



## **Socio-economic Profile of Goat Rearing Farmers and Their Management Practices in Sylhet, Bangladesh**

**Md. Ariful Islam<sup>1,2</sup>, Md. Nazmul Hossain<sup>3</sup>, Sree Shawon Chokraborti<sup>3</sup>,  
Sufianur Rahman<sup>4</sup>, Anika Tasnim<sup>5</sup> and Abdullah Al Zabir<sup>5,6\*</sup>**

- <sup>1</sup>Department of Pharmacology and Toxicology, Sylhet Agricultural University, Sylhet, Bangladesh.  
<sup>2</sup>Integrated Development Programme, Building Resources Across Communities (BRAC), Bangladesh.  
<sup>3</sup>Department of Livestock Productions and Management, Sylhet Agricultural University, Sylhet, Bangladesh.  
<sup>4</sup>Department of Agricultural Economics and Policy, Sylhet Agricultural University, Bangladesh.  
<sup>5</sup>Faculty of Agricultural Economics and Business Studies, Sylhet Agricultural University, Sylhet, Bangladesh.  
<sup>6</sup>Department of Agricultural Statistics, Sylhet Agricultural University, Sylhet, Bangladesh.

### **Authors' contributions**

*This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/JAERI/2018/43818

#### Editor(s):

- (1) Dr. Ozdal Gokdal, Professor, Adnan Menderes University, Çine Vocational School, Turkey.  
(2) Dr. N. Karunakaran, Department of Economics and Vice-Principal, EK Nayanar Memorial Govt. College, Elerithattu, India.

#### Reviewers:

- (1) Kamran Baseer Achakzai, Pakistan.  
(2) Siwi Gayatri, Aarhus University, Denmark.  
(3) Samuel N. Ndirangu, University of Embu, Kenya.

Complete Peer review History: <http://www.sciencedomain.org/review-history/26486>

**Original Research Article**

**Received 28 June 2018  
Accepted 12 September 2018  
Published 01 October 2018**

### **ABSTRACT**

The study aimed to find out the socio- economic profile of goat rearing farmers and to investigate the ongoing goat management practices in Sylhet district. One hundred and fifty goat rearing farmers from three districts of Sylhet were randomly selected for the study. The study revealed that a large number of respondent goat rearing farmers were middle- aged (56.67%) having a primary level education (36.67%) with large family size (55.33%). Majority of the farmers (59.33%) were labour, and most of them (81.33%) were married. Two third of the farmers were in the landless

\*Corresponding author: E-mail: [zabir.sylau@gmail.com](mailto:zabir.sylau@gmail.com);

group having maximum 0.02- acre land and normally started their goat- rearing business by taking a loan from NGOs (48%) or invested their own money (49.33%). Half of the goat houses were made of tin, and most of them were without *Macha* (a platform little above the floor). About one-third of the farmers (36%) followed free- range system by only grazing their goat natural fodder (72.00%) and provided wheat bran (59.33%) as a concentrate feed. Most importantly, they never supplied water to the goat house. Black Bengal goat is the most preferred breed in the area. Majority of the farmers (66%) have partial knowledge about diseases, and among them, only 18.67% farmers followed regular vaccination schedule. One- third of the farmers used anthelmintic regularly. Village veterinary doctors were the main source of technical support. Moreover, 87.33% farmers buried the dead body of goat and threw (56.67%) the goat placenta to the outside. In case of a breeding system, 96.67% farmers used natural breeding and 69.33 hired bucks for breeding purpose.

*Keywords: Goat farming; farm management; socio-economics; Sylhet.*

## 1. INTRODUCTION

Goat is called the poor man's cow since it is well recognised as a renewable resource for the poor people and the first farm animals associated with the human in an interdependent relationship for a long time [1]. It proved useful to human over the age for its productivity, size and quality as food [2]. In Bangladesh, goats are reared by the poor farmers as a secondary source of income. Other than the commercial enterprises, goat act as a substantial part of family income [3].

In livestock production, goat is considered as a special species because of its economic importance, its position in the related sector and its utilisation ability [4]. According to the Department of Livestock Services (2015-2017), there are 257.66 lakh goats in Bangladesh contributing partly in total livestock meat production (61.52 Lakh Metric Ton). About 45% population in Bangladesh lives under the poverty line, and among total farm household, 36% people are involved with goat rearing [5].

For better goat productivity and marketing, appropriate intervention is very much important. To achieve these objectives, data is needed for the current goat production and management system [6,7]. In Sylhet, goat has become an important source of income for every class of society either in the form of main or secondary occupation. Very little data are currently available about the present condition of the farmers as well as their management practices. So, the objectives of the study are to explore the socio-economic conditions, identify critical constraints of goat enterprise and find out the opportunity

that can impact in increasing the production efficiency of goat farmers.

The study will help to assess the needs of the goat producers and will also help to suggest interventions for better management to increase goat productivity.

## 2. METHODS AND MATERIALS

### 2.1 Study Area

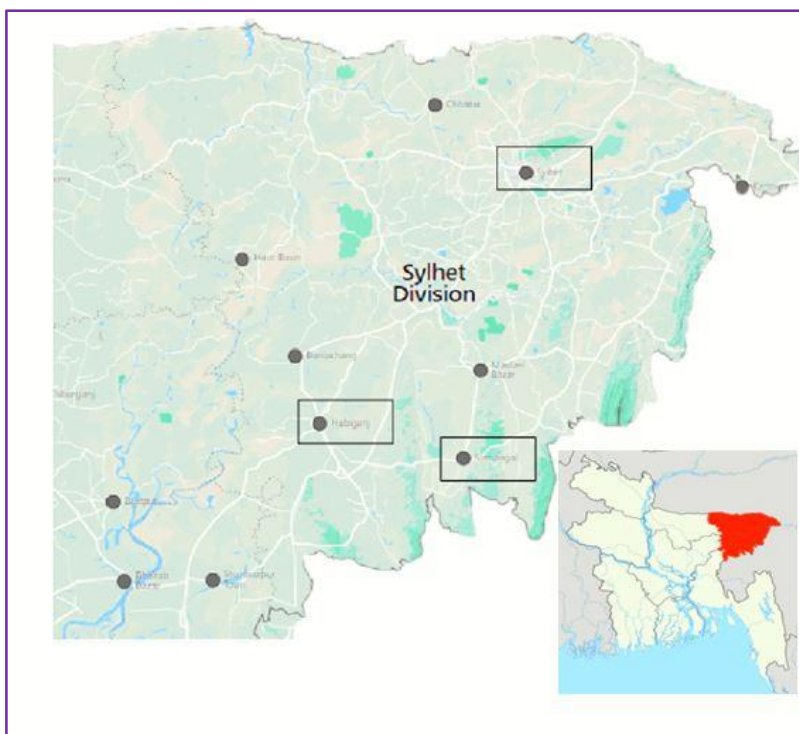
The study was done in Kamalganj and Sreemangal upazila from Sreemangal; Bybiana upazila from Habiganj and Shaporan, South Surma upazila from Sylhet district which are in the eastern part of Bangladesh.

Sylhet division is located in between 23°58' and 25°12' north latitudes and in between 90°56' and 92°30' east longitudes. The study area was selected based on the intensity of goat farmers in the division.

### 2.2 Survey Design

The study was conducted to find the information with the help of a pre-designed structured questionnaire.

A total of 150 households were interviewed by using a simple random sampling technique. Detailed information about the goat farmers was taken from Upazila agriculture office. From each Upazila 3 villages were selected, and from each village, about 10-20 households were interviewed who were engaged in goat rearing.



**Fig. 1. Study areas**

*N.B: Rectangles in the map indicate the study areas*

### 2.3 Data Collection

For data collection, a well-structured questionnaire was prepared. Information was collected by personal interviews from respondents. Prior to collection, the objective of the study was clearly explained to the respondents. Information was taken regarding the farmers' sex, age, education, farm size, social status, management cost, land, and household size as well as some data associated with goat rearing such as breed, the source of fund, feeding and nutrition, the source of feed, deworming veterinary treatment, disease prevalence etc. Some information like shed conditions of goat were collected through visual observation of farm as well as shed. Some data were also collected from secondary sources like government documents, related literature, books, journals, newspaper, articles, theses and websites. The information were collected during October- December 2017.

### 2.4 Data Analysis Technique

Primary data were collected through field survey, and secondary data were collected from journals,

Google search engine, published articles etc. Both primary and secondary data was scrutinised, checked and carefully edited to get the appropriate and related information after collection. Collected data was classified, tabulated and analysed regarding the objectives set for the study to derive the relevant findings. The data was analysed and presented mostly in tabular form because it was simple to calculate, widely used and easy to understand. The tabular analysis was mainly based on some statistical measures like averages, percentages etc. with the help of MS-Excel-2010.

## 3. RESULTS AND DISCUSSION

### 3.1 Socioeconomic profile

#### 3.1.1 Age

Age is the time that a person has lived for or it is the length of existence. Most of the goat farmers (54.67%) were middle- aged with the age range 36 to 50 years whereas 35.33% were in the old age group. Comparing with the above two groups, a small number of young people (10%) were found in the study areas who were

interested in goat farming. The findings of Nipane et al. [8] and Seth et al. [9] were in line of the present study. Tanwar et al. [10] reported that the majority of the people under old age group in Rajasthan, preferred goat farming as it is easy to manage.

### **3.1.2 Education**

Education is one of the most important socio-economic variables which influence the overall pattern of a better livelihood. In general, a farmer with a higher level of education has more potentiality than a lower one especially in the situation where more technical knowledge is required. Most of the people in the study area were illiterate, or they could only sign their name. According to them, no formal education for goat farming as well as for all other agricultural practices is needed. From the Table 1, it is evident that formal education in terms of primary, secondary and upper than secondary education was 36.67%, 23.86% and 5.11%, respectively.

The outcomes are in accordance with the findings of Sharma et al. [11], Tanwar et al. [10], Praveena et al. [12], Tudu and Roy [13] and expressed that greater part of the goat farmers was illiterate. However, Deshpande et al. [14] and Thombre et al. [15] revealed that a larger proportion of the goat farmers had a primary level education.

### **3.1.3 Main occupation**

This is clear from the study that goat keeping is generally practised in the study area by poor homestead workers to acquire extra income. Most of the farmers were labour (59.33%) followed by agriculture farmer which is 31.33% as shown in Table 1. The outcomes are in accordance with the findings of Sharma et al. [11], Deshpande et al. [14] and Thombre et al. [15] who expressed that major proportion of the goat keepers were rural workers with goat raising as their secondary occupation.

**Table 1. Socio-economic profile of the participant farmers**

<b>Characteristics</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent (%)</b>
Age	Young (up-to 35)	15	10.00
	Middle-aged (36-50)	82	54.67
	Old (Above 50)	53	35.33
Education	Illiterate	52	34.67
	Primary (1-5)	55	36.67
	Secondary (6-10)	36	23.86
	> secondary (>10)	08	5.11
Family Size	Small(up to 3)	23	15.33
	Medium (4-6)	44	29.33
	Large (above 6)	83	55.33
Main Occupation	Agriculture	47	31.33
	Farming	8	5.33
	Business	4	2.46
	Service	2	1.64
	Labour	89	59.33
Marital status	Married	122	81.33
	Unmarried	5	3.33
	Others	23	15.33
Farm size (hectare)	Landless (upto-0.02 acre)	94	62.67
	Marginal (0.021-0.20 acre)	47	31.33
	Small (0.21-1.00 acre)	6	4.00
	Large (Above 3.00 acre)	3	2.00
	Own	74	49.33
Source of Investment	Bank	4	2.67
	NGO	146	97.33
Annual income (Thousand Tk.)	Low (50-106)	119	79.33
	Medium (107-150)	27	18.00
	High (151-400)	4	2.67

### **3.1.4 Farm size**

This study revealed that about two-thirds (62.67%) of the goat farmers had no land while 31.33% had up to 0.02 acres of land. This indicated that a large number of the goat farmers were poor and had no hereditary land resources. Very small portions of the respondent were small and large farmers. The findings were in line with the findings of Verma et al. [16] and Deshpande et al. [14] who detailed that most parts of the goat keepers was landless. Moreover, Tanwar et al. [10] and Thombre et al. [15] expressed that a greater proportion of the goat farmers were small marginal farmers with 1-5 sections of land.

### **3.1.5 Family size and marital status**

Per capita income of the household depends largely on the family size. A family, consisting large member earns less than a family with small size. Also small family has relatively greater opportunity to save more from their incomes. The goat rearing farmers in the study area mostly had a large family size (55.34%) followed by small (15.33%) and medium family size (29.33%). This demonstrated that they were aware of the benefits of family planning but not applying it in real life. The outcomes are in accordance with the findings of Deshpande et al. [14] and Tanwar et al. [10] who found in their investigation that greater part of the goat farmers had a small family size (up to 5 individuals) followed by medium family size (6-10 individuals) and large family size (more than 10 individuals). Majority of the goat farmers (81.33%) were married, and they lived with their families. Only 3.33% were unmarried and rest of the farmers was divorced or widow.

### **3.1.6 Source of investment**

The amount of money or property committed for future returns are termed as an investment. Investment is important to expand business and to earn higher returns. From Table 1, it is perceived that half of the respondents used their fund to start farming. A minimal (2.67%) number of farmers used bank loan. The main reason behind this was that acquiring a loan from the bank was a very complicated matter and needed a lot of legal documents. Farmers preferred NGOs than a bank to acquire loans to start goat farming as evident in Table 1.

### **3.1.7 Annual income**

The annual income of the farmer varies from person to person and it ranged from 50,000 to

400,000 Tk (625\$ to 5,000\$). There are three categories of farmers depending on their income namely: low, medium and high. From Table 1, it was found that most of the farmers were in low categories (79.33 %) followed by medium (18.00%) and high (2.67%) income group. Though Raghava and Raja [17] Shinde et al. [18] and Braj Mohan et al. [19] reported the majority of goat farmers (34%) were in a medium income group.

## **3.2 Management Practice**

### **3.2.1 Housing system**

Most of the farmer being landless in Sylhet preferred to build their farm shed with a natural resources like bamboo, wood or sometimes coconut and straw over the roof. There were also some sheds made with mud / soil which are traditional in some of the areas of Sylhet. Table 2 illustrates the housing management of goat in the area, where it was found that most of the sheds were made with tin (54%); though a certain amount of sheds were made with bamboo-straw (28%) along with soil and other materials (Coconut or Nipa Palm leaves).

Macha is one kind of good management practice for goat rearing that holds floor level up to the earth. But in Sylhet very less number of goat rearing farmers (15.33%) built this system in their goat shed and rest of the farmers (84.67%) didn't. It resulted, frequent disease occurrence in the farm. Moreover, due to the lack of proper house designing planning, they failed to maintain adequate ventilation to the shed, though it is very important for goat comfort. Table 2 showed that only 19.33 % shed had sufficient ventilation whether rest of sheds having insufficient (59.33%) or no ventilation (21.33%) facility.

### **3.2.2 House cleaning**

It is clearly important to clean up the house regularly, to keep a good condition of goat health. Unhealthy and sick goats are less profitable and sometimes may die due to lack of immunity level. For keeping goats it's not important to use expensive drugs and consult with veterinary experts. It can be solved by proper vaccination and regular cleaning of the shed as well as proper hygiene management [20]. Table 2 illustrates that a large proportion of the farmers (79.33%) didn't adopt any significant sanitary measures regularly, which is one of the

main reason of less production performance and high mortality in the study area.

### **3.2.3 Goat feeding management**

Feeding management is one of the most important factors in goat farming. Feed cost is the highest cost among all other production costs. On the other hand, normal physiology depends on proper feeding management.

### **3.2.4 Sources of feed and fodder**

Two types of feeding practices prevailed dominantly, one was grazing (36%) only, and the other was grazing with supplement (96%) which was more common practice. No farmer was found giving mere supplements only. From Table 3, it is clear that farmer's preferred grazing with supplement, but most of their grazing system is natural (72%). Very few farmers (20.67%) cultivated high yielding fodder by themselves. It's due to a lot of natural grass available around

their vegetable garden, and they are not willing to cultivate fodder on their land. Shortage of land is also a key factor in their unwillingness.

### **3.2.5 Concentrate feed**

It was found that farmers were not well aware of the concentrate feeding management practices. Most of the farmers (59.33%) provided only wheat bran to goat as concentrate feed thinking that it's enough for goat. Some goat farmers (20%) collected various feed ingredients (wheat bran, broken rice, rice polish, oil cake, etc.) and prepared a mixed feed in their farm premises as a balanced feed. Nowadays commercial feed is also getting popular. Table 3 showed 8.67% of farmers were using commercial feed. During the study most of the goat farmer showed a willingness to use commercial feed. For their flocks, 12% farmers didn't provide any concentrate feed and depended on natural grazing only.

**Table 2. Housing system of goat farm**

<b>Characteristics</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent (%)</b>
Type	Tin-shed	81	54.00
	Bamboo-straw made	42	28.00
	Soil and others made	27	18.00
Macha	Yes	23	15.33
	No	127	84.67
Ventilation	Sufficient	29	19.33
	Insufficient	89	59.33
	Not at all	32	21.33
House cleaning regularly	Yes	119	79.33
	No	31	20.67

**Table 3. Goat feeding management**

<b>Characteristics</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent (%)</b>
Sources of feed	Only Grazing	54	36.00
	Only feed Supplement	-	-
	Grazing & Supplement	96	64.00
Fodder Source	Cultivation	31	20.67
	Natural	108	72.00
	Buying	11	7.33
Concentrate feed	Commercial feed	13	8.67
	Wheat bran	89	59.33
	Mixed	30	20.00
	Not at all	18	12.00
Provision of drinking water in the shed	Yes	-	-
	No	150	100

### **3.2.6 Provision of drinking water in the shed**

Table 4 showed the type of breed reared by a farmer in Sylhet region. From the study, it is apparent that lion's share of the farmer (74.67%) was rearing Black Bengal due to its high reproductive capacity, high consumer demand and easy management.

**Table 4. Available breeds in the study area**

<b>Category</b>	<b>Frequency</b>	<b>Percent (%)</b>
Black Bengal	112	74.67
Jamuna Pari	14	9.33
Cross Breed	11	7.33
Others	13	8.67

There were also some 9.33% of the farmers (rearing Jamuna Pari as an ornamental animal and sometimes as their hobby. But there were also found some crossbreed (8.67 %) among the respondent farmers.

### **3.2.7 Disease prevalence**

There are some diseases that frequently break down in the study area. It was realised that goat farmers should be provided with some basic training regarding goat diseases, control and

treatment So, it's important to have some idea about common diseases of goat for better health management and decision making. The idea of respondent goat farmer about diseases of the goat has shown in Table 5. About two-thirds of the goat farmers (66%) have partial idea followed by 22.00% farmer having a clear idea about the goat disease. There were some goat farmers who don't have any knowledge on this issue. The main reason behind this is the lack of training on goat rearing and diseases as mentioned by the respondent.

### **3.2.8 Vaccination and vaccine source**

Prevention is always better than the cure of disease and vaccination is the only way to keep disease away from the farm. Normally, there is only one common vaccine (Peste des Pestis Ruminant) available for goat in Bangladesh that is produced by Livestock Research Institute. And, it is the fatal disease for goat but 58.00% goat rearing farmers didn't follow any proper vaccination schedule. Only 18.67% of farmers were well aware of regular vaccination. Livestock Research Institute is the only supplier who supplies to the veterinary hospitals, but 56% of farmer purchased vaccine from the local market.

**Table 5. Prevention and control of diseases in farm house**

<b>Characteristics</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent (%)</b>
Idea about disease	Clear idea	33	22.00
	Partial idea	99	66.00
	Not at all	18	12.00
Vaccination	Regular	28	18.67
	Irregular	87	58.00
	Not at all	35	23.33
Vaccine source	Vet office	66	44.00
	Local Market	84	56.00
Anthelmintic	Regular	45	30.00
	Irregular	47	31.33
	Not at all	58	38.67
Veterinary services	Veterinary doctor	30	20.00
	Village doctor	90	60.00
	No consultancy	30	20.00
Dispose of Dead Carcass	Burn	-	-
	Buried	131	87.33
	Left to decay outside village	19	12.67
	Handed over to Butcher	-	-
Dispose Of Placenta	Throwing	85	56.67
	Buried	65	43.33

**Table 6. Breeding system practiced in the study area**

Characteristics	Category	Frequency	Percent (%)
Breeding method	Natural	145	96.67
	Controlled	5	3.33
Source of breeding buck	Borrowed	23	15.33
	Own herd	18	12.00
	Hired	104	69.33
	Bought	5	3.33

### **3.2.9 Anthelmintic**

Parasitic infestation is very common in Bangladesh which causes different ailments in livestock and the result is a decline in their production. Different types of parasitic infections cause economic losses regarding mortality, reduced growth and decreased milk production. Some parasites are also responsible for the deterioration in skin quality [21,22]. Table 5 shows that 38.67% of goat rearing farmers didn't use anthelmintic or any other preventive measures to control the parasitic infestation. Percentages of farmers, who regularly used anthelmintic were almost equal to the other group that is 30% and 31.33% respectively. There was a misconception amongst farmer that anthelmintic had to be used only in lifetime of goat's.

### **3.2.10 Disposal of dead body and placenta**

To reduce disease prevalence, hygiene management in the area is important. Proper hygienic management is possible by proper disposal of dead body and placenta as they are the source of different diseases. The study revealed that 87.33% farmer buried a dead body and 12.67% farmer threw it into the canal, rivers or outside of the village. No respondent destroyed the carcasses by burning though it was the best and significant method of dead body disposal. In case of the placenta, half of the respondent (56.67 %) threw it to outside and rest of the respondent buried it in the soil.

### **3.2.11 Breeding system**

The dominant part of farmers (96.67%) followed natural breeding compared to control breeding due to unavailability of controlled system facility in this area (Table 6). Most of the time, farmers castrate the male kids after the same day of birth to increase meat quality as well as for getting more profit. However, a small part of the farmer (3.33%) used control system for breeding. As a result, most of the farmers hired buck (69.33%)

or borrowed (15.33%) bucks for breeding which lead towards inbreeding and were not well aware of future problems of inbreeding. They also considered it an easy method to breed their goats, and there were no alternative systems available in the study area. Kosgey's [23] findings are in-line with the present result. In his report, he made Kenyan farmers to the lower ranked for keeping a goat for breeding purpose.

## **4. CONCLUSION AND RECOMMENDATION**

It can be summarised from the present study that most of the farmers were middle- aged with medium family size and owner of little or no land. These farmers also needed to take a loan for starting their goat- rearing business though it's not their main business. Moreover, due to lack of technical knowledge their housing management was not well established, also they still followed the traditional feeding system depending on natural forage and wheat bran as a concentrate feed. There were also misconceptions on disease prevention amongst the farmers, they were not using the vaccine and anthelmintic regularly and taking technical support from village doctor. Disposal of dead body and placenta were either buried in soil or thrown outdoors. In case of breeding, farmers use buck without any attention to inbreeding. So, goat farming would be more promising in the area if the issues regarding housing, feeding, and disease control as well as using improved breeding system could be solved. In the study area, a significant number of farmers are involved in goat farming and it seems a profitable business. Government and non-government agencies should give an extra care in this area to uplift the socio- economic conditions of the farmers by intervening in the aforesaid management tools for improvement. Considering this, they should arrange regular training programmes and make them aware of the scientific feeding, breeding, management and disease control in goats.



## ACKNOWLEDGEMENT

Authors are thankful to the respondents for their cooperations during the data collection and also to the reviewers for their valuable comments and instructions.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Ensminger ME, Parker RO. Sheep and goat science, Fifth Edition. Danville, Illinois: The Interstate Printers and Publishers Inc.; 1986.
2. Aziz MA. Present status of the world goat populations and their productivity. *World*. 2010;861(1078.2):1.
3. Sarker S, Islam MH. Prevalence and risk factor assessment of Peste des petits ruminants in goats in Rajshahi, Bangladesh. *Vet World*. 2011;4(12):546-9.
4. Devendra C. Potential of sheep and goats in less developed countries. *Journal of Animal Science*. 1980;51(2):461-73.
5. BBS (Bangladesh Bureau of Statistics). Book SP; 2014. Available:<http://tinyurl.com/3g9dmus> (Accessed 21/07/18)
6. Assan N, Sibanda M. Goat production in the smallholder section in the Matobo district in semi arid areas of Zimbabwe. *Agricultural Advances*. 2014;3(8):218-28.
7. Kosgey IS, Rowlands GJ, Van Arendonk JA, Baker RL. Small ruminant production in smallholder and pastoral/extensive farming systems in Kenya. *Small Ruminant Research*. 2008;77(1):11-24.
8. Nipane SF, Basunathe VK, Bankar SS, Seth P, Singh N, Singh NK. Socio-economic status of goat keepers in Bhandara District of Maharashtra State. *International Journal of Science, Environment*. 2016;5(5):3615-3622.
9. Seth P, Chander M, Pandey HK, Kumari R. Motivation to convert from traditional to improved livestock breed innovation: A case of 'T&D' pig breed farming in eastern region of India. *Annals of Plant and Soil Research*. 2015;17:91-3.
10. Tanwar PS, Vaishanava CS, Sharma V. A study on socio-economic aspects of goat keepers and management practices prevailed in the tribal area of Udaipur district of Rajasthan. *Indian J. Anim. Res*. 2008;42(1):71-4.
11. Sharma MC, Pathodiya OP, Jingar SC, Mitesh G. A study on socio-economic status of goat rearers and adoption of management practices. *Indian Journal of Small Ruminants*. 2007;13(1):75-83.
12. Praveena, Veeranna KC, Satyanarayan K, Ramachandra B, Suranagi MD, and Harisha M. Socio-economic profile of goat rearers in Bidar District of Karnataka. *Frontier Journal of Veterinary and Animal Sciences*. 2014;3(2):160-164.
13. Tudu NK, Roy DC. Socio-economic profile of women goat keepers and rearing challenges in goat in Nadia district of West Bengal. *International Journal of Science, Environment and Technology*. 2015;4(2): 331-6.
14. Deshpande SB, Sabapara GP, Malik PK, Sadana DK, Singh PK, Gurmej S, Joshi BK. Morpho-metric characteristics of Surti goats and socio-economic status of Surti goat keepers. *Indian Journal of Animal Sciences*. 2010;80(6):575-7.
15. Thombre BM, Suradkar DD, Mande JV. Adoption of improved goat rearing practices in Osmanabad district. *Indian Journal of Animal Research*. 2010;44(4).
16. Verma NK, Dangi PS, Aggarwal RA, Dixit SP, Kumar R, Ahlawat SP. Gohilwadi goats: Breed characterization management and population status. *Livestock International*. 2007;11(6):18-22.
17. Raghavan KC, Raja TV. Analysis on the socio-economic status of the goat farmers of Malabar Region of Kerala. *Veterinary Research*. 2012;5(4):74-6.
18. Shinde VG, Sangle GK, Dikle RN. Adoption of improved dairy practices by dairy farmers. Maharashtra. *J. Extn. Edu*. 1998;17:144-51.
19. Mohan B, Singh K, Dixit AK. Socio-Economic Status of Goat Farmers in Semi-Arid Zone of Uttar Pradesh. *Indian Research Journal of Extension Education*. 2016;12(2):128-31.
20. Peacock CP. Improving goat production in the tropics: A manual for development workers. Oxfam; 1996.
21. Nooruddin M, Baki MA, Das JG. Clinico-pathological studies of an outbreak of trichuriasis in cow calves. *Indian Journal of Veterinary Medicine*. 1987;7:116-9.
22. Dewan ML, Hossain MI, Baki MA. Pathological investigation on the mortality

- of buffalo calves of Bangladesh, 4: rural oriented treatment and control of round worms (*Neoscaris vitulo um*) infection in buffalo calves at Kanihari union of Mymensingh district. Bangladesh Veterinary Journal; 1979.
23. Kosgey IS, Baker RL, Udo HM, Van Arendonk JA. Successes and failures of small ruminant breeding programmes in the tropics: A review. Small Ruminant Research. 2006;61(1):13-28.

© 2018 Islam et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*

*The peer review history for this paper can be accessed here:*  
<http://www.sciencedomain.org/review-history/26486>