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Enhancing Farmer Awareness: Investigating the Knowledge Gaps in Goat Breeding Practices and Inbreeding Concerns

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Abstract

The farming of goats is essential to the global agricultural sector since it supplies a variety of communities with dairy products. There is a notable lack of knowledge among farmers about the best ways to raise goats and the dangers of inbreeding. The purpose of this investigation was to examine farmers' understanding of goat breeding strategies and their knowledge of the issues surrounding inbreeding. In India, information was gathered about the farmers' level of education, the breed of goats they kept, the size of their herd, the goat breeding method they used, the age at which the goats went into heat and the size of the litter. Goat farmers' educational levels were assessed at the elementary, secondary and higher levels for a total of 269 farmers. Goat herd size per home was 7.64±0.20, but Black Bengal doe litter size was 2.67±0.06. The raising of goats in the investigation area was dominated by individuals with an elementary education. Black Bengal goats were kept by the majority of farmers, as opposed to Jamunapari and Crossbred goats. Goats with more females than males in each household were more numerous. In the examined area, black Bengal doe populations were abundant. The majority of farmers stated that a goat was 7 months old at first heat yet several others said they were 9 months old and some discovered that their goats were 1 year old at first heat. Farmers had little knowledge of the body weight ratio between the bucks and does and the genetic merit of bucks. Every farmer employed the natural mating technique; several were indifferent to the breeding system, while nearly 10% permitted close mating when their does were inseminated, which can have contributed to an inbreeding depression in the goat population.

Keywords: Goats, Breeding, Agricultural Sector, Dairy Products, Awareness.

INTRODUCTION

One of the significant subsectors of India's agricultural economy is the cattle sector. The agricultural sector contributes to farmers' family income supplements, serves as a fallback in the event of crop and market failure, provides support during times of family need and has a recognized contribution to empowering women. Goat farming is one of the noteworthy livestock-based economic options in the rural community for the less fortunate segments of the population (1). There are over 33.63 million goats in Ethiopia; of them, 97% are native breeds. They are raised in agropastoral and crop-livestock agricultural systems and they are dispersed throughout Ethiopia's various agroecological zones (2). One of the most useful animals is a goat. Ethiopia is among the world's top 10 producers of goats. An estimated 31.2 million goats are thought to exist in Ethiopia; with 98.97% of them are native breeds. They are raised in a variety of agroclimatic conditions, from hot, dry and semiarid regions and in an extensive variety of production strategies (3). Goat farming is one of the least resource-intensive and most efficient farming methods due to goats' broad food habits, tolerance to poor environmental circumstances, cheap maintenance costs, intrinsic fit for small-scale production and short reproductive cycle. To better suit the needs of livestock caretakers, which are low on resources, these give goats a comparative edge over cattle and sheep (4). Goats were raised by Ethiopian farmers for a variety of reasons, including food production, socio-cultural concerns and the production of important non-food items like skin and manure. Ethiopian goat populations are enormous, widely distributed and have a variety of uses, although their productivity is low (5).

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Study (6) examined the suitability of the native goat farmers' farming practices and breeding methods in the Hai region, Northern Tanzania, for the creation of a community-based breed program in the area. Study (7) aimed to evaluate the breeding methods, describe the goat production system and produce baseline data for the establishment of a community-based goat breed program in the region. Research (8) examined the feasibility of "community-based livestock Breeding Projects (CBBPs)" as a means to preserve and enhance native small ruminants through the use of case studies with goats. Study (9) performed a survey of households in the arid or semi and sub-humid regions of northwest Ethiopia's area to learn more about the breeding techniques and production systems used by Arab and Oromo goat keepers. Study (10) aimed to understand more about the specific breeding techniques and approaches employed by Rajasthani goat keepers in the Pratapgarh area. They focused the search on the tehsils. From each tehsil, the communities with the greatest covered goat population were chosen at random.

Study (11) identified regions containing copy number variation that were incorrectly classified as homozygous and served the categorization effort by establishing the levels as well as the number of the generations to a common ancestor ("age") connected with inbreeding with African goat breeds. Study (12) aimed to understand breeding goals and pinpoint the selection standards used by goat farmers in Burkina Faso's rural areas, as well as any possible ramifications for the establishment of CBBP. Research (13) examined the connection between genomic and pedigree-based inbreeding in four sheep and two goat dairy breeds. They deduced two genomic inbreeding measures: "pedigree depth (the number of fully traceable generations, FullGen) and inbreeding (FPED) from investigations of the homozygosity (FROH) and genomic relationship matrix (FGRM)."Study (14) examined the genetic connection, genetic inbreed factor and population density in these three different breeds among the three regional goat farms. The different breeds were divided and formed separate groups depending on their genetic links, according to phylogenetic analysis and genomic correlations. Research (15) evaluated goat production restrictions in the Siltie Zone, SNNPR and Ethiopia that assessed breeding along with milking procedures in three agro-ecologies in the zone.

The purpose of this study was to fill in farmers' knowledge gaps regarding breeding techniques and inbreeding depressive disorders in goat populations, as well as to investigate information regarding the goat breeding system used by the rural villages at the study site.

MATERIALS AND METHODS

An overall number of 269 farmers were counted in some villages spread throughout Paliganj, Maner Sharif, Bihta, Bakhtiyarpur, Dinapur, Masaurhi and Paliganj near Patna in India. Data was gathered on farmer education levels, breeds of goats kept, number of goat herds, kind of breeding technique used, age at first heat and size of the litter. The study's design was unbalanced factorial in nature because there were unequal numbers of distinct features observed. The Statistics Package for Social Science Version 14.0 descriptive statistics menu was used to evaluate the data for frequency, percentages and mean values.

RESULTS

Farmers' level of education

The majority of goat farmers (60.97%) had less education than a class eight or class eight pass; others had some higher secondary or secondary schooling (30.86%); a smaller percentage had higher education (BA/BSc to MA/MSc) (8.17%). Table (1) displays the farmers' level of education.

Table (1). The farmers' level of education (Source: Author)

Level of Education	Number of Farmers	Percentage
Below Class Eight to Class Eight	164	60.97%
SSC to HSC	83	30.86%
BA/BSc to MA/MSc	22	8.17%
Total	269	100.00%

Goat herd size by household

On test day, there were 243 families with female goats and 235 with male goats. In Table (2) households, female goat populations (4.34±0.12) were greater than male goat populations (3.30±0.08).

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Table (2). Black Bengal goat herd size per household (Source: Author)

Sex	Mean ± SE
Male	3.30 ± 0.08 (235)
Female	4.34 ± 0.12 (243)
Total	7.64 ± 0.20

Size and profusion of Black Bengals goat litters

On test day, 196 out of the 269 household that were counted had Black Bengal goat kids available. Table (3) displays the extremely prolific Black Bengal goats in the investigated area. A small number of them produce 7 or 8 kids at a time, which was rather amazing. More care must be given to these kinds of does in order to increase goat production in India's rural communities.

Table (3). Black Bengal goats on test day (Source: Author)

Highest number of kids per kidding	Number of occurrences (Percentage out of total 196 does)
7	6 (4.08% out of a total 196 does documented at 196 households on test day)
8	4 (3.07% out of a total 196 does documented at 196 households on test day)
Average number of kids per kidding	
4.67 ± 0.06	(kids of 196 does documented at 196 households)

Age of female Black Bengal goats at first heat

A total of 269 farmers were counted, with 228 farmers out of 243 Black Bengal goat keepers responding to the age-measured beginning heat of their goats, as shown in Table (4).

Table (4). Responded black Bengal goat farmers report (Source: Author)

Age at first heat in month (AFHM)	Number of farmers reported
6	23 (10.09%)
7	89 (39.04%)
8	13 (5.70%)
9	44 (19.30%)
10	6 (2.63%)
11	5 (2.19%)
12	29 (12.72%)
13	6 (2.63%)
14	7 (3.07%)
15	6 (2.63%)
Total	228 (100%)

The majority of farmers (10.09%) stated that the goats they owned were 7 months old at first heat, many (5.70%) said they were 9 months old and some (12.72%) discovered that their goats were 1 year old at first heat. Under a semi-intensive raising approach, the majority of Black Bengal goat producers recorded the age of their goats at first heat, finding that the goats were 198.85±12.68 days old.

Goat breeds and insemination methods are maintained in the villages

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The majority of farmers (90.0%) raised Black Bengal goats, whereas a smaller number raised Jamunapari and crossbred goats, as shown in Table (5). The Black Bengal goat population made up around 91% of all goats.

Table (5). Breeding goats report (Source: Author)

Traits	Farmers Respondents
Goat breed kept	
Black Bengal goat	243 (90.0%)
Jamunapari	19 (7.10%)
Crossbreed	7 (2.90%)
Consider male and female body weight ratio during mating to inseminate their does	
Yes	129 (47.30%)
No	138 (52.70%)
Insemination system practiced	
Natural mating	269 (100.00%)
AI	2
Consider buck genetic merit for inseminating their does	
Yes	102 (36.02%)
No	165 (63.98%)
Breeding system practiced	
Allowed close mating	30 (9.65%)
Did not allow close mating	72 (25.62%)
Did not take care	167 (64.73%)

While many farmers did so, the majority (52.70%) did not take the male-to-female body mass ratio into account while mating to inseminate their does. To disperse their does, all farmers employed the natural mating system.

CONCLUSION

In India, goat farming was the purview of those with a basic education. The vast majority of farmers raise Black Bengal goats as their primary livestock. Interestingly, compared to male goats, households have a higher proportion of female goats. The occurrence of Black Bengal is notable in the researched area, indicating how well-liked they are by the local farmers. One interesting fact about the farmers' expertise is when they think their female goats go through their first heat. Some respondents stated that their female goats were 7 months old when the first heat occurred; others stated that they were 9 months old, while others stated that they were 1 year old. The difference in how old people view themselves could be due to different farming methods or inaccurate record-keeping. When it comes to the care of goats, it is clear that farmers are not well-informed about important topics like the breeding program, the ideal amount of bucks to doe body mass and the genetic worth of bucks. The general management and enhancement of the goat populations in the area are hampered by this knowledge gap. Improving farmers' comprehension of these crucial elements can lead to more efficient and long-lasting goat-rearing techniques. In order to bridge the knowledge gaps that these farmers have, efforts should be focused on education and training programs. Increased productivity and general health of Black Bengal goats in Patna can be achieved by giving them thorough information about breeding practices, suitable buck-doe percentages and the significance of buck genetic value. This could, therefore, have a favorable effect on the farmers' standard of living and support the long-term growth of the regional goat husbandry industry.

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