idea about genotype, quality & merit of semen. Average milk yield of Deshi and crossbred genotype were found as 1.72±0.80 and 6.65±5.05 liter per day respectively whereas lactation period and dry period were found respectively as 243.98±113.13 and 92.37±63.14 days in crossbred, 249.69±106.93 and 96.58±32.06 days in Deshi cows.

Bang. J. Anim. Sci. 2013. 42 (2): 89-95

Introduction

Livestock plays an important role in the economy of Bangladesh with a direct contribution around 2.67% to the GDP and according to Bangladesh Economic Review (2010); the growth rate in GDP of 2011-2012 for livestock was at 3.39 %. The need of per capita milk and meat is 240 gm and120g/day, respectively with a per capita availability of 43 ml milk, 21 g meat/ day (DLS 2005). So, it is clear that there is a huge shortage of livestock products in Bangladesh for human consumption.

Replication of successful pro-poor models for community based smallholder dairy development including contract farming schemes and development of national policy supported breeds/ genotypes have been suggested as vital elements of policy framework for dairy and breed development in Bangladesh (Anonymous 2007). The existing cattle breeding policy of the country is a two-tier system which kept provision of dairy development in the country using both i) high yielding variety which are crossbred e.g., Holstein Friesian×Local, and ii) improved indigenous dairy type cattle e.g., Red Chittagong, Pabna, Munshigonj, etc (Bhuiyan 2007). The gap between demand and supply of quality semen considered as one of the major constraints in enhancing productivity. To overcome the problem, it has become imperative to produce quality semen through active participation of the

*Corresponding Author: **bhuiyanbau@gmail.com**

farmers. More importantly, farmers are the custodians of the most species of livestock and, therefore much better placed to manage these resources and to participate in semen animal production initiative in a science-led fashion (Bhuiyan 2007, Jabbar et al. 2010). Taking the aforementioned background in consideration the present study was undertaken to look at the farmers' preference of cattle breeds/genotypes and their performance under peri-urban dairy management systems in Mymensingh district of Bangladesh.

Materials and Methods

A field investigation was carried out in different parts of Mymensingh Sadar and some parts of Gauripur upazilla of Mymensingh district. In the field reconnaissance, the actual field situation was assessed by field visit of project personnels. Exchanges of opinions and views were carried out to identify the present status, problems and potentialities of rearing cattle. Farmers of Boyra, Ghagra, Vabokhali, Akua, Khagdohor, Dapunia, Char Ishwardia, Char Nilakshmia and Vangnamari union were selected for survey purposes.

Stratified random sampling procedure was applied for selecting the samples for conducting baseline survey from 203 households located in 61 villages in fewer than 9 unions (Table 1). From every village 2-3 households (HHs) with cattle and 1-2 HHs without cattle (Non-cattle) was surveyed. The baseline survey was conducted by direct interview method during the period from 24 June to 07 July 2010.

For collecting the necessary data, the survey team explained to respondents about the aims and objectives of the baseline survey before going to make the actual interview. The respondents were assured that the information given by them would not be used against their interest and that it would be useful to the households themselves in many respects. Interviewees were requested to give correct information as far as possible. To ensure the quality of information the interview schedule was checked to ensure that information to each of the items had been correctly recorded. If there were any items overlooked and misunderstood or found contradictory, these were corrected through re-interviewing on the spot.

Table 1. Distribution of households where baseline survey was conducted

Location	With Cattle	Without cattle	Total
Barera	23	9	32
Ghagra	15	5	20
Bhabkhali	17	8	25
Akua	19	9	28
Char Ishwardia	21	7	28
Char Nilakshmia	10	5	15
Khagdahar	16	6	22
Dapunia	02	1	3
Vangnamari	20	10	30
Total	143	60	203

The senior team members monitored the interviews as well as provided specific feedback to the enumerators regarding interview (e.g., questioning style, use of probing questions, and approach to the respondents). As a follow-up to cross check survey enumeration, senior team members re-interviewed some of the sample households for checking the process followed by the data enumerators. The senior team members also checked all completed questionnaires on a daily basis to identify the missing information, ambiguous answers, digital errors, and provided feedback to the enumerators (if any). All the collected data were uploaded in computer and compiled in single Excel file. These data were then rechecked referring filled questionnaire and analyzed in accordance with the objectives of the study. The analysis was done using descriptive statistics like percentage, frequency distribution and mean where appropriate.

Results and Discussion

Table 2 shows some basic information of the respondents in the survey area. The mean of homestead land owned by the farmers was 36.17±32.94 decimal and most of them (48.3%) own low category of homestead land (11-50 decimal). Mean value of cultivable land owned was found as 101.52±61.044 decimal and a considerable number of farmers have medium to high land area. Farming experience is very important for successful farming and average farming experience found was 25.36±23.75 years. The mean family size was 6.26±2.42, but most of the farmers (70.9%) had a large size family (6-10).

Table 3 describes information about number and different age groups of livestock reared by the farmers in the study area. From the collected data, it is clear that most of the households have cattle and chicken. But among cattle owners, about 77.62% have lower number (1-3). Most of the farmers are not interested in goat rearing. But chicken is common, average number owned is 4.42±3.71 with an average of 5.29±5.10 chicks.

The two different cattle genotypes were available in the project area which included crossbred (41.52%) and Deshi (58.48%). Each genotype was further categorized as milch cow, pregnant cow, breeding bull, male and female calf. Among the cattle owners, 31.59% had milking crossbreds with 28.83 and 16.26% of female and male calves, respectively. Whereas, among 143 respondents, 23.52% and 30.50% had Deshi milking cows and female calves, respectively. A considerable number (9.15%) of Deshi bulls were also found. But crossbred–bulls are relatively less in number (7.36%).

Response from the cattle owners is presented in Figure 1. Among them, 52.13% are being reared for milk sale and consumption. The second important objective was selling of cattle as a business (31.19%). Besides these, there are other purposes as- cultivation of land, religious purpose, festival etc.
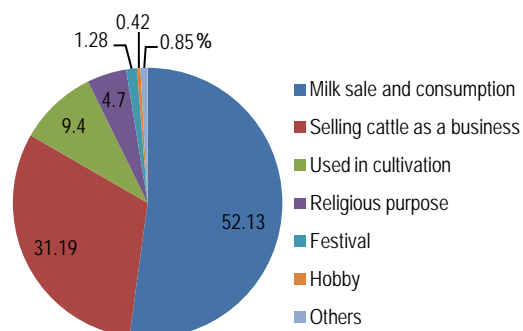

Figure 1. Objective of cattle rearing

Semi-intensive method of rearing was found mostly followed (77.62% of cattle owners) by the farmers (Figure 2). In addition, rearing all types of cattle together (71.33%) is preferred than that of separately (6.29%). Rahman et al. (2013) found that about 80%, 17% and 3% farmers reared cattle by semi-intensive, intensive and extensive or free grazing system, respectively which is very similar of these results.

Table 2. Primary information of the farmers

Primary information	Category	HH	% of total	Mean±SD
Homestead land (decimal)	Very low (0-10)	52	26.40	36.17±32.94
	Low (11-50)	98	49.74	
	Medium (51-150)	46	23.35	
	High (151-upward)	1	0.5	
Cultivable land (decimal)	Very low (0-10)	01	0.9	101.52±61.044
	Low (11-50)	29	27.62	
	Medium (51-150)	53	50.48	
	High (151-upward)	22	20.95	
Farming experience (year)	No experience (0)	49	24.1	25.36±23.75
	Moderate (1-15)	45	22.2	
	Medium (16-30)	35	17.2	
	High (31-upward)	74	36.5	
Family members	Low (0-2)	5	2.5	6.26±2.42
	Medium (3-5)	43	21.2	
	High (6-10)	144	70.9	
	Very high (11-upward)	11	5.4	

HH, household; SD, standard deviation

Table 3. Information about the number of livestock in the households (203)

Species and Category	Different stages of livestock					
	Adult		Grower		Calf/Kid/Chick/Duckling	
	%	Mean±SD	%	Mean±SD	%	Mean±SD
Cattle:	8.72 (13)		22 (22)		10.85 (14)	
Low (1-4)	85.23 (127)	2.21±1.68	72 (72)	1.56±1.40	82.95 (107)	1.83±1.43
Medium (5- 10)	6.04 (09)		1106 (06)		6.20 (08)	
Goat:	14.93 (10)		19.05 (4)		27.03 (10)	
Low (1-4)	80.6 (54)	1.69±1.62	71.43 (15)	1.90±1.87	67.57 (25)	1.59±1.46
Medium (5-10)	4.48 (3)		9.52 (2)		9.52 (2)	
Chicken:	12.03 (19)		25.37 (17)		35.78 (39)	
Low (1-5)	64.56 (102)	4.42±3.71	56.72 (38)	3.63±3.14	18.35 (20)	5.29±5.10
Medium (6-15)	23.42 (37)		17.91 (12)		45.88 (50)	
Duck:	15.46 (13)		27.54 (7)		27.59 (08)	
Low (1-5)	58.89 (53)	4.26±3.70	38.46 (10)	4.38±4.03	34.48 (10)	4.93±4.64
Medium (6-15)	26.67 (24)		34.62 (9)		37.93 (11)	

The feeds and amount of feeds offered to their cattle in study area are summarized in Table 4. Normal straw are preferred by the farmer to fed animals which is about 84.9%, 84.44% and 81.48% for cow, heifer and bull, respectively. Most of the farmers use Deshi/locally available grass (96.8% for cow), whereas only 3.2 % (for cow) fed exotic grass. Among concentrates, wheat bran (29.6% for cow), oil cake (25.23% for cow), rice polish (18.38% for cow) are highly preferred. On an average, every cow gets one kg mixed concentrate feed daily, whereas heifer & bull gets 0.45kg/day/animal, 0.27kg/day/animal respectively. Rahman et al. (2013) found that more than 84% of the farmers managed feed from both sources (own and purchased) for their cattle even though 15% fully depended on purchasing feed from local market, but a little (1%) of them from their own sources which is very similar of this study.

Level of consumption of milk among the cattle owners was not so good; mean found was only 1.18±0.88 liters daily, whereas mean sale of milk by farmers was 8.86±24.62 liters daily. Average milk price in the surveyed area was Tk. 35.32±8.98/liter. Milk selling channel that is used by most of the farmers is through milkman. About 56.25% of the respondents sell milk by the help of milkman, whereas 28.75% sale in retail by own. But it should be clear that a farmer can use more than one channel at a time. Most of the respondents (62.35%) are not happy with the price.

During survey in the area, farmer's response on different constraints was considered. The main problems found were lack of good semen, low pregnancy (conception) rate, lack of inseminators, and high price of breeding service and unavailability of AI service. Most of the time, farmers mentioned more than one problem at a time.

About 98.64% of the respondents reported that they breed their cows based on their observation of sign of heat of cows (Table 5). About 38.94% of the farmers still use natural breeding by bull, of which 58.87% bulls were Deshi type. Rahman et al. (2013) found that most of the farmers (76%) inseminated their cows artificially rather than naturally (19%) and merely of 5% did both, which is not similar of this study. The main AI service providers were government, BRAC and BAU AI center. BAU AI center provides service to about 61.36% of the total breed able cows in the surveyed area. Most of the farmers (82.9%) had no knowledge about good (merit and quality) semen.

Table 4. Type of feeds and amount offered to cattle

Feed types and amount	Category	Cow		Heifer		Bull	
		Frequency	%	Frequency	%	Frequency	%
Straw	Normal	113	84.9	76	84.44	44	81.48
	Treated	20	15.1	14	15.56	10	18.52
Grass	Deshi	121	96.8	78	95.12	49	94.23
	exotic	4	3.2	4	4.88	3	5.77
Concentrate Feeding	Yes	73	51.05	39	27.27	32	22.38
	No	70	48.95	104	72.73	111	77.62
Concentrated feed ingredients	Wheat bran	95	29.60	55	27.64	44	30.78
	Oil cake	81	25.23	49	24.62	35	24.48
	Rice polish	59	18.38	43	21.61	29	20.28
	Khude	52	16.20	30	15.10	25	17.48
	Salt	30	9.35	17	8.54	7	4.90
	Others	4	1.25	5	2.51	3	2.09
	Fed/animal/day(kg)	1.03		0.45		0.27	

Disease management is one of the important pre-requisite of successful cattle rearing. Still a large number of farmers (59.44%) are not attached to vaccination program. Vaccination for BQ, Anthrax and FMD are common (Table 6). About 41.96% of farmers reported death of cattle in last five years. Major causes of death were FMD and Anthrax. Farmers call registered veterinarian and quack almost in same proportion of 45.45 and 44.06%. Mean of de-worming per year was found 1.92 ± 1.41.

Farmer's preference towards genotype and reasons behind this preference is very much important for taking decision. More than fifty percent farmers (52.45%) prefer Deshi while 41.26% prefer crossbred (Table 7). Main reasons behind preference for Deshi were easy management (24.48%) and lower feed requirement (12.59%), whereas important reason behind crossbred preference (35.66%) was their higher milk production. Rahman et al. (2013) found that the cow genotypes, more than half (61.16%) was of the indigenous which was significantly ($p<0.01$) higher than the crossbreds (38.84%) which is very similar of this study.

The lactation period of crossbred and Deshi cattle was 257.5 and 249.69 days, respectively (Table 8). The dry period was found higher in Deshi cattle (96.58 days) as compared to crossbred (92.37 days). Mean dry period found in all cattle types is within normal range (<120 days). Generally, Deshi cows are milked once in a day, whereas crossbreds are milked more than single time. The average milk yield and lactation length of Deshi cows were 2.33 ± 0.96 liters/d and 249.69 ± 106.93 days, respectively. Conversely, the average milk yield and lactation length of crossbred cows were 9.72 ± 6.50 liters/d and 243.98 ± 113.13 days, respectively.

Table 5. Breeding information

Breeding information	Category	No of Animal	%
Sign of heat	Shown	218	98.64
	Silent	3	1.36
Type of service	Natural service	88	38.94
	AI	138	61.06
Sources of Semen for AI	Semen from Government	22	25.0
	Semen from BRAC	12	13.63
	Semen from BAUAI Centre	54	61.36
How farmer get AI services	Cows at AI center	30	60.0
	Inseminator at home	20	40.0
Bull used in natural service	Deshi	73	58.87
	Cross breed	51	41.13
Genotypes used in AI	Friesian crossbred	59	43.07
	Sahiwal	20	14.60
	Deshi (Red Chittagong Cattle)	54	39.41
	Others	4	2.92
Knowledge about semen	Yes	33	17.10
	No	160	82.90

Rahman et al. (2013) found that the average milk yield and lactation length of indigenous cows were 2.37±0.26 kg/d and 276.56±19.17 days, respectively. Conversely, the average milk was 9.33±2.44, 3.00±0.38, 3.16±0 and 2.25±0.25 kg/d for Holstein x Local, Sahiwal x Local, Sindhi x Local and Chittagong x Local cows, respectively. The average lactation length was 326.39±19.34, 306.28±25.52, 267.56±26.51 and 260.18±14.52 days for Holstein x Local, Sahiwal x Local, Sindhi x Local and Chittagong x Local cows, respectively.

Table 6. Status of disease management

Case	Category	Frequency	%
Vaccination	Yes	55	38.46
	No	85	59.44
Types of vaccination done	Black Quarter	23	29.11
	Anthrax	26	32.91
	FMD	29	36.71
	Septic Throat	1	1.27
Cattle death in last 5 years	Yes	60	41.96
	No	77	53.85
Causes of death	Black Quarter	3	5.88
	Anthrax	11	21.57
	FMD	15	29.41
	Septic Throat	2	3.92
	Bloat	7	13.72
	Others	13	25.50
Veterinary services	Registered veterinary doctor	65	45.45
	Village Quack	63	44.06
	Drug seller	4	2.80
	Others	2	1.39
De-worming of cattle (No./yr/herd)	1.92 ±1.41 (Mean±SD)		

The findings of the present study revealed the existing cattle rearing practices under peri-urban system of management which are more or less in line with similar production environments. The breed/genotype preference has found to be in accordance to their management level. That is Deshi is the choice of low input farmers and crossbreds are the choice of high input farmers. The reasons behind preference for Deshi were easy management and lower feed requirement, whereas important reason behind crossbred preference was their higher milk production. These findings corroborate with that of Rahman et al. (2013) where more than half (61.16%) like indigenous which was significantly (p<0.01) higher than the crossbreds (38.84%). However, in the present study 43.07 % farmers used HF crossbred semen while the degree of choice of Sahiwal and Red Chittagong semen by the farmers were 14.60 and 39.41% respectively.

Table 7. Cattle preference of the farmers and reasons behind

Category	Crossbred		Deshi	
	HH	%	HH	%
Overall Cattle preferences	59	41.26	75	52.45
High milk production	51	35.66	5	3.50
High milk price and profitable	12	8.39	4	2.80
Milk quality high or tasty	1	0.70	7	4.90
High growth rate and tasty meat	5	3.50	4	2.80
Regular calving	1	0.70	6	4.20
Easy management or rearing	3	2.10	35	24.48
Low rearing cost	0	0	9	6.29
Low feed needed	1	0.70	18	12.59
Less disease risk	1	0.70	9	6.29
Low space needed	0	0	3	2.10
Ploughing	1	0.70	7	4.90
Nice looking	2	1.40	3	2.10
Best among all	0	0	6	4.20

Reason Behind Preference (vertical label spanning reason rows)

Table 8. Performance of different cattle genotypes

Cattle Type	Mean					
	Daily Milk Yield (litre)	Lactation Period (day)	Dry Period (day)	Parity	Number of Milking/day	Highest Milk Production (litre)
Crossbred	6.65±5.05 (89)	243.98±113.13 (88)	92.37±63.14 (65)	2.63±1.44 (67)	1.56±0.49 (90)	9.72±6.50 (89)
Deshi	1.72±0.80 (103)	249.69±106.93 (101)	96.58±32.06 (76)	2.85± 1.66 (105)	1.03±0.16 (108)	2.33±0.96 (105)

Case numbers are given in parentheses

Conclusion

Important information to note from this study is that 82.90 % farmers had no knowledge about good semen or semen meaning that farmers used semen for breeding through AI without any information about the merit of semen. In general, it could be due to poor awareness among the farmers in this regard. These results therefore in Bangladesh suggested to stop current chaotic AI delivery and a combination of different strategies for breed improvement should be adopted and breeding research, development and service delivery need to be designed taking cognizance of perspectives of experts and farmers.The study infers that cattle breeding service providers should always make meritorious and quality semen available as per farmers' breed / genotype choice to optimize profitable dairy farming.

References

Anonymous (2007). National Livestock Development Policy. Government of the People's Republic of Bangladesh. Ministry of Fisheries and Livestock, P. 31.

Bangladesh Economic Review (2010). Finance division, Government of the People's Republic of Bangladesh, P. 83-93.

Bhuiyan AKFH (2007). Production of genetically potential breeding bulls for cattle development in Bangladesh. Keynote paper presented at the National Workshop- 2007 on Breed Upgradation through Progeny Test Project, Government of Bangladesh, BIAM Conference Hall, Dhaka, 16 June, P. 1-10.

DLS (2005). Development and Activities, Department of Livestock Services, Govt. of the People's Republic of Bangladesh.

Jabbar MA, Husain SS, Islam SMF, Amin MM, Khandaker MAMY, Bhuiyan AKFH, Ali SZ, Faruque O (2010). Stakeholder perspectives on breeding strategy and choice of breeds for livestock development in Bangladesh. Bangladesh Journal of Animal Science, 39: 20-43.

Rahman MM, Hoque MA, Saha NG, Faruque MO (2013). Studies on management system and identification of the causes of genetic erosion of indigenous cattle in Mymensingh district. Bangladesh Journal of Animal Science, 42: 23-28.