Study on demography, management, and performances of goats on smallholdings in Chattogram district

A production report submitted in partial satisfaction of the requirement for the Degree of Doctor of Veterinary Medicine (DVM)

Submitted by

Sujoy Das

Roll No: 18/16

Reg No: 02074

Intern ID: 15

Session: 2017-18

Faculty of Veterinary Medicine

Chattogram Veterinary and Animal Sciences University

Khulshi, Chattogram – 4225, Bangladesh

August,2023

Study on demography, management, and performances of goats on smallholdings in Chattogram district

Submitted by

Sujoy Das

Roll No: 18/16

Reg No: 02074

Intern ID: 15

Session: 2017-18

Approved as to style and content by

Professor Dr. Ashutosh Das

Department of Genetics and Animal Breeding

Faculty of Veterinary Medicine

Chattogram Veterinary and Animal Sciences University

Khulshi, Chattogram- 4225, Bangladesh.

August,2023

Biography

I am Sujoy Das, the son of Samarendra Das and Arunika Sengupta. I passed my Secondary School Certificate examination from Nasirabad Government High School, Chattogram in 2014 (G.P.A-5.00) and Higher Secondary School Certificate examination from Government Hazi Muhammad Mohsin College, Chattogram in 2016 (G.P.A-5.00). Now I am an intern veterinarian under the Faculty of Veterinary Medicine at Chattogram Veterinary and Animal Sciences University, Bangladesh. I am passionate about veterinary medical research and want to use my skills and creativity to help the nation overcome the present obstacles in this sector.

Table of contents

List of tables

List of figures

Acknowledgement

The author is eternally grateful and thankful to the Almighty “GOD”, the supreme ruler of the universe, without his blessing he would not have been able to successfully finish the research work and this Production report on study on demography, management, and performances of goats on smallholdings in Chattogram district.

The author would like to express his gratitude to his respectful internship supervisor, Professor Dr. Ashutosh Das of the Department of Genetics and Animal Breeding in the Faculty of Veterinary Medicine at Chattogram Veterinary and Animal Sciences University, for his intellectual guidance, valuable advice, and ongoing encouragement throughout the study's duration to finish this production report.

The author would also want to express his heartfelt thanks to Professor Dr. A.S.M Lutful Ahasan, honorable vice chancellor of Chattogram Veterinary and Animal Sciences University.

The author expresses gratitude to Professor Dr. Mohammad Lutfur Rahman, Dean of the Faculty of Veterinary Medicine, and Professor Dr. A.K.M. Saifuddin, Director of External Affairs, for offering an exceptional internship program and research experience.

Last but not least, the author would like to express his deep appreciation and immense gratitude to his respected parents for their heartfelt blessings, affectionate feelings, encouragement, and other sacrifices made in order for the author to pursue higher education and successfully complete this study work. The author would also want to express her gratitude to his friends, well-wishers, and staff members who assisted with the questionnaire survey for their kind cooperation in getting this done.

The Author

August,2023

Abstract

The study aimed to learn about the demography, management, and performance of goats on smallholdings in the Chattogram district. Data for this study were gathered randomly from 90 female goats over 2.5 months, from 16 April 2023 to 30 June 2023, This study primarily gathered data for breed, age, body weight, flock size with sex ratio, feeding, vaccination, deworming, litter size with sex ratio, and litter survival number. Results indicated that flock size ranged from 3 to 33, with a median of 21, the mean male-to-female ratio was 1:1.60 in each flock, the average age of the chosen does was 30±1.43 months. In the study, around 32% of farmers fed solely roughage to their goats, whereas the remaining 68% fed both roughage and concentrate. Around 68% of the farmers vaccinated their goats whereas the remaining 32% is not in the study. The statistical mean live weight of Black Bengal, Jamunapari, Haryana, Cross breed, Totapuri, Khari, and Barbari was 25.51±1.36, 34.70±2.53, 30.84±2.86, 28.68±3.05, 31.40±2.38, 41.00±9.00, and 34.00±4.93 respectively, according to breed, whereas highest in Khari The mean litter size of Black Bengal, Jamunapari, Haryana, Crossbreed, Totapuri, Khari, and Barbari was 2.59±0.79, 1.65±0.11, 1.85±0.53, 2.15±0.22, 1.80±0.20, 2.00±0.00 and 1.00±0.00 respectively, whereas largest in Black Bengal. The male-to-female ratio in litters of Black Bengal, Jamunapari, Haryana, Crossbreed, Totapuri, Khari, and Barbari was 1:1.59, 1:0.65, 1:1, 1:1, 1:0.50, 1:0, 1:2 respectively. In Black Bengal, Jamunapari, Haryana, Crossbreed, Totapuri, Khari, and Barbari, the percentage of kid survival rate was 97.14%, 100%, 88.46%, 95.12%, 100%, 100%, and 66.67% respectively. The highest kid survival rate observed in Jamunapari, Totapuri and Khari. The 2nd highest was Black Bengal. As a result, it is possible to assume that the findings of this study will be the future solution to poverty in the study region Chattogram throughout Bangladesh.

Keywords: demography, management, performance, litter size, kid survival rate.

CHAPTER-I

Introduction

In Bangladesh, goats are the most prevalent livestock species. In order to combat poverty, the government has placed additional focus on goat farming and developed a national initiative (Paul et al., 2020). The goat comes in second place in Bangladesh regarding livestock output, contributing around 38.0, 23.1, and 28.0% of all meat, milk, and skin production (FAO, 2010). The goat is often known as the "poor man's cow." This is because the goat has a long history of being related with people. Its production, size, and food quality have all benefitted people over time (Aziz, 2020).

Compared beef, goat products such as meat (chevon) and milk have no religious restrictions and are widely consumed worldwide. According to the World Health Organization, approximately 70% of the global population is hypersensitive to cow's milk (Tayeb et al., 2020) with skin rash, gas, and stomachache symptoms. However, no such sensitivity has been observed for goat's milk.

The Chittagong area of Bangladesh is home to a large population of goats. The region's hot and humid weather makes it a haven for goat farming. Goats of the Black Bengal, Jamunapari, Haryana, Totapuri, Khari, Barbari and Crossbreeds are present in this area.

The Black Bengal goats made up more than 90% of the goat population in Bangladesh (Paul et al., 2011). Black Bengal goats are raised primarily for meat production. However, they are also renowned for their procreation, fertility, fecundity, excellent resistance, early sexual maturation, the

delicate nature of their flesh, and outstanding skin quality (Devendra et al., 1983).

Because of their huge body size and milk output, Jamunapari are considered dual-purpose animals. In Bangladesh, it is also a well-adapted goat breed (Jannat et al., 2023). They are a huge breed with unusually large ears.

Haryana, Totapuri, Khari, Barbari, and Cross breeds are also becoming increasingly popular because of their great productivity. However, there is a need for more information about their demography, management, and performance in Chattogram district. Consequently, analyzing these goat factors that result in increased production on smallholdings in Chattogram becomes sensible. As a result, the current study was developed to study the demography, management, and performance of goats on small holdings in Chattogram district.

The study has objectives as follows:

1. To learn about the demography of goats on smallholdings in Chattogram.
2. To understand how smallholder farmers in Chattogram conduct management practices such as feeding and vaccination.
3. To understand the performance of goats on smallholdings.

CHAPTER-II

Literature Review

Goats play a significant part in the livelihoods of smallholder farmers in Bangladesh because they serve as resources that may be quickly liquidated to provide income in times of need (Akhter et al., 2006). In Asia, however, the population of small ruminants (sheep and goats) is growing at a far faster pace (5.3 vs. 1.8%) than that of large ruminants (cattle and buffalo). This is most likely owing to the fact that raising small ruminants has several advantages, such as requiring a limited space, being a constant producer in poor times, being a prolific breeder, and having a lower nutritional demand than cattle and buffalo (Morand-Fehr et al., 1999). It is possible for small holders in Chattogram to raise goats by keeping them on tree leaves, bushes, and shrubs in the surrounding area. On a small holding, women and children, on the other hand, may easily handle this species. Low birth weight, slow growth, and child mortality are caused by nutritional deficiencies in kids, especially those produced by prenatal and postnatal maternal deficiencies, which are lower in this species' entire productivity (Husain, 1993). However, there is a need for more information about their demography, management, and performance in Chattogram district for increasing production on smallholdings in Chattogram. As a result, the current study was developed to study the demography, management, and performance of goats on small holdings in Chattogram district.

CHAPTER-III

Materials and methods

3.1. Study period and area

The study was conducted for 2.5 months, from 16 April 2023 to 30 June 2023, in many areas of the Chattogram district, including Chattogram Town, Roazan Upazila, and Hathazari Upazila. I have picked a location for my study where goats are raised in smallholdings.

3.2. Selection of animals

For this study, 90 does were chosen at random, comprising 27 Black Bengal, 20 Jamunapari, 19 Crossbred, 14 Haryana, 5 Totapuri, 2 Khari, and 3 Barbari goats to assess their demography, management effectiveness, and performance. They are mostly raised in intensive circumstances.

3.3. Data Collection

To achieve the objectives of the study, the questionnaire was created. A random door-to-door survey of goat-owners' houses was done to obtain data. Each farmer received a questionnaire, which was carefully and regularly checked during visits. In the questionnaire, the following details were given:

1. Owner's information
    a) Name of the owner and occupation
    b) Location
    c) Farm name (if applicable)
1. Animal's Information
    a) Breed, Flock size, Number of male and female
    b) Age & weight
    c) Vaccination and Deworming
    d) Feeding (Roughage or Concentrate)

e) Gestation Period, Litter size, Survival number
f) Reason for the death of litter (if applicable)
g) Any previous disease condition of doe (if applicable)

According to the study's goals, the gathered data was arranged, compiled in a Microsoft Excel spreadsheet, and evaluated.

3.4. Statistical analysis

The acquired data was saved in Excel-2016, and descriptive statistics (Mean, median, standard error mean) were generated to compare the different variables. Mean values were found for age, male-female ratio, body weight and litter size. The standard error of the mean was computed to determine how representative is the sample of the population and to ensure validity.

Figure 1: Picture of different smallholdings goat farms in Chattogram and data collection.

CHAPTER- IV

Results

4.1 Population structure

4.1.1. Breed distribution

The number of Black Bengal, Jamunapari, Haryana, Cross breed, Totapuri, Khari and Barbari does is presented in Table 1. Figure 2 shows a proportional distribution of available breeds and varieties.

Table 1: Distribution of breeds in the studied goat population

Breed	Count
Black Bengal	27
Jamunapari	20
Haryana	14
Cross	19
Totapuri	5
Khari	2
Barbari	3
Total	90

Total 90 does were chosen at random, comprising 27 Black Bengal, 20 Jamunapari, 19 Crossbreed, 14 Haryana, 5 Totapuri, 2 Khari, and 3 Barbari.

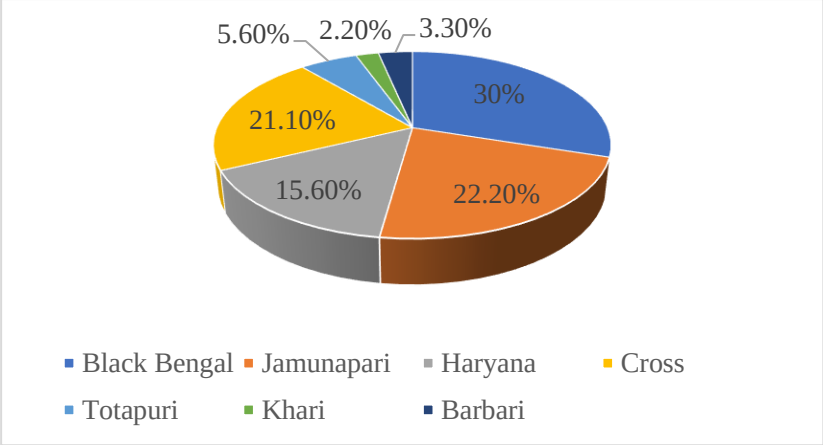

Figure 2: Proportional distribution of the breeds and varieties that are available.

4.1.2. Flock size

The flock size ranged from 3 to 33, with a median of 21.

4.1.3. Male-female ratio

On smallholdings goat farming in the Chattogram district, the mean male to female ratio was 1:1.60 in each flock.

4.1.4. Age distribution

The average age of the chosen does on small holdings in the Chattogram district was 30±1.43 months.

4.2 Management

4.2.1. Feeding Practice

Figure 3 represents how goats were fed in the studied households.

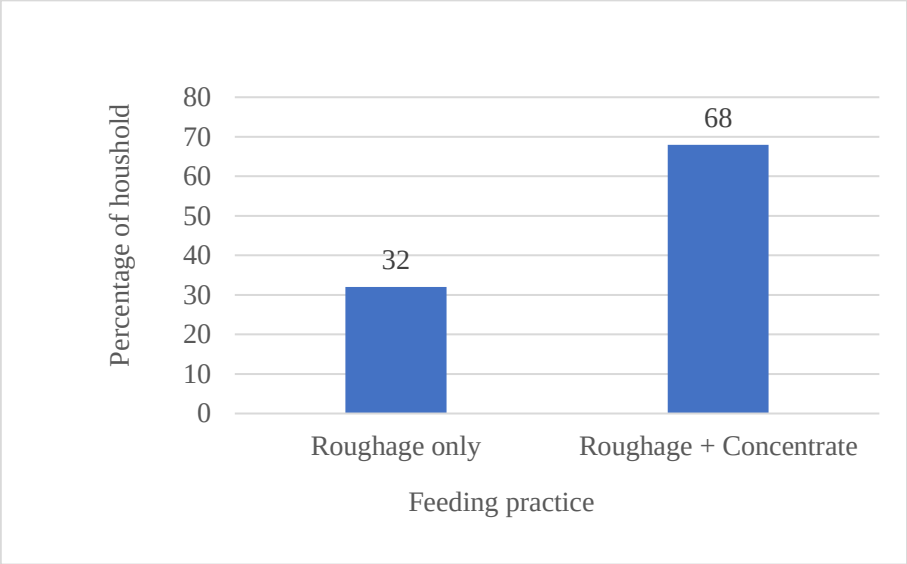

Figure 3: Feeding practice used for goats in the studied households.

In the study, around 32% of farmers fed roughage to their goats, whereas the remaining 68% fed roughage and concentrate.

4.2.2. Vaccination Practice

Vaccination practices in the investigated families are illustrated in Figure 4.

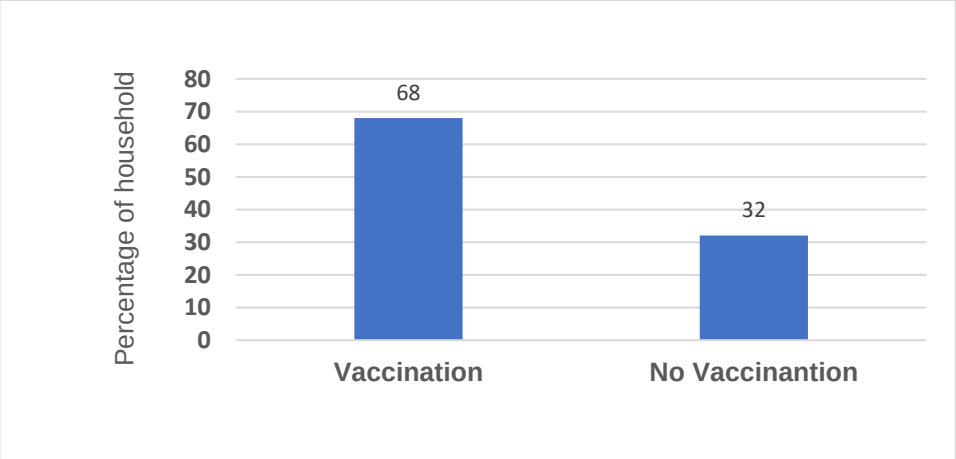

Figure 4: Vaccination practice in the studied households.

Around 68% of the farmers vaccinated their goats, whereas the remaining 32% were not in the study.

4.3. Productive performances

4.3.1. Liveweight

Khari had the highest live weight (41.00±9.00) due to effective management practices, while Black Bengal had the lowest live weight (25.51±1.36) due to their small size (Table 2).

Table 2: Breed-wise distribution of the live weight of does in the studied population.

Breed	Live weight in KG (Mean±SE)
Black Bengal	25.51±1.36
Jamunapari	34.70±2.53
Haryana	30.84±2.86
Cross	28.68±3.05
Totapuri	31.40±2.38
Khari	41.00±9.00
Barbari	34.00±4.93

Table 2 displayed the statistical mean live weight of Black Bengal (25.51±1.36), Jamunapari (34.70±2.53), Haryana (30.84±2.86), Crossbreed (28.68±3.05), Totapuri (31.40±2.38), Khari (41.00±9.00), and Barbari (34.00±4.93).

4.3.2. Litter size

According to breed, the Black Bengal had the largest litter size (2.59±0.79), while the Barbari had the smallest (1.00±0.00) (Table 3).

Table 3: Breed-wise distribution of litter size of does in the studied population.

Breed	Litter size (Mean±SE)
Black Bengal	2.59±0.79
Jamunapari	1.65±0.11
Haryana	1.85±0.53
Cross	2.15±0.22
Totapuri	1.80±0.20
Khari	2.00±0.00
Barbari	1.00±0.00

The mean litter size of Black Bengal (2.59±0.79), Jamunapari (1.65±0.11), Haryana (1.85±0.53), Crossbreed (2.15±0.22), Totapuri (1.80±0.20), Khari (2.00±0.00), and Barbari (1.00±0.00) was shown in Table 3.

4.3.3. Male-female ratio in litter

Table 4: Breed-wise male female ratio of litter in the studied population.

Breed	Male:Female
Black Bengal	1:1.59
Jamunapari	1:0.65
Haryana	1:1
Cross	1:1
Totapuri	1:0.50
Khari	1:0
Barbari	1:2

The male-to-female ratio in litters of Black Bengal, Jamunapari, Haryana, Cross breed, Totapuri, Khari, and Barbari was 1:1.59, 1:0.65, 1:1, 1:1, 1:0.50, 1:0, 1:2 respectively (Table 4).

4.3.4. Kid survival rate

Figure 5 represents breed-wise kid survival rate percentage in the studied population.

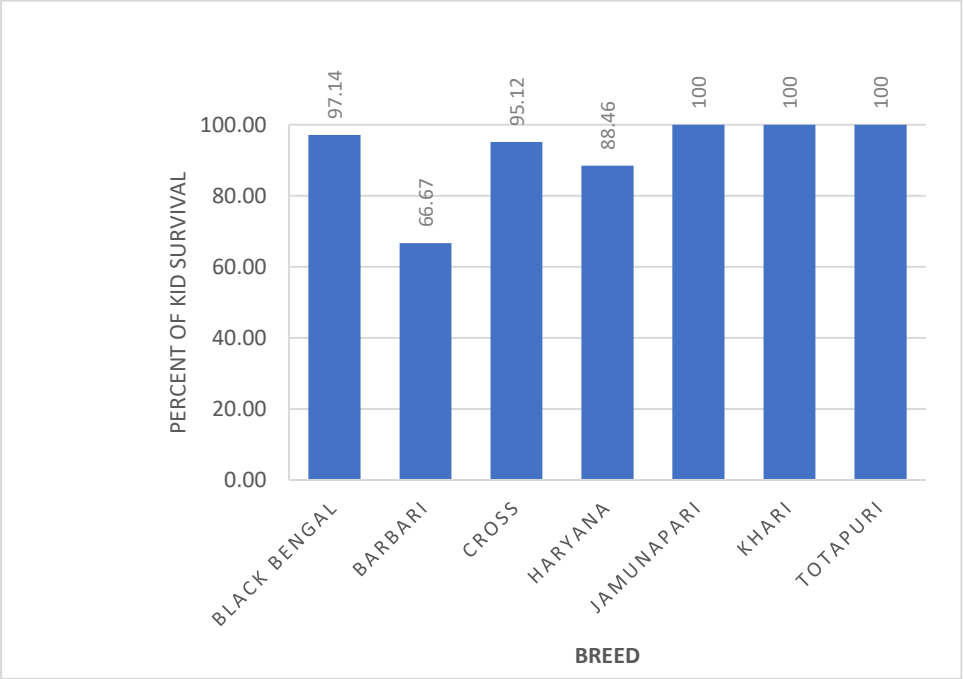

Figure 5: Percent of kid survival in the studied goat population

In Black Bengal, Jamunapari, Haryana, Crossbreed, Totapuri, Khari, and Barbari, the percentage of kid survival rate was 97.14%, 100%, 88.46%, 95.12%, 100%, 100%, and 66.67%,respectively (Figure 5).

CHAPTER-V

Discussion

5.1. Population structure

A field survey was used to evaluate the demography, management, and performance of goats on smallholdings in the Chattogram district. Table 1 lists the total number of does with breed distribution analyzed. A total of 90 does were selected randomly, comprising 27 Black Bengal, 20 Jamunapari, 19 Crossbreed, 14 Haryana, 5 Totapuri, 2 Khari, and 3 Barbari. A large number of Black Bengal does were there. The primary reasons for breeding Black Bengals are their smaller size and prolificacy. Nearly the same amounts of Jamunapari, Crossbreeds, and Haryana were present. Due to their larger size and higher feed requirements, these three breeds' number were substantially lower than those of Black Bangel. Because of their low adaptability, the Totapuri, Khari, and Barbari breeds were few.

The flock size ranged from 3 to 33, with a median of 21. The flock size might vary depending on the farmer's financial circumstances and available area.

In smallholdings goat farming in the Chattogram district, the mean male-to-female ratio was 1:1.60 in each flock, depending on the farmer's objective for rearing.

The average age of the chosen does on small holdings in the Chattogram district was 30±1.43 months. No parameter was significantly influenced by age.

5.2. Management

In Figures 3 and 4, the feeding and vaccination practice was displayed. Due to the farmers' preferences and levels of understanding of these methods, these practices might differ.

5.2.1. Feeding Practice

In the study, around 32% of farmers gave their goats only roughage, while the remaining 68% gave them both roughage and concentrate. (Figure 3)

Due to their belief that it supports gastrointestinal system health, some farmers chose just roughage. Some farmers preferred roughage and concentrate because they thought concentrates improved growth performances and milk yield.

5.2.2. Vaccination Practice

In the study, about 68% of the farmers vaccinated their goats, while the remaining 32% did not (Figure 4) because they were unconcerned about vaccination.

5.3 Productive performances

5.3.1. Liveweight

Table 2 represents the breed-wise distribution of the live weight of animals in the studied population. Black Bengal, Jamunapari, and Crossbreed all had a mean adult live weight of 25.51±1.36, 34.70±2.53, and 28.68±3.05 respectively. Compared to the findings of (Bhowmik et al., 2014), it was somewhat greater for Black Bengal but lower for Jamunapari and Crossbreed. In Haryana, Totapuri, Khari, and Barbari, the mean live weights were 30.84±2.86, 31.40±2.38, 41.00±9.00 and 34.00±4.93 respectively. Black Bengal had the lowest live weight, while Khari had the highest.

5.3.2. Litter size

Table 3 shows the breed-specific distribution of litter size of does in the studied population. Black Bengal, Jamunapari, Haryana, Crossbreed, Totapuri, Khari, and Barbari had mean litter sizes of 2.59±0.79, 1.65±0.11, 1.85±0.53, 2.15±0.22, 1.80±0.20, 2.00±0.00, 1.00±0.00 respectively. In Black Bengal, the litter size was larger than the findings of (Hasan et al., 2015). In Jamunapari, it was also slightly larger the findings of (Paul et al., 2014) and (N.Z et al., 2017). According to breed, the Black Bengal had the largest litter size (2.59±0.79), while the Barbari had the smallest (1.00±0.00).

5.3.3. Male female ratio in litter

Breed-wise male female ratio of litter in the studied population was represented in table 4. The male to female ratio in litters of Black Bengal, Jamunapari, Haryana, Cross breed, Totapuri, Khari, and Barbari was 1:1.59, 1:0.65, 1:1, 1:1, 1:0.50, 1:0, 1:2 respectively.

5.3.4. Kid survival rate

Figure 5 represented the percentage of breed-wise kid survival rate in the studied population. In Black Bengal, Jamunapari, Haryana, Cross breed, Totapuri, Khari, and Barbari, the percentage of kid survival rate was 97.14%, 100%, 88.46%, 95.12%, 100%, 100%, and 66.67% respectively. The highest kid survival rate observed in Jamunapari, Totapuri and Khari. That was 100%. The 2nd highest was Black Bengal (97.14%). The lowest kid survival rate observed in Barbari (66.67%). It may be due to their low adaptability.

CHAPTER-VI

Conclusion

Goats play a significant part in small-holder farming systems. Improved feeding combined with effective management strategies under intensive circumstances may result in greater productive and reproductive performance of goats on smallholdings in Chattogram. However, due to farmers' lack of awareness of husbandry procedures, sometimes production levels do not reach expected levels. As a result, there is an immediate requirement to train farmers in management practices in order to improve goat performance on smallholdings in the Chattogram area.

References

Akhter, S., Husain, S., Chowdhury, S., Munzur, M., & Dev, G. (2006). Estimation of variance components and prediction of breeding value for some economically important traits of Black Bengal goat. *Bangladesh Journal of Animal Science* , 20-26.

Paul, M. J., & F. N. (2020). MANAGEMENT PRACTICES, REPRODUCTIVE PERFORMANCE AND CONSTRAINTS OF GOAT REARING IN BANGLADESH. *Indian Journal of Small Ruminants*, 138-141.

Aziz, M. (2020). Present status of the world goat populations and their productivity.

Devendra, C., & Burns, M. (1983). *Goat Production in the Tropics(Revised edition).* U.K: Commonwealth Agricultural Bureaux.

FAO. (2010). (Food and Agricultural Organization of the United United Nation). In *Production Year Book* (pp. 213-219.). Rome, Italy.

Husain, S. S. (1993). A study on the productive performance and genetic potential of Black Bengal goats (Unpublished doctoral dissertation). *Bangladesh Agricultural University, Mymensingh, Bangladesh.*

Hasan, J. U., & Mohammad Liaquat Osman Mojumder, M. S. (2015). Reproductive performance of Black Bengal goat under semi-intensive and extensive condition in Rajshahi district of Bangladesh. *Asian Journal of Medical and Biological Research*, 22-30.

Morand-Fehr, P., & Boyazoglu, J. (1999). Present state and future outlook of the small ruminant sector. *Small Ruminant Research* , 175-188.

Tayeb, M. s., & Majdy M. Qutub, M. N. (2020). The Allergic Diseases Commonly Associated with Cow Milk Protein Sensitization: A Retrospective Study (Jeddah – Saudi Arabia). *WORLD FAMILY MEDICINE/MIDDLE EAST JOURNAL OF FAMILY MEDICINE VOLUME*, 61-66.

N. Z., S., M. A., Z., & M., A. (2017). Performance of Jamunapari goat (doe) under semi-intensive farming in Pabna district of Bangladesh. *International Journal of Natural Sciences* , 154-157.

Bhowmik, M. M., & Md. Matiur Rahman, S. I. (2014). Preliminary Study on Productive and Reproductive Performances of Jamunapari, Black Bengal and Crossbred Goats at Chittagong Region of Bangladesh. *Iranian Journal of Applied Animal Science.*, 89-93 .

Paul, R., Rahman, A. D., & S., K. M. (2014). Evaluation of productive and reproductive performance of Black Bengal goat. *Bangladesh Animal Husbandry Association. All rights reserved. Bang. J. Anim. Sci.*

Jannat, M. A., Ali Akbar Bhuiyan, N. H., & Mohammad Mahbubul, A. K. (2023). Morphometric characterization and growth performance of Jamunapari goat under semi-intensive production system. *Journal of Fisheries, Livestock and Veterinary*, 101-108.

Paul, M. A., & M. A. Moinuddin, R. C. (2011). Characterization of Black Bengal goat . *Bangladesh Agril. Univ.*, 61–66.