Asian Australas. J. Biosci. Biotechnol. 2017, 2 (1), 60-67

Asian-Australasian Journal of Bioscience and Biotechnology
ISSN 2414-1283 (Print) 2414-6293 (Online)
www.ebupress.com/journal/aajbb

Article

High yielding dairy cattle husbandry and their production performance at Baghabari Milk Vita areas of Bangladesh

Md. Shahjahan*

Lal Teer Livestock Limited, Anchor Tower, 108, Bir Uttam C.R. Dutta Road, Dhaka 1205, Bangladesh

*Corresponding author: Dr. Md. Shahjahan, Senior Scientific Officer (Breeding), Lal Teer Livestock Limited, Anchor Tower, 108, Bir Uttam C.R. Dutta Road, Dhaka 1205, Bangladesh. E-mail: sajubau@gmail.com or muhammad.shahjahan@multimodebd.com

Received: 06 April 2017/Accepted: 23 April 2017/ Published: 30 April 2017

Abstract: The aim of this study was to identify the recent husbandry practices of high yielding dairy cows including their production performances surrounding the Baghabari Milk Vita areas of Bangladesh. The survey was conducted on 15 households of Pabna (Santhia) and Sirajgonj (Shahjadpur) districts. Data were also collected from six *bathans* at Sahajadpur of Sirajgonj district. Medium scale farming (67%) observed more compared to small (27%) and large (7%) in the studied areas with maximum 20 milch cows. Highest average milk production recorded 213 liters per day in few households and the milk price varied between 31 to 35 BDT per liter. Most of the farmers (80%) used the semen of Milk Vita because of its excellence (73%) for better productivity in their progenies. About 73% farmers directly depended on Milk Vita for selling their cows' milk while 27% on contract persons (*Ghos*). Two feeding systems were available in the surveyed areas based on the availability of greed grass/fodder: stall feeding (July to November) and *bathan* feeding (December to June). Total number of AI services (1.62) differed according to crossbreeds ($P< 0.05$) and rearing system ($P< 0.01$) with peak milk production 17.57 liters per day. Breeding of the high yielding cows was conducted through artificial insemination (80%) and mainly by the free semen of Milk Vita (80%). Hybrid fodder production, ensuring quality feed/ingredients and milk price, and recorded breeding based on predominant breed could strengthen the overall dairying at Baghabari Milk Vita regions of Bangladesh.

Keywords: household; artificial insemination; *bathan*; repeat breeding; milk production; semen

1. Introduction

Livestock rearing is an integrated part of agricultural development in Bangladesh and it is expected that about 75% rural people directly or indirectly associated with livestock farming. Shamsuddin *et al*. (2007) reported that livestock contributes 2.79% of GDP while dairy sector alone contributes 1.8% for the development of village micro economy. Dairying is growing faster in this country but it is facing the problems of inefficient managements and health care, breeds of unplanned higher exotic blood percentage, uncontrolled breeding, high farm input and low output prices leading to lower productivity (Uddin *et al*., 2010).

Out of total 23.10 million cattle populations 6 million are dairy cattle and its 10-15% are crossbreed (DLS, 2012; Hamid and Hossain, 2014). There are several milk pocket areas in Bangladesh where Baghabari Milk Vita areas are the origin of high yielding cattle because of the breed development program since the British ruling of this Indian subcontinent. Das *et al*. (2003) and Zaedi *et al*. (2009) mentioned two types of feeding systems surrounding the Baghabari Milk Vita areas namely stall feeding (July to November) and *bathan* feeding (December to June) because of the availability of legume pasture in winter season.

High yielding dairy cows of Milk Vita regions are developed from the imported purebred bulls and semen of various temperate breeds like Australian-Friesian-Sahiwal, Holstein and Jersey with local Pabna milking cows (PMC). The average milk production of high yielding Holstein-Friesian, Jersey, Sahiwal and Red Sindhi

crossbreeds found average 5 to 10 liters per day (Khan, 2009). The annual milk production in Bangladesh is 6.97 million while the supply needed 14.48 million tons (DLS, 2015). However, mastitis and repeat breeding are two major constraints for the dairying in those areas.

The present study was planned to clear the concept of high yielding cattle husbandry with reproductive performance and peak milk production capability in a famous milk pocket area which was not paid more attention from previous studies in Bangladesh.

2. Materials and Methods

A benchmark survey was conducted on 15 randomly selected households by a preselected survey questionnaire during 8-9 July, 2016 having dairy farms in Sirajgonj (Shahjadpur) and Pabna (Santhia) districts of Bangladesh (Figure 1). Another study was performed to clarify the individual cow performance with available husbandry practices from six randomly selected *bathans* from Shahjadpur of Sirajgonj district on 27-28 December, 2016. All surveyed data were firstly extracted into MS excel version 2010 (Microsoft, Redmond, WA, USA). The gathered data were then analyzed by statistical models χ^2- tests and GLM (multivariate) including descriptive statistics using SPSS version 16 (SPSS Inc., Chicago, IL, USA) with LSD *post hoc* mean separation test.

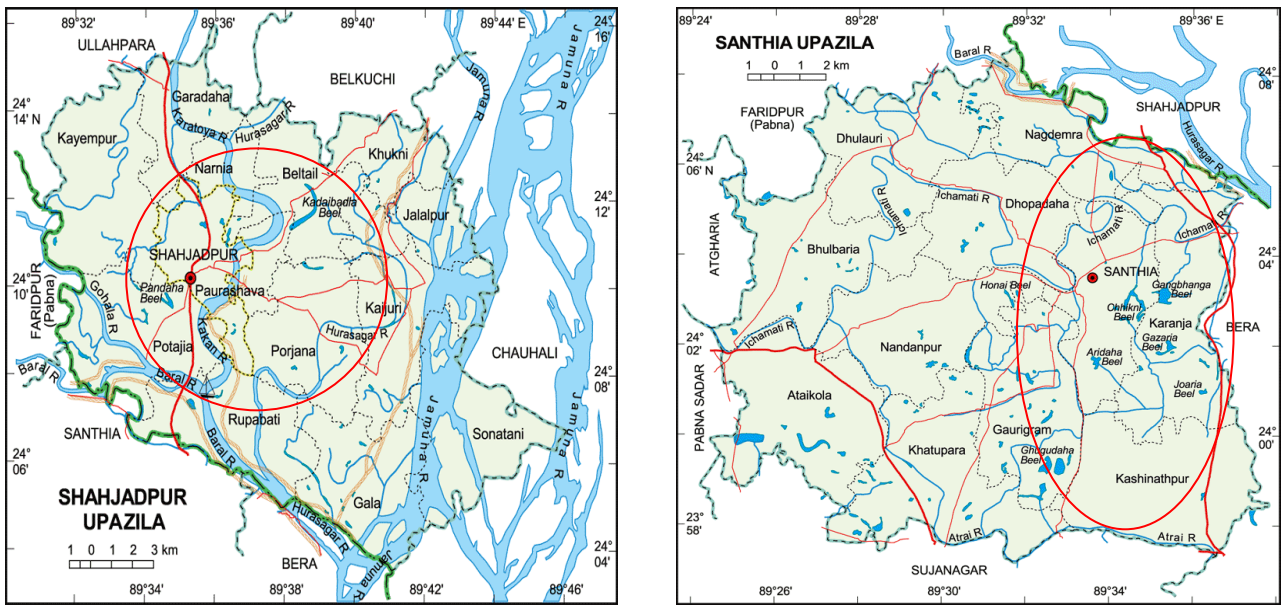

Figure 1. Location of the surveyed areas (red circled) in Sirajgonj and Pabna districts.

3. Results and Discussion

3.1. Husbandry of high yielding cows at household and *bathan* areas

Survey in the households of two districts nearby the Baghabari Milk Vita plant revealed overall farming status (Table 1 and Figure 2), in which about 67% were medium scale farming with up to 20 milking cows. Small scale (27%) farming mainly found in Pabna district while large scale dairy farming (7%) in Sirajgonj district. Housing (P = 0.003) and animal welfare (P = 0.003) were observed comparatively better (40% for both) in Sirajgonj rather than Pabna district.

About 80% farmers belong to small scale farming with 2-3 milking cows in Bangladesh (Saadullah, 2002; Kobir, 1997). But this study reported 67% medium scale farming in the surveyed area. It might be the reason of rapid growth of population, poverty and meeting the nutritional requirement for country people as an alternate income source or business. In addition, dairy farms closely to Milk Vita plant are more developed and organized than the farms of long distances because of milk selling opportunity in that place.

The overall statistics regarding milk production in the surveyed areas are shown in Table 2. The average highest cattle population was 32 in the studied household areas including average 19 milch cows. Highest milk production reached up to 213 liters from few households where the farmers deprived for real price of milk either by Milk Vita (31 Taka per liter) or *Ghos* or other existing milk collection sources (35 Taka per liter). The average AI fee noted 250 Taka in those areas but most for the farmers received free AI service for their cows including free treatment, medicine and medication from the inseminators and veterinary doctors of Milk Vita.

This might be another important factor for those farmers to receive the semen from Milk Vita and this free AI service created a monopoly milk business there.

Zaedi *et al*. (2009) classified different dairy farmers in Milk Vita region and found average 3.9 (small scale), 8.4 (medium scale) and 19.9 (large scale) crossbreeds cows in each farm and these findings agreed with the present study. Mandal (2013) observed that Milk Vita occupied 46% shares of milk business followed by Aurong (25%) and Pran Milk (15%) in Bangladesh.

The dairy management system in two districts (Table 3) at household levels revealed that *ad libitum* fodder and straw supplying was practiced based on the availability of fodder in 60 and 40% households, respectively. In summer, the dairy farmers of Pabna district allowed cultivating fodders to their cattle but reverse situation (mainly straw) found in Sirajgonj because green fodder is usually available during *bathan* feeding at winter season. Farmers of both districts were conscious about concentrate feeding for more milk production. Artificial insemination was practiced in 80% dairy farms although few farms confirmed about natural mating to minimize repeat breeding problem of their cows. Most of the farmers (80%) used the semen of Milk Vita because of its excellence (73%) for higher milk production and growth performance in progenies. About 73% farmers directly depended on Milk Vita for selling their cows' milk while 27% on contract persons (*Ghos*).

Rashid *et al*. (2007) found average 5.12 cows per household in their study where 76% breeding were performed by artificial insemination in Jessore district of Bangladesh. They also reported 42% farmers sold their cows' milk to plant and 15% to open market. About 79% artificial insemination identified in the crossbreed cattle of Shahjadpur Upazila of Sirajgonj while 66% in Bera Upazila of Pabna district (Islam *et al.*, 2010).

The study on few *bathan* areas revealed that those areas encompassed with single or multi ownerships with different ranged cattle population (Figure 3). Green fodder was abundant for cattle in those areas, in addition, most of the farmers provided hand mixed concentrate feeds (maximum 6 kg by two times) for milch cows to ensure the milk production (Table 4). The farmers mainly performed artificial insemination from the semen of Milk Vita for breeding purpose except natural mating by breeding bulls in few repeat breeding cases. The collected milk from these areas usually sold to Milk Vita as main source**.**

Zaedi *et al*. (2009) stated that *bathan* is one kind of strip of sandy land rising out of a river bed and also a large area of pasture land for Napier (*Nnapier spp.*), Jambo, Local Durba and Carpert green grasses, and Khesari (*Lathyrus sativa*) and Mati kalia (*Vigna sinensis*) legume production. They also added that cattle were housed in temporary shed and allowed to graze daily about 6-8 hours, and two times concentrate feeding per day (11 am and 3 pm). Although legume fodder were available in the Baral of river for the *bathan* animals the farmers also provided a concentrate mixture of rice polish, mustard oil cake and common salt once a day while the fodder were replaced by straw during stall feeding (Das *et al*., 2003). A study on different Thana of Jessore district by Rashid *et al*. (2007) observed that concentrate feed of dairy cattle was prepared by rice bran, wheat bran, pulses bran, mustard oil cake, till oil cake, crushed rice, molasses and salt with 35.39, 23.70, 14.53, 12.95, 8.28, 2.53, 2.05 and 0.63%, respectively.

Table 1. The dairy farming status in the studied Milk Vita areas.

Variable	Category	n	District		Total (%)	Probability
			Pabna (%)	Sirajgonj (%)		
Farming type	Small scale (up to 5 milking cows)	4	26.70	0	26.70	0.101
	Medium scale (6-20 milking cows)	10	33.30	33.30	66.60	
	Large scale (above 20 milking cows)	1	0	6.70	6.70	
Housing system	Excellent	7	6.70	40	46.70	0.003
	Good	6	40	0	40.00	
	Poor	2	13.30	0	13.30	
Animal welfare	Excellent	7	6.70	40	46.70	0.003
	Good	7	46.70	0	46.70	
	Poor	1	6.70	0	6.70	

Table 2. Statistics of milk production attributes in Milk Vita areas.

Variable	Category	n	Mean±SE
Cattle population	Up to 10	5	7.20±1.53
	11-20	5	15.80±1.66
	Above 20	5	32.00±4.73
Milking cows	Up to 5	7	4.29±1.04
	6-10	5	8.80±0.80
	Above 10	3	19.00±5.69
AI service fee	Paid	6	250.00±42.82
	Free	9	0.00±0.00
Milk production per day (l)	Up to 50	7	30.43±6.64
	51-100	5	82.00±9.17
	Above 100	3	213.33±48.07
Milk price (BDT)	Milk Vita	10	30.60±3.81
	Others	5	35.20±1.64

Table 3. Overall dairy management system in Milk Vita areas.

Variable	Category	Frequency (%)	
		Yes	No
Fodder	*Ad libitum*	60	40
Straw	*Ad libitum*	40	60
Concentrated feeding (ready/loose)	Either type	100	0
Breeding	Solely natural	0	100
	Solely artificial	80	20
	Both	20	80
Semen for AI	Milk Vita	80	20
Milk selling opportunity	Milk Vita	73.33	26.67
	Neighbor	0	100
	Others (contract person or *Ghos*)	26.67	73.33

Table 4. Average concentrate feed mixture ratios from the studied six *bathan* areas.

Sl No.	Name of feeds/ingredients	Amount (%)
1	Ready cattle feed/Till oil cake	32
2	Wheat bran	50
3	Lentil/Khesari/Matikali bran	17
4	Salt	1
Total		**100**

Table 5. Production performance of high yielding cattle based on genotype and rearing system.

Variable	Category	n	Trait (Mean±SE)	
			Number of AI service for last calving	Peak milk production at three months of lactation (liter/day)
Genotype	L×HF	35	1.60±0.19^{ab}	18.80±0.96
	L×HF×SL	22	1.41±0.17^{b}	16.41±0.99
	L×HF×JE	11	2.18±0.52^{a}	16.27±0.79
	L×JE	13	1.54±0.22^{ab}	17.31±1.12
	Probability		**0.034**	**0.176**
Rearing system	Household	45	1.38±0.15	18.22±0.86
	Bathan	36	1.92±0.20	16.75±0.56
	Probability		**0.005**	**0.088**
Overall mean			***1.62±0.12***	***17.57±0.54***

SE= Standard Error; L= Local (mainly Pabna cattle), HF= Holstein Friesian, SL= Sahiwal and JE= Jersey cattle breed

Figure 2. Small (a), medium (b) and large scale (c) dairy farming systems in studied areas.

Figure 3. Small (a), medium (b) and large scale (c) dairy *bathans* in studied areas.

Figure 4. Available high yielding dairy crossbreeds in the studied Milk Vita areas.

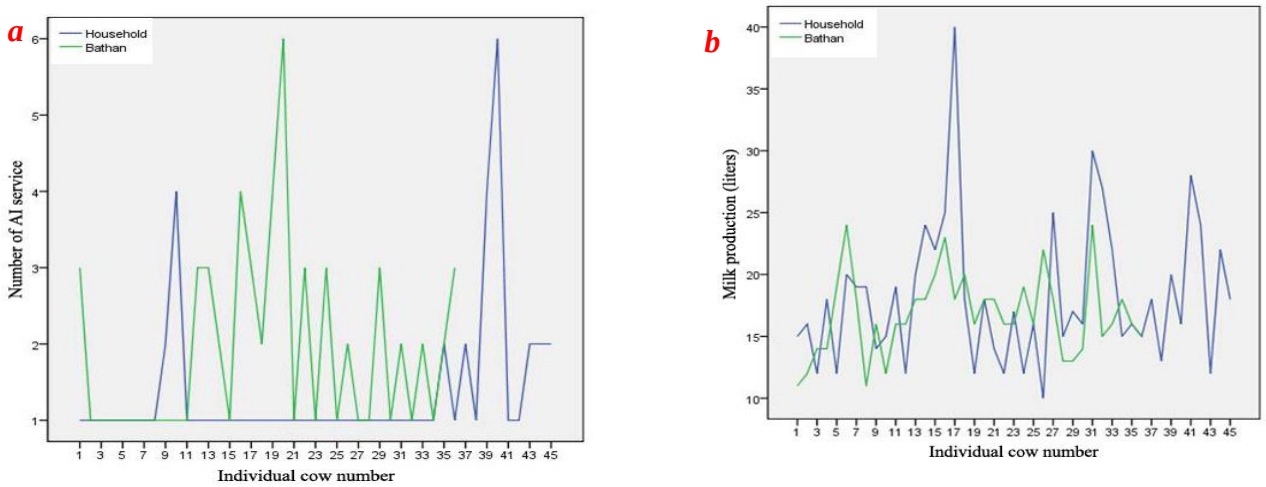

Figure 5. Individual AI services for last pregnancy (a) and highest milk production in last lactation (b) of high yielding cows at household and *bathan* at Milk Vita areas.

3.2. Production performance of high yielding cows at household and *bathan* areas

The effect of crossbreeds showed differences on reproductive performance (P = 0.034) of high yielding cows but no variation observed on peak milk production (Table 5). Similarly variation only observed for the effect of rearing system on reproductive trait (P = 0.005) regarding total number of AI in last pregnancy. The overall mean showed that cows were conceived by 1.62 artificial inseminations with peak milk production 17.57 liters per day. Individual performance diversity of studied high yielding cows (Figure 4) is clearly presented for AI service (Figure 5*a*) and highest milk production (Figure 5*b*) based on breed and rearing system.

Kabir and Kisku (2013) identified 1.64 AI services per conception which was agreed with this study. The results of Miazi *et al*. (2007) were not agreed with present study mentioning 1.25 services for Local×Jersey. These results showed higher sustainability of Jersey crossbreeds than Friesian in local environment. Khan *et al*. (2014) found average 8 and 5 liters milk from Holstein Friesian and Sahiwal crossbreeds in Sarsha Upazila of Jessore with lactation period 262 and 250 days, respectively. Majid *et al*. (1996) identified similar production from

Local×Friesian (6.67 liters/day) and Local×Sahiwal×Friesian (6.15 liters/day) genotypes in F_3 generation at Savar Dairy Farm which were not agreed with this study. However, Nath *et al.* (2016) observed comparatively higher milk production from Holstein Friesian (13 liters/day), Jersey (8 liters/day) and Sahiwal (6 liters/day) crosses at households of Mithapukur Upazila of Rangpur district. The variation of study in different periods indicated genetic progress on milk production.

Das *et al*. (2003) recorded service per conception (1.36) and average milk production (8.28 liters) in Local (Pabna)×Friesian genotype at Bagharaighat region of Sirajgonj. Similarly Baset *et al.* (2012) identified 1.36 service per conception in Local (Pabna)×Friesian genotype in Bagharari *bathan* area which was slightly lower than this study. Mamun *et al*. (2015) observed 1.21 AI per conception in Holstein Friesian crossbreed at Uzankashir Char of Mymensingh district. In the rural area of Rajshahi district peak milk production observed 11.63 liters from Local×Holstein-Friesian and 9.1 liters milk per day from Local×Sahiwal×Holstein-Friesian genotypes (Sarder *et al.*, 2007) which were not agreed with this study. These results indicated more genetic improvement than previous for milk production but lower reproductive efficiency beside such development.

4. Conclusions

It is concluded that high yielding dairy cattle husbandry was satisfactory in the studied Milk Vita areas comparing to other milk pocket areas of Bangladesh. But few constraints identified regarding scarcity of fodder, higher price of ready feed and lower quality of feed ingredients, monopoly milk business with depriving price for farmers, and genetic admixture of cattle for uncontrolled breeding. Hybrid fodder cultivation, ensuring quality feed and recorded breeding program with special care during *bathan* feeding according to predominant breed characteristics could strengthen the overall dairy farming status both in husbandry and productivity. Government and non government organizations could contribute to those works for the advancement of dairying in Bangladesh.

Acknowledgements

The author is grateful to the management of Lal Teer Livestock Limited for facilitating this partial study beside few schedule works in those areas.

Conflict of interest

None to declare.

References

Baset MA, 2012. Milk urea nitrogen concentration as a tool to monitor dietary protein status to dairy cow. PhD thesis, Department of Dairy Science, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Das PK, SZ Ali, ABMM Islam and BK Roy, 2003. A comparative study of productive and reproductive performance and estimates of heritability for economic traits in different genetic groups of cattle available at Baghabarighat Milk Pocket Area of Bangladesh. Online J. Biol. Sci., 3: 726-740.

DLS, 2012. Annual Report on Livestock, Division of Livestock Statistics, Ministry of Fisheries and Livestock, Farmgate, Dhaka, Bangladesh.

DLS, 2015. Annual Report on Livestock, Division of Livestock Statistics, Ministry of Fisheries and Livestock, Farmgate, Dhaka, Bangladesh.

Hamid MA and KM Hossain, 2014. Role of private sector in the development of dairy industry in Bangladesh. Livest. Res. Rural Dev., 26: http://www.lrrd.cipav.org.co/lrrd26/10/hami26179.htm.

Islam KMA, MM Uddin, MN Sultana, M Assaduzzaman and MN Islam, 2010. Distribution pattern and management practices of cross bred dairy cows in cooperative dairy production system in Bangladesh. Livest. Res. Rural. Dev., 22: 2010.

Kabir F and JJ Kisku, 2013. Reproductive performance of different crossbred cows of Bangladesh. Afr. J. Agric. Res., 8: 723-726.

Khan MAS, MSR Siddiki and ME Uddin, 2014. Performance of Different Genetic Group of Cows Under Bangladesh Condition. Proceedings of 10th World Congress on Genetics Applied to Livestock Production, August 17 - 22, Vancouver, BC Canada.

Khan MKI, 2009. Development of models for the genetic improvement of dairy cattle under cooperative dairying conditions in Bangladesh. PhD thesis, Institute of Vet, Animal and Biomedical Sciences, Massey University, Palmerston North, New Zealand.

Kobir A, 1997. Socio-economic impact of small holder dairy farming -a case study of Rangpur district in Bangladesh. MS Thesis, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Majid MA, AI Talukder and M Zahiruddin, 1996. Productive performance of pure breeds, F1, F2 and F3 generations cows raised in central cattle breeding and dairy farm of Bangladesh. Asian-Aust. J. Anim. Sci., 9: 461-464.

Mamun MJA, MAS Khan, MAH Sarker and MN Islam, 2015. Productive and reproductive performance of Holstein Friesian crossbred and indigenous cow under small holder farming system. Bang. J. Anim. Sci., 44: 166-170.

Mandal ANK, 2013. Situation of processed dairy products in Bangladesh. A presentation of the workshop held in Bangkok by Food and Agriculture Organization, Rome, Italy.

Miazi OF, ME Hossain and MM Hassan, 2007. Productive and reproductive performance of crossbred and indigenous dairy cows under rural conditions in Comilla, Bangladesh. Univ. J. Zool. Raj.Univ., 26: 67-70.

Nath SK, DK Bhowmik, M Rokonuzzaman, K Afrin, AK Dash and MR Alam, 2016. Production Performance of Different Cross Breeds of Milch Cow in Mithapukur Upazila, Rangpur, Bangladesh. Int. J. Adv. Multidiscip. Res., 3: 29-33.

Rashid MM, BC Roy, M Asaduzzaman and MM Alam, 2007. Study of the dairy cattle management systems at farmer's level in Jessore district of Bangladesh. Pak. J. Nutr., 6: 155-158.

Saadullah M, 2002. Smallholder dairy production and marketing in Bangladesh', Edited by D. Rangnekar and W. Thorpe, Proceedings of a South-South workshop held at National Dairy Development Board (NDDB) Anand, India, 13-16 March 2001, pp. 7-21.

Sarder MJ, MM Rahman, S Ahmed, MR Sultana, MM Alam and MM Rashid, 2007. Consequence of dam genotypes on productive and reproductive performance of dairy cows under the rural condition in Bangladesh. Pak. J. Biol. Sci., 10: 3341-3349.

Shamsuddin M, MM Alam, MS Hossein, WJ Goodger, FY Bari, TU Ahmed, MM Hossain and AHMSI Khan, 2007. Participatory rural appraisal to identify needs and prospects of market-oriented dairy industries in Bangladesh. Trop. Anim. Health Prod., 39:567-581.

Uddin MM, MN Sultana, OA Ndambi, T Hemme and KJ Peters, 2010. A farm economic analysis in different dairy production systems in Bangladesh. Livest. Res. Rural. Dev., 22: 122.

Zaedi M, k Demura, Y Yamamoto, K Masuda, D Sawauchi and T Nakatani, 2009. Bangladeshi dairy farmers' conditions under Milk Vita. Rev. Agri. Econ., Hokkaido University, 64: 181-190.