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Production Practices and Profitability Analysis of Household Goat Rearing in a Selected Area of Mymensingh District

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Abstract: *This study was undertaken to examine the production practices and profitability analysis of household goat farming in Mymensingh district. It covered 80 households from three villages of Baluka upazila of which 40 from project under management of UNEP-GEF-ILRI FAnGR Asia Project of Bangladesh Agricultural University (BAU) and 40 from non-project. Evidence showed that the numbers of goat per project and non-project households were 3.65 and 2.95 respectively. Semi intensive goat rearing was practiced by the 75.0% of project and 77.5% of non-project households. Forty percent project and 60% non project households fed their goat homestead resources and 60% of project and 40% of non project households fed purchased feed to their goat. All the project households practiced goat vaccination mainly PPR whereas it was 55.0% in case of non-project household. Hundred percent project households maintain records, but non-project households maintained no records. Net return from goat rearing were found Tk. 8531.46 and Tk. 6737.00 for having and no having shed, Tk. 7893.98 and Tk. 7244.73 for having and no having feeding cost, Tk. 8798.86 and Tk. 6935.53 for having and no having treatment cost, respectively for the project households. The average net return per project household was calculated Tk. 7634.28 on the other hand Tk. 3805.36 for the non-project household. In case of non project household the net return were calculated Tk. 4310.84 and Tk. 3631.41 for having and no having shed, Tk. 3824.78 and Tk. 3802.34 for having and no having feeding cost, Tk. 3879.99 and Tk. 3503.31 for having and no having treatment cost, respectively. As a whole, the average net return per project household was higher Tk. 3828.00 compare to non-project household. It indicates that the intervention had a positive impact on the profitability of the project household. Thus, the study recommended for extension of the project interventions in other rural areas of Bangladesh.*

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Key words: Production practice, Goat farming, Feeding systems, Intensive and Net return.

1. Introduction

Livestock plays an important role in the national economy of Bangladesh with a direct contribution of around 3% to the agricultural GDP and providing 15% of total employment in the economy (BER, 2011). The present estimated growth rate of this sector is 3.39 during FY 2011-12. About 75% people rely on livestock to some extent for their livelihood, which clearly indicates that the poverty reduction potential of the livestock sub-sector is high (Tareque and Chowdhury, 2010). Although the contribution of livestock to household income is clearly recognized but its unplanned and inefficient production systems, still exit in many developing countries of the world including Bangladesh (Moholl, 2002). Among the livestock herds, the goat has proved to be of utmost importance in many developing countries, because they are widely kept by the rural farmers. Other people have called goat 'the poor person's bank or the poor family's insurance policy (Peacock, 1996). The many different modern goat breeds are found across all agro-ecological environments (Husain, 1993). There are about 300 breeds and types of goats, the majority of which are found in the topics and subtropics (Devendra and Burns, 1983). Due to the increasing human population pressure on land goats are increasing simultaneously which makes the goat enterprise more important in smallholder production systems in the high potential areas (Peters, 1989).

The average number of goats per household was 2.31 and they are mostly reared by landless, small and medium farmers (Faruque, 2010). Goats have been reared in Bangladesh from the time of human settlement in this part of the earth. They are also considered a potential genetic resource for poverty alleviation as they are the source of many small and landless farmers. Goats are used primarily for meat and milk production, but their skin is a valuable by product. Goat meat is the most popular and expensive in the Bangladesh and is acceptable to people of all castes, creeds and religions. The higher demand of meat and skin in the local as well as foreign markets focused the goat enterprise extremely prominent to the vulnerable group of people in the existing socio economic condition of the country (Husain, 1993). Small-scale farmers have limited access to land and capital and so the rearing of goats using common property resources at least gives them an opportunity to improve their income position (Riethmuller, 2003). The goat population in Bangladesh is increasing by year to year. According to the estimate of the Department of Livestock Services (DLS) the population of goat raised to 25.20 million in year 2012-13 against of number 19.10 million in the year 2004-05. Meat production was reached 36.2 lakh ton in the year 2012-2013 in against of 11.3 lakh ton in the year 2005-2006.

Indigenous goat is the important livestock species in Bangladesh, for which

require less money, space and technological knowledge to rear. It is saying that about 85% people of Bangladesh live in rural area. Maximum of them have no capacity to rear high costing cross breed livestock species. Indigenous goats are highly adapted to the harsh conditions, poor nutrition and disease and/or parasite challenges. Over all the indigenous breeds are habituated with the environment of Bangladesh. The taste and preference of Bangladeshi people trend to indigenous livestock species and the price of indigenous species near about double in the market. So the rural people can easily rear some goats at household level to meet the animal protein requirement. This study highlights the current indigenous goat production circumstances in Bangladesh with a view to identifying the major challenges which need to be addressed in order to improve the indigenous goat productivity and thereby improve the livelihood of the rural households who are the custodian of these valuable genetic resources. By reviewing various research papers it is expected that there is some scope to study on the mentioned topics on the basis of some research questions that may be helpful for conservation as well as improvement of household goat production. The research questions are:

- Goat keepers are practicing different production systems but there is no in-depth information about what are the various production systems are practicing the goat keepers in the study area?
- What is the profitability variation of goat rearing under different production systems?
- What interventions/policy options can be promoted that would increase Black Bengal owner's income and increase contribution to their livelihood?

The overall objective of the present research is to increase the household income of the rural farmers in Bangladesh through household goat (Black Bengal) farming. The specific objectives of the study are as follows: (i) to assess the household goat production practices (ii) to examine the profitability of household goat rearing under different production practices.

2. Methodology

The study was conducted with the support of UNEP-GEF-ILRI FAnGR Asia Project which was implemented its activities on Goat rearing at Bhaluka upazila under Mymensingh district. Three villages from Bhaluka upazila under Mymensingh district were selected purposively for the study covering 80 households where 40 from project and 40 non-project households. The survey was conducted during November–December 2014 by using a structured interview schedule. Data of secondary sources was collected from various research publications, BBS and other authentic sources as per requirement of the study. The collected data for the study were processed and analyzed using different software (Excel, SPSS, etc). The following techniques were used in analyzing the collected

data as per objectives of the study:

To assess the household goat production practices in the study areas, the following factors were considered;

i. **Types of goat as per coat colour**: Collected data was presented in tabular form.

ii. **Housing system:** Patterns of housing system was described in tabular form with resource full information.

iii. **Feeding system:**

a. Types of feed that was used by the goat keeping household

b. Sources of feed-Purchase or home supply;

iv. **Breeding system:**

a. Selection process of Doe;

b. Selection process of Buck;

c. Age of first kidding;

d. Breeding type: Control/natural;

v. **Healthcare:**

a. Training/awareness;

b. Preventive measure: Vaccination, de-worming;

c. Treatment-Type of treatment, Type of service providers;

vii. **Record Keeping:**

All the production and reproduction record, input cost; and income related record was analyzed in tabular form.

To examine the profitability of household goat rearing under different production practices, the profit function was estimated.

The following profit (∏) equation was used to determine the profitability of household goat rearing under different management practices:

$$\prod = Ic + Pg.Gs + Pg.Gc - Cost$$

Where,

∏ = Profit per household;

Ic = Value of change in inventory;

Pg = Per unit price of goat;

Gs = Total number of goat sold in a year; and

Gc = Total number of goat consumed in a year.

3. Results and Discussions

3.1 Production Practices of Goat Rearing

Production of an enterprise greatly depends on its production procedures. Livestock production is not out of this theme. The productivity of goat also depends on proper housing, nutrition, health management and selection of appropriate animal (Moholl, 2002). An attempt has been taken in this section to illustrate the present production practices of household goat farming of the study area.

3.1.1 Goat population and available types

Goats in the study area were 54.79%fully black, 13.70% was brown, 28.08% was boiragi, 2.06% was white and 1.37% was mixed in project households (Table 1). Overall 3.65 goats were found per project household. In the non project households 77.97% was black Bengal, 4.24% was brown and 17.79% was boiragi. Overall 2.95 goats were found per non project household. Nandy et al., (2011) reported that in West Bengal in majority causes the flock size ranges from 1-4. The present study supported Nandy's findings.

Table 1: Available goat type in the study area

Type s of goat	% of total of Project HHs	% of total of non-Project HHs
Black Bengal	54.79	77.97
Brown Bengal	13.70	4.24
Boiragi	28.08	17.79
White Bengal	2.06	0.0
Mixed	1.37	0.0
Total	100.0	100.0
Average (No./HH)	3.65	2.95

Source: Field survey, 2014.

3.1.2 Goat rearing system

75.0 percent of project household were used to practice semi intensive goat rearing system that was 77.5% in non goat household (Table 2). Twenty percent of project household used to rear intensive system in goat rearing while it is 17.5% in non-project household. Free or scavenging rearing system was practiced 5% household in both project and non-project household.

Table 2 Goat rearing system of the surveyed households

Rearing types	Project HHs		Non- Project HHs
	No.	Percent (%)	Percent (%)
Abadha (Intensive)	8	20.0	17.5
Semi intensive	30	75.0	77.5
Free/Scavenging	2	5.0	5.0
Total	40	100.0	100.0

Source: Field survey, 2014.

3.1.3 Goat housing pattern

Table 3 represented the housing information of goat rearing project and non-project households. 50% of goat rearing project household have special housing for goat keeping and 50% had no special housing for goat keeping. About 75% of non-project surveyed households had no special housing for goat rearing. They had only 25% special housing system for their goats. Among the special housing of project households had kept their goat with tin shed and tin fence house representing 85% and in non-project household Tin shed with mudd wall 50% was the highest special housing system for goat husbandry in the study area. In the project household had no special housing used to keep their goat in veranda 45% and in non-project household highest 30% kept their goats in the cattle shed with cattle.

Table 3 Goat housing pattern of the surveyed households

Description of information	Project HHs		Non-project HHs	
	No.	Percent (%)	No.	Percent (%)
No special housing	20	50.0	30	75.0
Special housing	20	50.0	10	25.0
Total	40	100.0	40	100.0
Special housing type				
Tin shed with Tin fence	17	85.0	3	30.0
Tin shed with mudd wall	3	15.0	5	50.0
Tin with bamboo fence	0	0.0	0	0.0
Straw shed with tree leaf fence	0	0.0	1	10.0
Others	0	0.0	1	10.0
Total	20	100.0	10	100.0
No special housing				
In the cattle shed with cattle	8	40.0	9	30.0
Kitchen room	0	0.0	6	20.0
Living room	2	10.0	5	16.67
Veranda	9	45.0	8	26.66
Others	1	5.0	2	6.67
Total	20	100.0	30	100.0

Source: Field survey, 2014.

3.1.4 House cleaning information

Same percent of goat rearing project households were practiced to clean regularly (Table 4). But in case of non-project goat keeping households 95% were habituated to clean regularly, remaining 5% households cleaned their goat house in every two days interval.

Table 4 House cleaning by the goat keepers

Description of items	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
Cleaning daily	40	100.0	38	95.0
Cleaning two days interval	0	0.0	2	5.0
Total	40	100.0	40	100.0

Source: Field survey, 2014.

3.1.5 Goat feed sources

Only home supplied feed was provided by 40% of project and 60% of non-project households. Project households 60% and non-project households 40% fed goats by purchasing feeds (Table 5).

Table 5 Goat feed sources in studied area

Source of feed	Project hhs		Non -project hhs	
	No.	Percent (%)	No.	Percent (%)
Home supplied	16	40.0	24	60.0
Purchased	24	60.0	16	40.0
Total	40	100.0	40	100.0

Source: Field survey, 2014.

3.1.6 General feeding management of goat

Free grazing was common type of feeding both project and non-project households (Table 6). Nandy et al., (2011) reported that all most all the farmers used to graze their goats. Dey et al,. (2007) conducted a study on goat production scenario in Bihar, India and found that goats are raised on grazing. Saadullah and Hossain (2000) stated that management system of indigenous goat in Bangladesh was a combination of both tethering and scavenging. All the studies are supported by the present study. In addition cocked rice, tree leaf and rice gruel was fed 50% of project households and 25% of non-project households to their goats, tree leaf and rice gruel was fed 47.5% of project households and 65% of non-project households.

Table 6 General feeding management of goat

Indicators	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
Type of feeding				
Free grazing and in addition cocked rice and tree leaf	1	2.5	4	10.0
Free grazing and in addition cocked rice, tree leaf and rice gruel	20	50.0	10	25.0
Free grazing and in addition tree leaf and rice gruel	19	47.5.0	26	65.0
Total	40	100.0	40	100.0
Daily install/when feeding				
One times	1	2.5	10	25.0
Two times	31	77.5	23	57.5
Three times	8	20.0	7	17.7
Total	40	100.0	40	100.0

Source: Field survey, 2014.

3.1.7 Feeding management of purchased feed for goats

Wheat bran was the major item of purchased goat feeds in both project and non-project households (Table 7). Wheat bran was purchased 79.17% by project and

100.0% by non-project households. Farmers practiced different feeding practices of purchased feeds. Purchased feed with water was practiced by 87.50% of project households and 100.0% of non-project households. Daily 62.50% of project households and 56.25% of non-project households fed purchased feed one time and 37.50% of project households and 43.75% of non-project households fed two times.

3.1.8 Breeding practiced by the goat keepers

Ninety percent of project households and hundred percent of non-project households used hire buck for breeding purpose (Table 8). Present study revealed that 90.0% of project households and 100.0% of non-project households used hire bucks for breeding their does as they had no breeding facility to breed their does with own bucks. 90.0% of project households and 85.0% of non-project households provided service charges when they served their does from the buck of buck parks as related to study of Gokhale et al., (2002).

Table 7 Feeding management of purchased feed for goats

Indicators	HHs		Non-project HHs	
	No.	Percent (%)	No.	Percent (%)
Feed type				
Wheat bran	19	79.17	16	100.0
Wheat bran and gram	2	8.33	0	0.0
Wheat bran, gram and pulse bran	1	4.17	0	0.0
Wheat bran and rice/broken rice	2	8.33	0	0.0
Total	24	100.0	16	100.0
Type of feeding				
Purchased feed with water	21	87.50	16	100.0
Mixed purchased all feed with water	2	8.33	0	0.0
Mixed purchased feed, cocked rice with water	1	4.17	0	0.0
Total	24	100.0	16	100.0
Daily install/when feeding				
One time	15	62.5	9	56.25
Two times	9	37.5	7	43.75
Total	24	100.0	16	100.0

Source: Field survey, 2014.

Table 8 Breeding practiced by the goat keepers

Description of items	Project HHs		Non-project HHs	
	No.	Percent (%)	No.	Percent (%)
Buck use				
Sources of breeding bucks				
Own	4	10.0	0	0.0
Others	36	90.0	40	100.0
Total	40	100.0	40	100.0

Breeding Method					
	Controlled	40	100.0	34	85.0
	Un controlled	0	0.0	6	15.0
Total		40	100.0	40	100.0
Consideration about the breeding buck					
	Consider	40	100.0	9	22.5
	No consideration	0	0.0	31	77.5
Total		40	100.0	40	100.0
Considering factors about breeding buck					
	Colour	36	90.0	5	55.56
	Pedigree	32	80.0	3	33.33
	Age	30	75.0	2	22.22
	Size	39	97.5	8	88.89
	Weight	29	72.5	0	0.0
	Physical appearance	35	87.5	0	0.0
	Testicle size	28	70.0	0	0.0
Provide service charge					
	Yes	36	90.0	34	85.0
	No	4	10.0	6	15.0
Total		40	100.0	40	100.0

Source: Field survey, 2014.

3.1.9 Buck rotation

Buck rotation is a process through which goat keepers serve their does with one buck only 6 to 12 months to prevent inbreeding problem. By this process bucks are rotted within 6-12 months from one buck park to another buck park. Hundred percent of project households maintained buck rotation regularly (Table 9). But in goat keeping non-project households only 10% was following buck rotation.

Table 9 Buck rotation practiced by goat keepers

Variables	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
Not following buck rotation	0	0.0	36	90.0
Following buck rotation	40	100.0	4	10.0
Total	40	100.0	40	100.0
Days for buck rotation				
6 Months	31	77.5	0	0.0
12 months	9	22.5	4	100.0
Total	40	100.0	4	100.0
Causes for buck rotation				
Healthy kids and less diseases	1	2.5	0	0.0
Healthy kids	26	65.0	1	25.0
Less diseases	8	20.0	0	0.0
Prevent mating with close relatives	5	12.5	0	0.0
Don't get the same buck after one year	0	0.0	3	75.0
Total	40	100.0	4	100.0

Source: Field survey, 2014.

3.1.10 Considering the factors of purchasing does

Both project and non-project households were practiced to consider some factors during purchasing a doe (Table 10). Size was the main considering factor as expressed by both project and non-project goat rearing households representing 100% in project and 97.5% in non-project households.

Table 10 Considering factors of purchasing does

Variables	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
Not following consideration	0	0.0	0	0.0
Following consideration	40	100.0	40	100.0
Total	40	100.0	40	100.0
Considering factors				
Colour	36	90.0	27	67.5
Pedigree	30	75.0	0	0.0
Age	43	85.0	28	70.0
Size	40	100.0	39	97.5
Weight	36	90.0	1	2.5
Physical Appearance	35	87.5	14	35.0
Udder	30	75.0	1	2.5

Source: Field survey, 2014.

3.1.11 Vaccination practiced by the goat keepers

Hundred percent of project households practiced goat vaccination whereas it was 55.0% in case of non-project goat keeping household against PPR (Table 11). Gokhale et al., (2002) reported that only 39.9% studied goat rearers vaccinated their goats for various diseases in Moharashtra, India. The vaccination percentage in the present study was higher than study of Gokhale et al. Training was the only one source of knowing about vaccination for project households in the year 2010 and 2011.

Table 11 Vaccination practiced by the goat keepers

Indicators	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
Not Practicing vaccination	0	0.0	18	45.0
Practicing vaccination	40	100.0	22	55.0
Total	40	100.0	40	100.0
Vaccination information sources				
Training	40	100.0	0	0.0
GEF community worker	0	0.0	7	31.82
Neighbour and other goat keepers	0	0.0	12	54.54
World Vision volunteers	0	0.0	3	13.64
Total	40	100.0	22	100.0
Vaccine information receiving year				
2010	9	22.5	1	4.55
2011	29	72.5	1	4.55
2012	2	5.0	5	22.72
2013	0	0.0	8	36.36
2014	0	0.0	7	31.82
Total	40	100.0	22	100.0

Name of vaccines					
	Cannot say	0	0.0	9	40.91
	Can say PPR	40	100.0	13	59.09
Total		40	100.0	22	100.0
Interval					
	6 months	40	100.0	13	59.09
	Cannot say	0	0.0	9	40.91
Total		40	100.0	22	100.0
Vaccination program arranged by					
	DLS	4	10.0	0	0.0
	NGO	5	12.5	7	31.82
	Own initiative	19	47.5	11	50.0
	Other	12	30.0	0	0.0
	Cannot say	0	0.0	4	18.18
Total		40	100.0	22	100.0

Source: Field survey, 2014.

3.1.12 Disease management practiced by the goat keepers

Thirty five percent of project housed hold was attack with different diseases as reported by respondents (Table 12). On other hand 80.0% of non-project households were attack with different diseases as reported by the non-project respondents. Pet fola/fapa and cold 35.29% were the main diseases in the project households each. Patla paikhana (34.92%) was the main disease as reported by respondents of non-project household. Village doctors were the main treatment sources for both project and non- project household 82.35% and 58.73%, respectively.

Table 12 Disease management practiced by the goat keepers

Indicators	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
No problems	26	65.0	8	20.0
Problems	14	35.0	32	80.0
Total	40	100.0	40	100.0
Type of problem				
Pet fola/fapa	6	35.29	13	20.63
Patla paikhana	1	5.88	22	34.92
Fever	2	11.77	5	7.94
Khora	0	0.0	3	4.76
Worm	0	0.0	13	20.63
Skin	0	0.0	2	3.18
Cold	6	35.29	4	6.35
Golafula	0	0.0	1	1.59
Other	2	11.77	0	0.0
Total	17	100.0	63	100.0
Sources of service				
Medicine shop	0	0.0	15	23.81
Other goat keeper	0	0.0	1	1.58
Veterinary surgeon/DLS	3	17.65	5	7.94
Village doctor	14	82.35	37	58.73
Other	0	0.0	5	7.94
Total	17	100.0	63	100.0

Source: Field survey, 2014.

3.1.13 Bio security management

Hundred percent project household and 75.0% of non-project household put death goat underground as a bio security measure (Table 13). Ninety five percent of project household presented causes of put underground the death goats not to disseminate diseases and five percent reported to prevent diseases and bad smell. Not to spread bad smell was one of the causes as reported 57.5% by the non-project households. Thirty five percent of non project households took bio security measure as cause not disseminate disease reported 35% of the non-project household

Table 13 Bio security measures taken by goat keepers

Type of activity/causes	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
Type of activity				
Thrown into jungle	0	0.0	10	25.0
Under ground	40	100.0	30	75.0
Total	40	100.0	40	100.0
Causes				
Not to disseminate disease	38	95.0	14	35.0
Not to spread bad smell	0	0.0	23	57.5
For cleaning	0	0.0	2	5.0
To prevent disease and bad smell	2	5.0	1	2.5
Total	40	100.0	40	100.0

Source: Field survey, 2014.

3.1.14 Record keeping

Record keeping was maintained by project household 100% and in non project household 0% (Table 14). Manzi et al., (2013) reported that records were rare (4%) and 50% of these kept breeding records. The record keeping practice was higher in the project households but was lower in the non-project households compared to the study of Manzi et al.,.

Table 14 Record keeping practiced by goat keepers

Description of entry	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
Not keeping record	0	0.0	40	100.0
Record keeping	40	100.0	0	0.0
Total	40	100.0	40	100.0
Type of record keeping				
Date of birth	40	100.0	0	0.0
Birth weight	40	100.0	0	0.0
Tagging	40	100.0	0	0.0
Pedigree	30	75.0	0	0.0
Weaning time and weight	35	87.5	0	0.0
Breeding record	36	90.0	0	0.0
Rearing cost	28	70.0	0	0.0
Health and treatment	30	75.0	0	0.0
Selling age	34	85.0	0	0.0
Buyer's information	29	72.5	0	0.0

Place of sale	30	75.0	0	0.0
Value	38	95.0	0	0.0
Form of record keeping				
Special card & khata	40	100.0	0	0.0

Source: Field survey, 2014.

3.2 Profitability of Goat Rearing

The purpose of this section is to calculate the costs and returns of household goat rearing. In this study cost items consisted of housing, feeding, vaccination, treatment and unpaid labour cost. On the return side total return and net returns per households invested were determined and analyzed. Costs and return were calculated on different management practices; such as those having housing cost and no housing cost, having feed cost and no feed cost, having treatment cost and no treatment costs.

3.2.1 Cost items of household goat rearing

Feed cost

In project household, the feed cost per household were calculated on the basis of different management practices; Tk. 475.50 for having shed cost, Tk. 575.42 for having feeding cost and Tk. 383.33 for having treatment cost of the households for their goats (Table 15). The average feed cost of the households were calculated on basis for no cost in different management practices was calculated Tk. 215.00 for having no housing cost, Tk. 0.0 for having no feeding cost and Tk. 322.4 for having no treatment cost for their goats. Overall average feeding cost was calculated Tk. 345.25 that was 22.59% of total cost.

Feeding cost per non-project household was calculated Tk. 227.50 for having shed cost, Tk. 439.06 for having feeding cost and Tk. 213.28 for having treatment cost of the households. The average feeding cost of the households were calculated on basis for no cost in the different management practices was calculated Tk. 163.79 for having no housing cost, Tk. 0.0 for having no feeding cost and Tk. 213.28 for having no treatment cost for their goats. Overall average feeding cost was calculated Tk. 175.62 that was 19.52% of total cost.

Housing cost

The housing cost per project household was calculated Tk. 776.29 for having shed, Tk. 510.10 for having feeding cost and Tk. 367.27 for having treatment cost respectively (Table 15). The average housing cost of the households were calculated on basis for no cost for housing was Tk. 0.0 for having no housing cost, Tk. 205.21 for having no feeding cost and Tk. 400.67 for having no treatment cost for their goats. Overall average housing cost was calculated Tk. 388.14 which was 25.40% of total cost.

Housing cost per non-project household was calculated Tk. 386.66 for having shed cost, Tk. 204.16 for having feeding cost and Tk. 108.33 for having treatment cost of the households. The average housing cost of the households were calculated on basis for no cost for housing was Tk. 0.0 for having no housing cost, Tk. 28.57 for having no feeding cost and Tk. 50.00 for having no treatment cost for their goats. Overall average housing cost was calculated Tk. 96.67 that was 10.75% of total cost.

Treatment cost

In project household treatment cost per household was calculated on the basis of different management practices; Tk. 59.75 for having shed, Tk. 57.17 for having feeding cost and Tk. 157.20 for having treatment cost of the households for their goats (Table 15). The average treatment cost of the households were calculated on basis for no cost in the different management practices Tk. 58.15 for having no housing cost, Tk. 61.62 for having no feeding cost and Tk. 0.00 for having no treatment cost for their goats. Overall average treatment cost was calculated Tk. 58.95 that was 3.86% of total cost.

Treatment cost per non-project household was calculated Tk. 92.50 for having shed cost, Tk. 98.56 for having feeding cost and Tk. 100.75 for having treatment cost of the households. The average treatment cost of the households were calculated on basis for no cost in the different management practices Tk. 76.63 for having no housing cost, Tk. 71.71 for having no feeding cost and Tk. 0.00 for having no treatment cost for their goats. Overall average treatment cost was calculated Tk. 80.6 that was 8.96% of total cost.

Vaccination cost

In project household vaccination cost per household was calculated on the basis of different management practices Tk. 18.5 for having shed, Tk. 16.87 for having feeding cost and Tk. 16.67 for having treatment cost of the households for their goats (Table 15). The average vaccination cost of the households were calculated on basis for no cost in the different management practices Tk. 16.50 for having no housing cost, Tk. 18.44 for having no feeding cost and Tk. 18.00 for having no treatment cost for their goats. Overall average vaccination cost was calculated Tk. 17.5 that was 1.15% of total cost.

Vaccination cost per non-project household was calculated Tk. 5.50 for having shed cost, Tk. 8.44 for having feeding cost and Tk. 7.03 for having treatment cost of the households. The average vaccination cost of the households were calculated on basis for no cost in the different management practices Tk. 7.83 for having no housing cost, Tk. 6.43 for having no feeding cost and Tk. 8.12 for having no treatment cost for their goats. Overall average vaccination cost was calculated Tk. 7.25 that was 0.81% of total cost.

Unpaid labour cost

In project household unpaid labour cost per household was calculated on the basis of different management practices; Tk. 768.5 for having shed, Tk. 754.79 for having feeding cost and Tk. 723.33 for having treatment cost of the households for their goats (Table 15). The average unpaid labour cost of the households were calculated on basis for no cost in the different management practices Tk. 668.25 for having no housing cost, Tk. 663.75 for having no feeding cost and Tk. 715.40 for having no treatment cost for their goats. Overall average unpaid labour cost was calculated Tk. 718.37 that was 47% of total cost.

Unpaid labour cost per non-project household was calculated Tk. 527.00 for having shed cost, Tk. 562.50 for having feeding cost and Tk. 540.62 for having treatment cost of the households. The average unpaid labour cost of the households were calculated on the basis of no cost in the different management practices Tk. 543.67 for having no housing cost, Tk. 507.62 for having no feeding cost and Tk. 535.00 for having no treatment cost for their goats. Overall average unpaid labour cost was calculated Tk. 539.50 that was 59.97% of total cost.

Total cost

In project households total cost per household having shed was calculated Tk. 2098.54, Tk. 1914.35 for having fed cost and Tk. 1647.81 for having treatment cost. Total cost per household was calculated Tk. 958.00 for having no shed, Tk. 949.02 for having no feeding cost and Tk. 1456.47 for having no treatment cost. In the non-project household total cost per household having shed was calculated Tk. 1239.16, Tk. 1312.72 for having fed cost and Tk. 970.01 for having treatment cost. On the other hand total cost per household was calculated Tk. 791.92 for having no shed, Tk. 614.33 for having no feeding cost and Tk. 621.69 for having no treatment cost.

Table 15 Cost and return from household goat production under different management practices

	Cost/ return items	Management practices						Overall	% of total cost
		Having shed		Feeding practice		Treatment			
		Yes	No	Yes	No	Yes	No		
Project HHs	No. of HH	20	20	24	16	15	25	40	-
	No. of goat	3.8	3.5	3.71	3.56	3.07	4	3.65	-
	Feed cost	475.5	215	575.42	0	383.33	322.4	345.25	22.59
	Housing cost	776.29	0	510.10	205.21	367.27	400.67	388.14	25.4
	Treatment cost	59.75	58.15	57.17	61.62	157.2	0	58.95	3.86
	Vaccination cost	18.5	16.50	16.87	18.44	16.67	18.00	17.50	1.15
	Unpaid labor	768.50	668.25	754.79	663.75	723.33	715.4	718.37	47.00
	Total cost	2098.54	958.00	1914.35	949.02	1647.81	1456.47	1528.22	100.0
	Total return	10630.00	7695.00	9808.33	8193.75	10446.67	8392.00	9162.50	-
	Net return	8531.46	6737.00	7893.98	7244.73	8798.86	6935.53	7634.28	-

Non Project HHs		Yes	No	Yes	No	Yes	No		
	No. of HH	10	30	16	24	32	8	40	
	No. of goat	3.10	2.90	4.00	2.92	2.91	3.12	2.95	
	Feed cost	227.50	163.79	439.06	**0**	213.28	28.57	175.62	19.52
	Housing cost	386.66	0	204.16	28.57	108.33	50.00	96.67	10.75
	Treatment cost	92.50	76.63	98.56	71.71	100.75	**0**	80.6	8.96
	Vaccination cost	5.50	7.83	8.44	6.43	7.03	8.12	7.25	0.81
	Unpaid labor	527.00	543.67	562.50	507.62	540.62	535.00	539.50	59.97
	Total cost	1239.16	791.92	1312.72	614.33	970.01	621.69	899.64	100.0
	Total return	5550.00	4423.33	5137.50	4416.67	4850.00	4125.00	4705.00	-
	Net return	4310.84	3631.41	3824.78	3802.34	3879.99	3503.31	3805.36	-
Difference	Net return	4220.62	3105.59	4069.2	3442.39	4918.87	3442.22	3828.00	

Source: Authors' estimation based on field survey, 2014.

3.2.2 Net return/profit from goat rearing

Net return in project household was calculated on the basis of different management practices; Tk. 8531.46 for having shed, Tk. 7893.98 for having feeding cost and Tk. 8798.86 for having treatment cost of the households for goat (Table 15). The net return of the households were calculated on basis for no cost in the different management practices; Tk. 6737.00 for having no housing cost, Tk. 7214.73 for having no feeding cost and Tk. 6935.53 for having no treatment cost of goat. Overall net return per project household was calculated Tk. 7634.28.

Net return of non-project household was calculated Tk. 4310.84 for having shed cost, Tk. 3824.78 for having feeding cost and Tk. 3879.99 for having treatment cost of the households. The average net return of the households were calculated on the basis of no cost in the different management practices Tk. 3631.41 for having no housing cost, Tk. 3802.34 for having no feeding cost and Tk. 3503.31 for having no treatment cost for their goat. Overall net return per non-project household was calculated Tk. 3805.36.

Net return per project household was higher than non-project household on the basis of different management practices; such as Tk. 4220.62 for having shed and Tk. 3105.59 for having no shed, Tk. 4069.20 for having feed cost and Tk. 3442.39 for having no feed cost, Tk. 4918.87 for having treatment cost and Tk. 3442.22 for having no treatment cost, respectively. Overall net return of project household was higher Tk. 3828.00 than non-project household.

4. Conclusions and Policy Implications

The production practices of goat differ between project and non-project households. As a result of variation in production practices, net return per goat rearing household were also varied. Net return were higher in the household who had goat shed, spent purchased feed and spent cost in treatment purpose compare to the households who had no goat shed, spent no cost in feed and spent no cost in treat-

ment in both project and non-project households.

The following policy implications ensure from the findings of the study.

- Project intervention of the farmers focusing on diseases control, improved housing, feeding, breeding, proper data recording system should be arranged
- Government and non-government organizations should take initiative to supply goat feed at lower cost and provide financial support to goat keepers for construction of goat shed.
- Line ministry especially DLS should strengthened treatment facilities for prevention of diseases for improving indigenous goat in order to enhance the traditional goat production practices in the rural areas of the country.

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