Socio-economic status of buffalo farmers and the performances of buffaloes at Lalpur Upozila of Natore 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 Lalpur Upozila of Natore district in Bangladesh. For this investigation total one hundred twenty buffalo farmers were selected from twelve villages. Ten farmers who have at least five buffaloes were randomly selected from each village. The investigation revealed that majority of the buffalo farmers was below 30 years of age. Fifty five percent farmers were educated and remarkable number of farmer (40%) were reared only livestock. More than 80 % of the farmer holding 2 to 5 acres of land, and maximum farmers belonged to medium income categories. Sixty eight percent of the farmers took bank loan and/ or NGO loan for rearing buffaloes. Most of the farmers practiced buffalo rearing as their family profession. The buffalo of this area was mostly crossbred types. The highest numbers of buffaloes found were heifer. More than 80% of the farmer kept their female buffaloes above five years. In this study area the average milk production of buffalo was 3.32L/d. Birth weight of crossbred buffalo calves was 30.5 kg, weaning and slaughter age of buffaloes in selected areas were 16 and 57 months respectively. The average age at first heat was 3.47 years. The gestation period, number of service per conception, post partum hear period and inter calving period was 10 months, 3.42 times, 5.31 and 13.5 months, respectively. Most of the farmers maintain their buffaloes mainly in extensive system, and availability of the feeds and fodder was the major problem for buffalo rearing. Most of the farmers were fully depend on river bed (char) grasses and grazing their buffaloes 5-7 hours. Out of locally available feeds and fodders rice straw, river bed grasses and sugarcane top were the main source of feeds for buffaloes. The CP content of baghata grass was found higher compared to other unconventional grasses. Incidence of diseases, foot and mouth diseases was high and farmers did not follow any vaccination and de-warming programme. The annual cost of production per buffalo was Tk. 8741.50 while a gross return per buffalo was Tk. 25028.50. The annual educational capacity increased of the buffalo farmers was 63% but other parameters 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.

Key words: Socio-economic status, farmer, buffalo, productive and reproductive performances

Introduction

Buffaloes are becoming world's most interesting domestic animals and extensive efforts have been made throughout the world to improve and exploit the production and reproduction. The genotypes of buffaloes and to relate it with production traits reveal that three types such as River, Swamp and Swamp × River and 19 breeds are randomly distributed in 40 countries in the world including Bangladesh (Cockrill, 1982;

FAOSTAT, 2012). Buffalo is a triple purpose animal that provides milk, meat and mechanical power to mankind (Das and Khan 2010; Michelizzi et al., 2010; Abd El-Salam and El-Shibiny 2011; Pasha and Hayat, 2012, Aspilcueta-Borquis et al., 2012; da Luz et al., 2013; de la Cruz-Cruz 2014) and has been an integral part of livestock agriculture in Asia for over 5000 years (Nanda and Nakao, 2003). Buffalo is the second largest source of milk supply in the world and milk production was 13%

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of the total world milk production in 2012. India and Pakistan produce 67% and 24% of the total world buffalo milk, respectively while Bangladesh has produced less than 1% of the world buffalo milk (FAOSTAT, 2012). In addition to the dairy buffaloes they are also used as an important source of meat from spent and surplus animals. In meat production, buffalo share 1.3% in the world, 24.4% in India and 26.9% in Pakistan (Suhail et al., 2009). Buffalo population in Bangladesh figures at 1.62 million and is contributing through the production of 3500 and 22400 metric ton meat and milk respectively per year (FAO, 2010; DLS, 2013). Buffaloes are better converters of poor quality fibrous feeds into milk and meat, with better degradation of both crude protein and protein free dry matter than in 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 in Bangladesh was 18.89 and 19.29 and 2.57 and 2.49 percent in FY 2010-2011 and 2011-2012 respectively (BER, 2012) 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, Amin et al., 2015). The primary reasons for the selection of Lalpur area rest on country's topography, ecology and buffalo production system, concentration of buffaloes, communication facilities etc. (*https://en.wikipedia.org/wiki/Natore_District*).

In Bangladesh, the role of buffaloes is not much emphasized and the species did not receive due attention by the policy makers and the researchers. 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 study was undertaken to know the socio-economic status of buffalo farmers; productive and reproductive performances of buffalos and livelihood changes

of the buffalo farmers in selected areas at Lalpur Upozila of Natore district in Bangladesh which is known to be hottest location in the country.

Materials and Methods

Selection of study areas and respondents

The study was conducted at Lalpur Upozila of Natore district in Bangladesh during the months of July to September, 2011. A total of one hundred buffalo farmers were selected from ten villages. Ten farmers each having at least five heads of buffaloes were randomly selected of the research site.

Collection of data and measurement of variables

The primary information was collected on pre-tested questionnaires through personal interview on socio-economic characteristics of buffalo farmers (age, education, occupation, land holding, source of capital), buffalo stock 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 towards buffalo husbandry were also investigated.

Collection, preparation and chemical analysis of available feeds and fodders

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) and 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 were analyzed with the help of SPSS-v-20 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 average age of the buffalo farmers in the study area was 31.1 years. The majority of the buffalo farmers were below 30 years of age followed by 31-40 years and few numbers of the farmers was above 50 years. About half of the farmers were educated, but out of educated farmers higher percentage was found between primary to class eight. Large numbers of farmers were illiterate. No farmers were found who completed SSC to graduation. The education level of buffalo farmers was reported to be 100% in Subornochar Upozila of Bangladesh (Amin et al., 2015); 91.82% in Bihar (Singh et al., 2011) and 56.1% Jharkhand (Singh et al., 2012), In this study area, sixty percent of the farmers were engaged in agriculture with livestock rearing but remarkable number of farmer (40%) reared only livestock. No farmer was found engaged in livestock rearing with business. Amin et al., (2015) reported that 68% farmers of Subornochar Upozila in Noakhali district of Bangladesh were engaged agriculture along with buffalo rearing. Sarker et al., (2013) reported that 30% of the buffalo farmers of Bagerhat districts in Bangladesh were fully depended on buffalo rearing. More than 80 % of the farmer holding 2 to 5 acres of land, followed by below one acres and no farmer have found holding above five acres of land. Maximum farmers belonged to medium income (Tk. one to four lac) categories. Amin et al., (2015) reported that 68% farmers of Subornochar Upozila in Noakhali district of Bangladesh were of medium income categories. In India, majority (96.92%) of the farmers belonged to low family income categories (Sathyanarayan et. al., 2010). Sixty eight percent of the farmers took bank loan and/ or NGO loan, rest of them used own capital for purchasing or rearing buffaloes. None of the farmers got training on buffalo rearing. More than three fourth of the farmers practiced buffalo rearing as their family heritage and rest of them were influenced by the neighboring farmers.

Buffalo stock size and duration of rearing

Buffalo stock size like types of buffalo and duration of rearing buffaloes are presented in Table 2. The buffalo breeds of this area were near about hundred percent crossbred (Murrah × Ravi-Nili) types (98.49). Heifer buffaloes were found in highest proportion followed by milking buffalo and buffalo bull calves. More than 80% of the farmer owned female buffaloes above five years followed by four and two years old buffaloes and rest of them had three years old buffaloes. Farmers sell their male buffalo bull at post weaning or at yearling age.

Performances of buffaloes

Productive performances

Milk production of buffaloes in this study area averaged 3.32 L/d. Gupta et al., (2014) reported that daily milk production of non-descript cows in the eastern region of India varied from 1.56 to 4.12 L/d. Almost similar type of observations were recorded for milk production in non-descript cows, crossbred cows and buffaloes in eastern region (Jharkhand) by Singh et al., 2005). This finding differ with the findings of large number of authors (Roy and Saha, 2003; Faruque and Hossain 2007; Siddiquee et al., 2010; Karim et al., 2013; Amin et al., 2015). They reported that milk production of indigenous Bangladeshi buffalo were 2.1 to 2.7 L/d. Khan et al., (2014) also reported that Azikheli buffalo in Pakistan produce daily 7.19 ± 0.18 liters of milk per day. In this study, the buffaloes were crossbreed type and milk production was better than in cattle. Birth weights of indigenous and crossbred buffalo calves were 28 and 30.5 kg respectively, weaning and slaughter age of indigenous buffalo in selected areas were 16 and 57 months respectively. The weaning and slaughter age of buffaloes were almost close in indigenous and crossbred buffaloes but higher than in cattle.

Status of buffalo farmers and and the performances of buffaloes

Table 1. Socio economic condition of buffalo farmers at Lalpur Upozila of Natore district in Bangladesh

Parameters	Category	Percentage of respondents
Age	Below 30	60
	31-40	20
	41-50	15
	Above 51	5
	Total	100
Education	Non educated	45
	Can sign only	10
	Primary	10
	Class eight	35
	SSC or above	00
	Total	100
Occupation	Only Livestock	40
	Agriculture with livestock	60
	Other	00
	Total	100
Land holding (land in acres)	Up to 1	16
	1-2	42
	3-5	42
	Above 5	0
	Total	100
Annual Income (Tk. in lac)	Low (below 1)	22
	Medium (1 to 4)	75
	High (above 4)	3
	Total	100
Source of capital	From bank loan/ NGO	68
	Own capital	32
	Total	100
Exposure to training	With training	00
	Without training	83
	Influence by neighbor	17
	Total	100

Table 2. Distribution of buffaloes in selected area at Lalpur Upozila of Natore district in Bangladesh

Parameters	Category	Percentage of respondents
Types of buffaloes	Indigenous milking buffalo	0.64
	Indigenous heifer buffalo	0.42
	Indigenous buffalo bull	0.42
	Crossbred milking buffalo	25.42
	Crossbred heifer buffalo	52.99
	Crossbred bull buffalo	20.08
	Total	100
Duration of rearing	2 year	6.02
	3 years	3.02
	4 years	7.54
	Above 5 years	83.42
	Total	100

Reproductive performances

The reproductive parameters viz. 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 all respondents viewed that average age at first heat that was puberty of buffaloes was almost similar (3.46 years). The average gestation period, number of service per conception, post-partum heat period and inter calving period of buffaloes in selected area were 10 months, 3.42 times. 5.31 and 13.5 months respectively.

Table 3. Reproductive performances of buffaloes at Lalpur Upozila of Natore district in Bangladesh

Parameters	Time/Period ± SD
Age at 1st heat (year)	3.46±0.20
Age at 1st pregnancy (year)	3.82±0.19
Age at 1st calving (year)	4.55±0.22
Gestation period (month)	10.0±0.00
Number of service per conception (times)	3.42±0.24
Post partum heat period (month)	5.30±0.38
Inter calving period (month)	13.5±1.35

Major diseases

Among major diseases of buffaloes incidence (%) of foot and mouth diseases (FMD) black quarter (BQ), anthrax and hemorrhagic septicemia (HS) were found to be 53, 25, 15, and 7 respectively. Incidence of diseases is a major constraint of livestock production which not only reduces the productivity but also causes economic loss. Several authors (Mitra et al., 1995, Sarker et al., 2013; Gupta et al., 2014 and Anim et al., 2015) also reported that a serious threat of infectious diseases likes FMD, BQ and HS in buffaloes were the main problem. No buffalo farmer reported early or endemic mastitis. Hence, proper support is required for vaccination against some epidemic viral and bacterial diseases for their prevention. The common diseases like scours, pneumonia, navel–ill, parasites (ecto and endo), blot and diarrhoea were also noticed. However, farmers of the selected area were not totally ignorant about vaccine and de-worming programme but they did not practice any vaccination and de-warming practice.

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 expressed that poor availability of the feeds and fodder was the major problem for buffalo rearing. This result agreed with the result of Amin et al., (2015) and Sathyanarayan et al., (2010). Rice straw is the main feed source of buffaloes in the study areas and respondents grazing their buffalo up to 5-7 hours a day. Most of the respondents were fully depend on river-bed (char) grasses (durba, baghata grass, vadal grass, kaishe grass, khasheri koli etc.) in the barren land, rest of the respondents used cut and carry grass, sugarcane top, sugarcane pulp and whole sugarcane. Large numbers of the respondent were found to supply small quantity of concentrates (rice polish, wheat bran, broken rice, rice gruel, oil cake (til oil cake, mustard oil cake)) to their buffaloes. Sarker et al., (2013) reported that in Bagerhat districts of Bangladesh majority of the farmers were fully dependent on grazing. Majority of the respondents kept their buffaloes mainly with extensive system and very little percentage of the farmer practiced semi-intensive system in the study areas.

Chemical composition of feedstuffs

The chemical compositions of the available feedstuffs fed to buffaloes in Lalpur areas are presented in Table 5. The CP content of broken wheat, wheat bran, khasheri koli, vadal grass and baghata grass were found to be 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

Table 4. Availability of feeds and fodder and feeding system of buffaloes at Lalpur Upozila of Natore district in Bangladesh

Parameters	Category	Percentage of respondents
Availability of feeds	Available	36
	Not available	64
	Total	100
Source of feed	Roadside, barren and river bed (char)grass	76
	Cut and carry grass	10
	Concentrates	14
	Total	100
Feeding method	Extensive	78
	Semi-intensive	22
	Intensive	00
	Total	100

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 and therefore provides a good indication of the nutritional value of the feed. The highest value of ether extract content was found in rice polish and the lowest was found in dhubla/dubra grass.

Table 5. Chemical composition of feedstuffs fed to buffaloes at Lalpur Upozila of Natore district in Bangladesh

Name of the feedstuff	Chemical composition (% DM basis)								
	DM	OM	CP	CF	ADF	NDF	EE	NFE	Ash
Broken rice	86.6	82.2	9.2	22.6	2.8	11.2	2.2	59.8	3.4
Broken wheat	87.5	83.9	11.5	28.8	3.9	13.6	3.1	48.7	6.9
Rice polish	92.4	85.0	9.8	11.9	12.6	32.0	10.4	52.2	14.3
Wheat bran	92.0	85.5	13.9	12.0	15.8	44.2	5.7	56.4	8.5
Straw	87.4	72.7	3.5	33.8	21.4	71.1	1.3	42.7	13.8
Khasheri koli	90.40	77.9	19.6	25.8	22.43	35.39	2.58	39.52	12.5
Kaishe grass	93.13	79.25	14.39	35.32	26.49	30.67	1.87	34.54	13.88
Vadal grass	93.06	78.23	17.22	32.56	18.12	21.13	1.73	33.66	14.83
Baghata grass	91.23	73.03	20.05	31.34	19.03	21.44	1.42	28.99	18.2
Sugarcane top	92.17	86.61	10.60	34.6	23.05	34.01	1.36	47.88	5.56
Dhubla/durba grass	92.07	78.88	10.93	36.43	21.37	29.72	1.06	38.39	13.19

Cost-benefit of buffalo rearing

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 lower than the feed cost. Farmers generally bred their buffaloes naturally with own and/or neighbor 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 and sugarcane. The major cost of healthcare was medicinal cost. Total rearing cost of one buffalo per year was Tk. 8741.50. Amin et al., (2015) and Sarkar et al., (2013) reported that the total rearing cost of one buffalo per year was Tk. 6850.00 and Tk. 5070.00 respectively in Bagerhut and Noakhali district in Bangladesh. The rearing cost was found higher in Lalpur than that from above mentioned district.

Table 6. Management cost of one buffalo per year at Lalpur Upozila of Natore district in Bangladesh

Category	Expenditure (Tk.)
Average feed cost (year)	6660.00±515.70
Average breeding cost (year)	470±46.56
Average cost of housing and equipment (year)	1176.50±151.97
Total	8306.50±546.70
Medicine and vaccine cost	
Average cost of medicine (year)	435.00±45.82
Average cost of vaccine (year)	
Total healthcare cost	435.00±45.82
Total rearing cost	8741.50±541.23

Cost for family members

The average yearly expenditure for family member was Tk. 20830.00. Highest cost was found for purchasing food (Tk. 12880.00) among the total expenditure followed by education (Tk. 3500.00), clothing (Tk. 2050.00), health care (Tk. 1050.00) and maintaining social status (Tk. 1000.00). The housing cost was found to be lowest (Tk. 350.00) among the expenditure.

Income from buffalo rearing

The annual average income per year per post weaning male calves and milk was Tk. 15000.00 and Tk. 39600.00, respectively. In India and Bangladesh, net annual income from rearing one dual purpose buffalo (Amin et al., 2015); cross breed cow (Kalash et al., 2009) and one dual purpose buffalo (Sarkar et al., 2013) was Tk. 13932.00 , Rs. 30784.00 and Tk. 15630.00 per year, respectively. In this study, the net income from one milking buffalo per year was Tk. 25028.50 indicated that rearing buffaloes in the selected area was profitable.

Livelihood improvement and impact of buffalo farmers

Before rearing buffaloes, the farmers spent only Tk. 9580.00, 1380.00, 620.00, 2150.00, 750.00 and 280.00 for purchasing food, cloth, social status, education, health care and housing, respectively but they were able to spend Tk. 12880.00, 2050.00, 1000.00, 3500.00, 1050.00 and 350.00 respectively after they started rearing buffaloes, which was 34.45, 48.55, 61.29, 62.79, 40.00 and 25.00% higher than the previous state, respectively. This result clearly indicated that livelihood status of buffalo farm families are improved through buffalo rearing, and 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; Amin et al., 2015).

Conclusion

Considering all the studied parameters, buffalo rearing was a profitable practice in the selected areas and improve the socio-economic status of buffalo farmers.

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