Status of buffalo farmers and buffaloes at Subornochar upozila of Noakhali district in Bangladesh

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Abstract

The aim of the study was designed to investigate the socio-economic status of buffalo farmers, productive and reproductive performances and management practices of buffaloes at different villages of Subornochar upozila of Noakhali district in Bangladesh. For this investigation total one hundred buffalo farmers were selected from ten villages. Ten farmers who have at least five buffaloes were randomly selected from each village. The investigation revealed that majority of the buffalo farmers age was ranged from 41 to 50 years followed by 51 to 55 years and less than 40 years. Hundred percent farmers were educated but no farmers were found who completed graduation. More than half of the farmers have primary educated followed by SSC or above and rest of them could sign only. In the study area, sixty eight percent of the buffalo farmers were engaged with agriculture along with buffalo rearing and rests of them were engaged with other business. More than half of the respondents were holding land above ten acres, followed by seven to ten acres and rest of them below three acres. Sixty five percent of the farmers took bank loan and rest of them used own capital and/or NGO's loan for rearing buffaloes. There were no farmers found who got training on buffalo rearing. More than two third of the respondents practiced buffalo rearing as their family profession and rest of them were influenced by the neighboring farmers. The buffalo breed of this area was mostly indigenous types. The highest numbers of buffaloes found were heifer followed by milking buffalo and buffalo bull calves. About half of the farmers kept their buffaloes at least two years followed by three and one years and rest of them was more than three years.The average milk production of indigenous buffalo was 2.7 liter/day. Birth weight, weaning weight, weaning and slaughter age of indigenous buffalo in the selected areas were 27.5 kg, 56.5 kg and 14 and 55 months, respectively. The average age at first heat that was puberty of buffaloes was 3.4 years. The gestation period, number of service per conception, post partum hear period and inter calving period was 10 months, 3.1times, 4.5 and 15.8 months, respectively. Most of the farmers maintain their buffaloes mainly in extensive system and bathan (80%). Majority of the farmers (70%) expressed availability of the feeds and fodder as the major problem for buffalo rearing. Out of locally available feeds and fodders rice straw, pasture grasses and Uri grass were the main source of feeds for buffaloes in selected areas. Uri grasses was very soft, very high in CP content and were commonly available in the bank of river or see shore. Buffalo farmers were not practicing to supply concentrate feeds to their buffaloes. Four major diseases of buffaloes were found where the incidence of foot and mouth diseases was high (63%). Farmers of the selected area were totally unaware about vaccination and de-worming and they did not follow any vaccination and de-warming programme. They sale their buffaloes to the farmers or butcher and average cost of a pair of buffalo was Tk. 80,000.00 to Tk. 180,000.00. The annual cost of production per buffalo was Tk. 6350.00 while a gross return per buffalo was Tk. 13932.00. The annual food purchasing capacity of the buffalo farmers was increased 58%. The educational, social status, health care and housing cost of the buffalo farmers were also increased through buffalo rearing. Considering all this parameters related to livelihood, it was clearly found that the socio-economic status of the buffalo farmers was improved through buffalo rearing.

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Introduction

Bangladesh is one of the highest densities of livestock populated country in the world, of them 145 large ruminants per km^2 compared with 94 for India, 30 for Ethiopia and 20 for Brazil (NARS, 2010). Buffalo population in this country is 1.62 million and is contributing through the production of 3500 and 22400 ton meat and milk respectively per year (DLS, 2013). Buffaloes hold strategic place in overall livestock economy of Bangladesh and serve three important purposes such as milk, meat and drought power supply (Ghaffar *et al.,* 1991). The primary reasons for the selection of subornochar area is based on country's topography, ecology and buffalo production system, concentration of buffaloes, communication facilities etc. with the expectation to obtain reliable information. Buffaloes have a number of advantages are better converters of poor-quality fibrous feeds to produce more protein and to gain more body weight, more disease resistance, power and outstanding draught capacity and longer life span, milk and meat, with better degradation of both crude protein and protein free dry matter than cattle (Terramoccia *et al.,* 2000). Other works have also indicated that buffaloes have a better digestive ability than cattle to utilize poor quality roughage (Hussain and Cheeke, 1996; Bartocci *et al.,* 1997; Agarwal *et al.,* 2008). The contribution of agriculture and livestock sub-sector to gross domestic product was 18.89 and 19.29 and 2.57 and 2.49 percent in FY 2010-2011 and 2011-2012 respectively (BER, 2012, accessed, 2015) and 13% of the total foreign exchange earnings from this sector (BBS, 2012). Buffalo has some significant importance on livelihoods improvement. Buffalo rearing increase livelihood status of the farmers especially for the farm women and development of this sector is the potential path to rural prosperity (Kalash *et al*., 2009; Sarker *et al.,* 2013). In Bangladesh, the role of buffaloes is not emphasized and the species did not receive the attention of the policy makers and the researchers in accordance with its merits. Very little work has been done so far on the socio-economic status of the buffalo farmers and the management practices of buffalos in Bangladesh. Therefore, considering the above discussion, the present investigation was undertaken to know the socio-economic status; productive and reproductive performances of buffalos and livelihood changes of the buffalo farmers in some selected areas at Subornochar upozila of Noakhali district in Bangladesh.

Materials and Methods

Selection of study areas and respondents

A survey was conducted at Subornochar upozila of Noakhali district in Bangladesh during the months of July to September, 2011. Total one hundred buffalo farmers were selected from ten villages. Ten farmers were randomly selected from each village that has at least five buffaloes.

Collection of data and measurement of variables

The primary information was collected on pretested questionnaires through personal interview on socio-economic characteristics of buffalo farmers (age, education, occupation, land holding, source of capital), buffalo holding size (types of buffaloes, duration of rearing). Production (birth weight, weaning weight, weaning age, slaughter age, milk production) and reproduction status (age at first heat, first pregnancy, first calving, gestation period, number of service per conception, post partum heat period, inter calving period). Health care practices (incidence of diseases and health care), and feeding system (feeds and fodder availability, sources of feed, feeding methods). Cost benefit of buffalo rearing, impact and livelihood improvement of farmers toward buffalo husbandry was also investigated.

Collection, preparation and chemical analysis of available feeds and fodders

Proximate composition of some locally available feeds and fodders fed to buffaloes were collected to investigate their nutritional contents such as organic matter (OM), crude protein (CP), crude fiber (CF), ether extract (EE), nitrogen free extract (NFE), ash. Neutral detergent fibre (NDF) and Acid detergent fibre (ADF) were estimated by fibretec systems (VELP Scientifica, EU) following the procedure of

Georing and Van Soest (1970). Samples of feeds & fodder were collected from the selected area, mixed thoroughly, sun dried and ground at the size of 0.5 mm for chemical analysis according to the methods of AOAC (2004).

Statistical analysis

All the collected data were checked and cross checked before transferring to master sheets. The data was analyzed with the help of SPSS-v-16 computer package program.

Results and Discussion

Socio-economic condition of buffalo farmers

The socio economic condition of buffalo farmers are presented in Table 1. The majority of the buffalo farmer's age was ranged from 41 to 50 years followed by 51 to 55 years and less than 40 years. Hundred percent farmers were educated but no farmers were found who completed graduation. More than half of the farmers have primary educated followed by SSC or above and rest of them could sign only. The education level of buffalo farmers was reported to be 91.82% and 56.1% in Bihar (Singh *et al.*, 2011) and Jharkhand (Singh *et al.*, 2012), respectively. In the study area, sixty eight percent of the buffalo farmers were engaged with agriculture along with buffalo rearing and rests of them were engaged with other business. Sarker *et al.,* (2013) reported that 30% of the buffalo farmers of Bagerhat Districts in Bangladesh were fully depended on buffalo rearing. More than half of the respondents are holding land above ten acres, followed by seven to ten acres and rest of them below three acres. More than half of the respondents belonged to medium income categories followed by high and low income categories. In India, majority (96.92%) of the respondents belonged to low family income categories (Sathyanarayan *et. al.,* 2010). Sixty five percent of the farmers took bank loan and rest of them used own capital and/or NGO's loan for rearing buffaloes. There were no farmers found who got training on buffalo rearing. More than two third of the respondents practiced buffalo rearing as their family profession and rest of them were influenced by the neighboring farmers.

Table 1. Socio economic condition of buffalo farmers in Subornochar

Parameters	Category	Percentage of respondents
Age	Below 40	13
	41-50	65
	51-55	17
	Above 56	5
	Total	100
Education	Can sign only	5
	Primary	38
	Below SSC	25
	SSC or above	31
	Total	100
Occupation	Principle (agriculture)	68
	Other	32
	Total	100
Land holding (land in acres)	1-2	5
	3-6	10
	7-10	30
	Above 10	55
	Total	100
Annual Income (Tk. in lac)	Low (below 1)	17
	Medium (1 to 4)	56
	High (above 4)	30
	Total	100
Source of capital	From bank loan	65
	Own capital	35
	Total	100
Training skill	With training	00
	Without training	77
	Influence by neighbor	23
	Total	100

Buffalo holding size and duration of rearing

Buffalo holding size like types of buffalo and duration of rearing buffaloes are presented in Table 2. The buffalo breeds of this area were mostly indigenous types. The highest numbers of buffaloes found were heifer followed by milking buffalo and buffalo bull calves. About half of the farmers kept their buffaloes at least two years followed by three and one years and rest of them was more than three years.

Performances status of buffaloes

Productive performances

The average milk productions of indigenous buffaloes were 2.7 liter/day. Gupta *et al., (*2014) reported that daily milk production of non-descript

Table 2. Distribution of buffaloes in selected area of Subornochar

Parameters	Category	Percentage of respondents
Types of buffaloes	Indigenous Milking Buffalo	23
	Indigenous Heifer Buffalo	54
	Indigenous Buffalo Bull	21
	Crossbred Milking Buffalo	0.86
	Crossbred Heifer Buffalo	0.86
	Crossbred Bull buffalo	0.28
	Total	100
Duration of rearing	1 year	13
	2 years	45
	3 years	32
	Above 3 years	10
	Total	100

cows in the eastern region of India varied from 1.56 to 4.12 L/d and almost similar type of observations was recorded for milk production in non-descript cows, crossbred cows and buffaloes in eastern region by Singh *et al.*, (2005), Roy and Saha, (2003). In this study, the buffaloes were indigenous type but milk production was good compared to cattle. Birth weight, weaning weight, weaning and slaughter age of indigenous buffalo in selected areas were 27.5 kg, 56.5 kg and 14, 55 months respectively. The weaning and slaughter age of buffaloes was almost close in indigenous and crossbred buffaloes but higher than cattle.

Reproductive performances

The reproductive parameters that are age at first heat, age at first pregnancy, age at first calving, gestation period, number of service per conception and inter calving period of buffaloes in the selected area are shown in Table 3. In this study, almost hundred percent respondents said the average age at first heat and first pregnancy that was puberty of buffaloes was almost similar (3.4 years). The gestation period of buffaloes in selected area was 10 months. The average number of service per conception was 3.1 times. The average post-partum heat period was 4.9 months and inter calving period was 15.8 months found in this investigation.

Major diseases

Four major diseases of buffaloes were found where the incidence of foot and mouth diseases (FMD) was 63% followed by anthrax (15%), black quarter (BQ) (12%) and hemorrhagic septicemia (HS) (10%). Incidence of diseases is a major constraint of livestock production which not only reduces the productivity but also causes economic loss. Mitra *et al.*, (1995), Sarker *et al.*, (2013) and Gupta *et al.,* (2014) also reported that a serious threat of infectious diseases like FMD, HS and BQ in animals were the main problem. Hence, proper support is required for vaccination against some epidemic viral and bacterial diseases for their prevention and control. No buffalo farmers were claimed for early or endemic mastitis but common diseases like scours, pneumonia, navel–ill, ecto and endo parasites (tick, lice, mice, round worm, tape worm, lung worm), blot, diarrhoea and anemia were noticed. However, very dangerous scenario was found that all the farmers of the selected area were totally unaware about vaccination and de-worming and they did not follow any vaccination and de-warming programme.

Table 3. Reproductive performances of buffaloes in Subornochar

Parameters	Time/Period
Age at 1st heat (year)	3.4
Age at 1st pregnancy (year)	3.8
Age at 1st calving (year)	4.51
Gestation period (month)	10.0
Number of Service per conception (times)	3.1
Post partum heat period (month)	4.9
Inter calving period (month)	15.8

Feeding and management of buffaloes

Availability of feeds and feeding systems

Availability, source of feeds and fodder and feeding methods are presented in Table 4. Majority of the farmers have expressed availability of the feeds and fodder was the major problem for buffalo rearing, agreed with the result of Sathyanarayan *et al.,* (2010). Most of the respondents were fully dependent on roadside and grasses (durba, hishra etc.) in the unused land, rest of the respondents were used cut and carry grasses, water hyacinth, tree leaves and urigash. Rice straw is the main feed source of buffaloes in selected areas. No farmers were found to supply concentrate to their buffaloes.

Like study areas of Bagerhat districts in Bangladesh majority of the farmers were fully dependent on grazing (Sarker *et al.,* 2013). Majority of the respondents kept their buffaloes mainly with extensive system and bathan and very little percentage of the farmer practiced semi-intensive system in the study areas.

Table 4. Availability of feeds and feeding system of buffaloes in Subornochar

Parameters	Category	Percentage of respondents
Availability of feeds	Available	30
	Not available	70
	Total	**100**
Source of feed	Roadside and unused landed grass	80
	Cut and carry grass	20
	Concentrates	0.0
	Total	**100**
Feeding method	Extensive and Bathan	80
	Semi-intensive	20
	Intensive	0.0
	Total	**100**

Chemical composition of feedstuffs

The chemical compositions of the available feedstuffs fed to buffaloes in Subornochar areas are presented in Table 5. Uri grasses are very soft and are commonly available in the bank of river or see shore. The CP of uri grass was found highest compared with all other available. The CP content of broken rice, broken wheat, rich polish, wheat bran, straw, uri grass, durba grasses, hishra and water hyacinth were found higher compared to other unconventional grasses. The findings of CP values were comparable and even higher than those of other unconventional fodder leaves and higher than the minimum range of NRC for mature beef cattle (70 g/kg) and high producing dairy cows (190 g/kg). The CF content of the feedstuffs in the selected areas was lower, indicated a good quality feeds for buffaloes. The presence of high amount of CF in feeds reported to decrease dry matter digestibility in animals and therefore provides a good indication of the nutritional value of the feed material. The highest ether extract content was recorded in rice polish and the lowest was found in uri grass.

Cost-benefit of buffalo rearing

Cost of buffaloes

The price of buffaloes varies according to the size, body condition, milk production and utility. The price of a pair of buffaloes for dual purpose ranged from Tk. 80000.00 to 180000.00 in this study area. Sarkar *et al.,* (2013) found the price of a pair of buffaloes for draught purpose ranged from Tk. 60000.00 to 200000.00 in Bagerhat district, which is almost similar with the present study.

Management cost

The cost of feeding, breeding, housing, equipment and healthcare of buffaloes are presented in Table 6. Per year cost of housing and equipment was almost similar with feed cost. Farmers generally bred their buffaloes naturally with buffalo bull. For this reason, the breeding cost was low. On the other hand, they did not purchase any feed for buffalo except the scarcity period, that time they purchase straw only. The major cost of healthcare was medicinal cost. The total rearing cost of one buffalo per year was Tk. 6850.00. Sarkar *et al.,* (2013) reported that the rearing cost of one buffalo was Tk. 5070.00 in Bagerhut district in Bangladesh. The rearing cost was found higher in Subornochar than that from Bagerhat.

Cost for family members

The major costs of family members are presented in Table 7. Highest cost was found for purchasing food among the total expenditure followed by education, maintaining social status, health care and clothing. The housing cost was found to be lowest among the expenditure.

Income from buffalo rearing

The total (draught + milk) and net income per year per buffalo are presented in Table 8. The annual average income per year per buffalo for draught and milk was Tk. 15000.00 and 12000.00 BDT, respectively. In India and Bangladesh, net annual income from rearing one cross breed cow (Kalash *et al.* 2009) and one buffalo (Sarkar *et al.,* 2013) was Rs. 30784.00 and Tk. 15630.00 BDT per year,

respectively. In this study, the net income from one buffalo per year was 13920.00 BDT indicated that

rearing buffaloes in the selected areas was profitable.

Table 5. Chemical composition of feedstuffs fed to buffaloes in Subornochar areas

Name of the feedstuff	Chemical composition (% DM basis)								
	DM	OM	CP	CF	ADF	NDF	EE	NFE	Ash
Broken rice	87.4	84.2	9.3	23.6	2.9	12.0	2.1	61.8	3.2
Broken wheat	88.5	82.9	12.5	29.6	3.7	14.2	2.9	49.4	5.6
Rice polish	93.4	78.0	10.8	12.8	13.3	33.0	10.6	50.4	15.4
Wheat bran	96.0	87.0	14.8	14.0	14.8	43.1	4.9	57.3	9.0
Straw	86.5	71.6	3.9	35.9	20.5	70.3	1.4	43.9	14.9
Uri grass	89.9	72.8	26.6	26.7	17.7	26.2	1.1	28.5	17.1
Dhubla/durba grass	90.3	78.7	17.3	34.2	17.7	30.4	1.6	35.2	11.6
Hishra grass	91.0	76.3	19.4	26.5	19.1	27.9	2.6	36.9	14.7
Water hyacinth	89.5	76.0	13.4	13.7	15.6	28.4	2.6	56.9	13.5

Table 6. Management cost of one buffalo per year in Subornochar

Category	Expenditure (BDT)
Average feed cost (year)	3050.0
Average breeding cost (year)	300.0
Average cost of housing and equipment (year)	2500.0
Total	5850.0
Medicine and vaccine cost	
Average cost of medicine (year)	500.0
Average cost of vaccine (year)	000.0
Total healthcare cost	500.0
Total rearing cost	6850.0

Table 7. Average yearly expenditure of family members in Subornochar

Category	Average expenditure (BDT)
Food	1878.00
Cloth	711.00
House	350.00
Education	1276.00
Health care	751.00
Maintaining social status	1252.00
Total	**6218.00**

Table 8. Total and net income (BDT) from buffalo per year in Subornochar

Category	Income (BDT)
Income/buffalo/year (Draught & Milk)	15000.00 + 12000.00 = 27000.00
Total expenditure = (Rearing cost + Expenditure)	6850.0 + 6218.00 = 13068.00
Net income = (Income - Expenditure)	27000.00 - 13068.00 = 13932.00

Livelihood improvement and impact of buffalo farmers

Before rearing buffaloes, the farmers spent only Tk. 1280.00, 980.00, 1120.00, 1150.00, 710.00 and 320.00 for purchasing food, cloth, social status, education, health care and housing, respectively but they were able to spent Tk. 3050.00, 1720.00, 2650.00, 2710.00, 1270.00 and 450.00, respectively after they started rearing buffaloes, which was 43.38, 43.02, 57.73, 57.56, 44.09 and 28.88% higher than the previous state, respectively. This result clearly indicated that livelihood status of buffalo farm families are improved through buffalo rearing in Subornochar areas especially for the farm women and the development of this sector was the potential path to rural prosperity (Kalash *et al*., 2009). Sarkar *et al*., (2013) reported that the educational and social status, health care, housing cost of the buffalo farmers was also improved through buffalo rearing in Bagerhat.

Conclusion

Considering all the studied parameters, buffalo rearing was a profitable practice in the selected areas and improve the socio-economic status, purchasing capacity of food and cloths, impact on social status, health care, education, housing of buffalo farmers.

Acknowledgement

References

Agarwal N, Kamra DN, Chatterjee PN, Ravindra K, Chaudhary LC (2008). In vitro methanogenesis, microbial profile and fermentation of green forages with buffalo rumen liquor as influenced by 2-bromoethanesulphonic acid, Asian Australian Journal of Animal Science 21: 818-823.

AOAC (2004). Association of Official Analytical Chemists, Official Methods of Analysis, 17th Edition, Arlington, VA.

Bartocci S, Amici A, Verna M, Terramoccia S, Martillotti F (1997). Solid and fluid passage rate in buffalo, cattle and sheep fed diets with different forage to concentrate ratios. Livestock Production Science, 52: 201-208.

BBS (2012). Bangladesh Bureau of Statistics, Statistics Division, Ministry of Planning, Dhaka, Bangladesh.

BER (2012). Bangladesh Economic Review, Economic Advisers Wing, Finance Division, Ministry of Finance, Government of the People's Republic of Bangladesh (mof.gov.bd/en/index.php?option=com_con tent&view=article&... , accessed, 2015).

DLS (2013). Department of Livestock Services, Annual report on livestock, Division of Livestock Statistics, Ministry of Fisheries and Livestock, Farmgate, Dhaka, Bangladesh.

Ghaffar A, Khan MI, Mirza MA, Prizada WH (1991). Effect of year and calving season on some traits of economic importance in Nili-Ravi buffaloes. Pakistan Journal of Agricultural Research, 12(3): 217.

Goering HK, Van Soest PJ (1970). Forage fiber analysis (Apparatus, reagent, procedures and some applications). Agriculture Handbook, No. 379, ARS-USDA, Washington, DC.

Gupta JJ, Singh KM, Bhatt BP, Dey A (2014). A Diagnostic Study on Livestock Production System in Eastern Region of India.ICAR Research Complex for Eastern Region P.O. Bihar Veterinary College, Patna-800014 (Bihar).

Hussain I, Cheeke PR (1996). Evaluation of annual ryegrass straw: corn juice silage with cattle and water buffalo: digestibility in cattle vs. buffalo, and growth performance and subsequent lactational performance of Holstein heifers. Animal and Feed Science Technology, 57:195-202.

Kalash P, Rathore R, Kumar M (2009). Livelihood Improvement of Farm Women through Cattle and Buffalo Rearing in Jhunjhunu District of Rajasthan. International Journal of Rural Studies, 16: 1-3.

Mitra M, Ghosh D, Ali K, Guha C, Pramanik AK (1995). Prevalence of sub-clinical mastitis in an organized buffalo farm at Haringhata. Indian Veterinary Journal, 72: 1310-1311.

NARS (2010). National Agricultural Research System; Vision -2030 and beyond. Bangladesh Agricultural Research Council, Farmgate, Dhaka, Bangladesh.

Roy PK, Saha RC (2003). Association of certain body measurements with some economic traits in Jersey x Tharparkar/Red Sindhi crossbred cows. Indian Journal of Dairy Science, 56: 338-340.

Sarker S, Hossain MM, Amin MR (2013). Socio-economic status of buffalo farmers and the management practices of buffaloes in selected areas of Bagerhat district of Bangladesh. Bangladesh Journal of Animal Science, 42: 158-164.

Sathynarayan K, Jagadeeswary V, Chandrashekhar V, Murthy, Wilfred RS, Sudha G (2010). Socio-economic status of livestock farmers of Narasapura village – A Benchmark Analysis. Veterinary World, 3: 215-218.

Singh KM, Singh RKP, Meena MS, Kumar A, Kumar AK, Anjani (2011). A village level study of poverty in Bihar: using panel data approach. MPRA Paper No. 45232. ICAR

Research Complex for Eastern Region, Patna.

Singh KM, Singh RKP, Meena MS, Kumar A, Kumar AK, Anjani (2012). Rural poverty in Jharkhand: an empirical exploration of socio-economic determinants. MPRA Paper No. 44811. ICAR Research Complex for Eastern Region, Patna.

Singh RB, Saha RC, Ghosh MK (2005). Nutritional needs of dairy cattle in eastern and north-eastern India for sustainable milk production. In Technological interventions for socio-economic enrichment of rural dairy farmers in eastern and north-eastern India, NDRI Kalyani, Nadia, West Bengal.

Terramoccia S, Bartocci S, Amici A, Martillotti F (2000). Protein and protein-free dry matter rumen degradability in buffalo, cattle and sheep fed diets with different forage to concentrate ratios. Livestock Production Science, 65: 185 -195.