Original Research Article

GENERAL MANAGEMENT PRACTICES AND SOCIO-ECONOMIC CHARACTERISTICS OF THANJAVUR BLACK GOAT FARMERS OF TAMIL NADU

Abstract

The present study was conducted with the objective ~~of~~ to know~~ing~~ the management practices and socio-economic characteristics of Thanjavur Black goat farmers in Thanjavur, Thiruvarur, Nagapattinam, Tiruchirappalli, and Pudukkottai districts of Tamil Nadu. Data were collected from 250 goat flocks through a pretested interview schedule from April to September 2022. The data was analyzed by percentage, frequency, and the Chi-square test. The study revealed that Thanjavur Black goats were compact and docile in nature, so 54.40 ~~per cent~~% of small farmers (with up to 2.5 acres) preferred to rear this goat. The Thanjavur Black goat is a native goat and mainly reared for meat purposes; 72.80 ~~per cent~~% of the goat flocks were small (1–15 goats). Further, 51.20 ~~per cent~~% of farmers were male, the majority of whom were in their middle age (59.60 %) and had less than 5 years of experience in goat farming (47.20 %). Besides, about 40.40 ~~per cent~~% of the farmers completed their primary education, and farmers, accounting for 69.60 ~~per cent~~% of them, were the most backward community. The study found that the majority of farmers engaged in small-scale goat rearing as an additional source of income. The study further shows that 85 ~~per cent~~% of the goat shelter was half open without a side wall, 50.80 ~~per cent~~% of the farmers followed grazing only with additional rice gruel, 86.80 ~~per cent~~% of mating happened on grazing land with other herd mates, and foot and mouth disease, enterotoxaemia, and *peste des petits ruminants* were major diseases in Thanjavur Black goats. So far, no significant efforts have been attempted to register this indigenous germplasm. The current study was conducted to record the management practices and socio-economic profile of the farmers.

Keywords: Management Practices, Tamil Nadu, Socio-economic, Thanjavur Black Goat.

1. Introduction

Backyard goat farming is an integral part of the lives of landless, small, and marginal agricultural farmers. It helps generate income, create employment opportunities, and uplift the economic status of rural people in India. India has 148.88 million goats, with Tamil Nadu having a population of 9.9 million goats, which is higher than the previous (Report, 2014) census, and the majority of goats were non-descript or a mixture of breeds. The goat population has increased by 10.14 ~~per cent~~% over the previous census. The goat population has increased by 10.35 % in rural areas and by 5.78 % in urban areas (Report, 2019). In India, the vast majority of goat breeds evolved naturally as a result of adaptation to agro-ecological conditions, with other breeds benefiting to a lesser extent from human selection for various purposes. Goat breeds were mainly defined by their geographical position, morphological characteristics, and production performance (Manadal *et al*., 2014). In India, 37 goat breeds were recognized by the National Bureau of Animal Genetic Resources (ICAR-NBAGR, 2022), Karnal. In Tamil Nadu, three goat breeds are recognized, namely Kanni Adu, Kodi Adu, and Salem Black goats were distributed in the southern and northern regions of the state. However, undocumented livestock germplasm is

present in the field. Among those is Thanjavur Black Goat, an undocumented native germplasm. So far, no significant efforts have been attempted to register this indigenous germplasm. A previous study described the Thanjavur Black goat as a smaller-sized black goat from Thanjavur district that is preferred for breeding by Kodi Adu goat farmers in Thanjavur and Pudukkottai districts (Thiruvenkadan, 2012). Thanjavur Black Goat, a native medium sized black goat widely distributed in the eastern region of Tamil Nadu, is mainly reared by farmers in their backyards with free range grazing for meat purposes. The current studies aim to study the management practices followed and the socioeconomic status of Thanjavur Black goat farmers in Tamil Nadu.

2. Materials and methods

Study area and data collection

The present study was carried out in Thanjavur, Thiruvarur, Nagapattinam, Tiruchirappalli, and Pudukkottai districts of Tamil Nadu from April to September 2022. The breeding tract of the Thanjavur Black goat was situated in the Cauvery Delta region, which is located in the eastern part of Tamil Nadu. The study area has 60 ~~per cent~~% cultivated land, and the main crop is paddy. The study region falls within the category of medium and high rainfall zones, and the climate is tropical. This zone receives an annual normal rainfall of 956.3 mm. Alluvial soil in the Cauvery Delta and sandy soil in coastal areas are the predominant soil types. Data were collected from these five districts using stratified random sampling. A total of 250 households' data were collected on management practices and farmers socio-economic profiles using a pretested interview schedule as per the ICAR-NBAGR (2016) guidelines. The interview schedule was carefully prepared to cover all aspects of Thanjavur Black goat farming to collect the most first-hand information (primary data) from the farmers. Besides data pertaining to management practices, information on housing, feeding, breeding, and diseases was collected. The collected data were tabulated and statistically analyzed using frequency, percentage, and the Chi-square test.

3. RESULT AND DISCUSSION

The study result is presented in aspects first it gives information on management practices and second sections provides details about socio-economic characteristics.

3.1 MANAGEMENT PRACTICES FOLLOWED BY THANJAVUR BLACK GOAT FARMERS

3.1.1 Shelter Management

All three housing systems were observed in the breeding tract of the Thanjavur Black goat. Large flocks (>30 goats) were housed away from the living area (17.20 %), mostly on the goat farmer's farmland or in the backyard of the house. Small (1–15 goats) and medium (16–30 goats)-sized flocks were mostly housed adjacent to the owner's house or part of the house (82.30 %). The goats spend the majority of their time on grazing land during the day; nearly 96.40 ~~per cent~~% of farmers provide night shelter to the goats, and only 3.60 ~~per cent~~% provide both day

and night shelter. According to Verma *et al*. (2005), the majority of the Jakhrana goats were kept in open enclosures during the day and in closed housing at night. The percentages of closed, open, and half-open shelter provided to the goat were 5 %, 10 % and 15 %, respectively.

The majority of the Thanjavur Black Goat Shelter was built with no side walls, and 88.40 ~~per cent~~% of them were *kutcha* houses, which were supported by four to six wooden poles and covered with plastic sheets to maintain the structure of the house. Only 11.60 ~~per cent~~% of the houses were *pucca* structures. After kidding, 59.20 ~~per cent~~% of farmers provided kids with separate housing spaces to protect them from rain and sun. The majority of the farmers offered a unique enclosure for kids called a "*kodappu*" or "*koodu*," built of bamboo stalks or Palmyra leaves, or a separate enclosure created by dividing the shed with small wooden sticks in one side of the corner of the shed. This result agrees with the Jain *et al*. (2000) study in Kanni Adu, where kids were kept in a special enclosure called "*koodu*." Cow dung was used to disinfect the floor and prevent cracking.

3.1.2 Feeding practices

Thanjavur Black goats were taken for grazing from 9:00 a.m. to 6:00 p.m. on the common grazing lands, harvested paddy fields, fallow lands, and road sides, which usually cover 2 to 3 kilometers per day. The grazing period and time vary depending on the season and flocks. In this breeding tract, community grazing was practiced by combining three to four flocks and moving them to a common grazing land. They are taken to a common water source around midday. Similarly, Berari goats are also reared through community grazing and go for pasture grazing in the morning and return in the evening (Verma *et al*., 2012).

About 50.80 ~~per cent~~% of the Thanjavur Black goat farmers were grazing only and 48.40 ~~per cent~~% were grazing with concentrated feed like soaked oil cake water and rice gruel. Few farmers were feeding extra concentrate to bucks and pregnant does. The main source of grazing was grasses, herbs, weeds, and tree fodder. Thiruvenkadan and Karunanithi (2006) found that 33 ~~per cent~~% of farmers fed concentrate to their Salem Black goats and allowed them to graze 3–4 kilometers for 6-7 hours per day. On the grazing land, approximately 85 ~~per cent~~% of the farmers were lopping the tree leaves during the day with sickle hooks. After grazing, the goats were tied inside the shed, and then they were fed with dry fodder or tree leaves of Neem (*Azadirachta indica*) and Selanthalai (*Delonix elata*).

3.1.3 Breeding practices

The majority of the small flocks were without breeding bucks; however, 86.80 ~~per cent~~% of mating happens on grazing land with other herd mates and farmers who were unaware of conception details. This suggests that breeding management could be improved to increase the availability of breeding bucks in small flocks and that there may be a need for better communication between farmers to track breeding and conception details. Thanjavur Black Goat Farmers generally did not exchange the male for breeding. Instead, 56.80 ~~per cent~~% of farmers retained the best male for breeding, 37.20 ~~per cent~~% never changed their breeding buck and kept it for more than 5 years, 4.40 ~~per cent~~% were interested in replacing the male and purchased a new buck every 2 years, and 1.60 ~~per cent~~% purchased a buck each year from a local market. Kidding takes place throughout the year; there is no seasonality; however, peaks were noted

between January and March and October and December. This present finding agrees with Jain *et al*. (2000) report in Kanni Adu that kidding peaks in January and March, October and December. This indicates that, Thanjavur Black goat farmers do not practice flock rotation and tend to keep the same breeding bucks for a number of years. The lack of flock rotation and repeated use of breeding bucks could lead to inbreeding and decreased genetic diversity within the Thanjavur Black goat population. It is important for farmers to implement proper breeding management practices to ensure the long-term sustainability of the breed.

3.1.4 Disease prevalence and management

Based on the present survey, foot and mouth disease (FMD), enterotoxaemia, and *peste des petits ruminants (PPR)* diseases were majorly affecting the Thanjavur Black goats. These results were similar with Malabari and Berari goats' management practices (Verma *et al*., 2009; Verma *et al*., 2012). Vaccination of the animals against the diseases was practiced by 39.60 ~~per cent~~ %of the farmers, and 60.40 ~~per cent~~% farmers were not practicing vaccination. The percentage of farmers who routinely dewormed the goats was 70.40 ~~per cent~~% and 29.60 ~~per cent~~ %of farmers were not doing deworming. The most common endoparasitic infections in Thanjavur Black goats were *Amphistomes* and *Strongyle*. Ectoparasitic infestation was common in Thanjavur Black goats infested with Haemophilus ticks, and 96% of farmers washed their animals with ectoparasiticides.

3.2 SOCIO-ECONOMIC PROFILE OF THE THANJAVUR BLACK GOAT FARMERS

The socio-economic profile of the farmers is depicted in Table 1. The majority of goat farmers (51.20 %) were male, with nearly equal numbers of female farmers (48.80%) observed, indicating that women were also actively involved in goat farming. These observations were in agreement with Siyak *et al*. (2020). Further, the majority of the goat owners (59.20 %) were between the ages of 30 and 50, with those over 50 years accounting for 28.40 ~~per cent~~% and those under 30 years accounting for 12.40 ~~per cent~~%. This finding was similar to that of Singh *et al*. (2018), who stated that the majority of goat owners were in middle age (72.50 %) followed by old age. The findings were consistent with those of Siyak *et al*. (2020), who discovered that 65.55 ~~per cent~~% of goat farmers in the Marwar region were in middle age.

According to the findings, 40.40 ~~percent~~ % of Thanjavur black goat farmers had primary education, 35.60 ~~percent~~ %were illiterate, and the remaining 24 ~~percent~~ % had secondary education or higher. Kumar *et al*. (2014) stated that 39.4 ~~per cent~~% farmers in the southern region were illiterate, while 38.38 ~~per cent~~% completed primary school; this finding is consistent with the current study. With regard to occupation, one-third of the farmers (36.80 %) had agriculture along with goat rearing, followed by goat rearing as the primary occupation (35.20 %), goat rearing for extra income as an additional occupation (21.60 %) and integrated farming systems (6.40 %). The present result was closer to Despande *et al.* (2010) study on goat farmers in the Gujarat region, with 38.67 ~~per cent~~% engaged in agriculture with animal husbandry and 57.99 ~~per cent~~% animal husbandry sector solely. Kumar *et al*. (2014) observed that 80 ~~per cent~~% of farmers were engaged in goat farming as a major enterprise, and 15 ~~per cent~~% followed agriculture along with goat farming.

The majority of goat farmers (87.20 %) were from nuclear families, with joint families coming in second (12.80 %). This finding is similar to that of Singh *et al*. (2018), who discovered that 55 ~~per cent~~% of farmers lived in nuclear families and 45 ~~per cent~~% in joint families. According to Kumar *et al*. (2014), 78.33 ~~per cent~~% of goat farmers in Tamil Nadu's southern region prefer to live in nuclear families, while 21.67 per cent prefer to live in joint families. The small flock owners (97.80 %) have an annual income below Rs. 10,000, followed by the medium owners (55.93 %) and large flock owners (11.11 %). Large flock (88.88 %) owners had an annual income above Rs. 10,000, followed by medium (44.06 %) and small flock (2.19 %). Hence, providing regular technical input to the farmers would positively impact the flock size and income of the small farmers.

Further analysis of Table 1 revealed that farming experience was distributed as follows: 47.20 ~~per cent~~% farmers had less than 5 years of experience in goat farming, 21.60 ~~per cent~~% had 5–10 years of experience, 10.40 ~~per cent~~% had 10–15 years of experience, and 20.80 ~~per cent~~% had more than 15 years of experience. This finding is consistent with the Singh *et al*. (2018) study, which found that 50 ~~per cent~~% of goat farmers in Jabalpur had less than 5 years of experience, with 30 ~~per cent~~% and 20 ~~per cent~~% having 10–15 years and more than 10 years of experience, respectively.

Over half of the 54.40 ~~per cent~~% respondents were small farmers (up to 2.5 acres), followed by 35.60 ~~per cent~~% of landless people, 5.20 ~~per cent~~% of large farmers, and 4.40 ~~per cent~~% of marginal farmers. These results differed from other earlier studies by Mohan *et al*. (2012) and Singh *et al*. (2021), and they stated that 51.90 ~~per cent~~% and 53.04 ~~per cent~~% of farmers were landless, respectively. The percentage of a farmer's class belonging from highest to lowest was most backward (69.60 %), scheduled caste (16.40 %), backward (12.80 %) and other communities (1.20 %). The result shows that no specific community is rearing this goat. The results were in accordance with Singh *et al*. (2021). It differs from Verma *et al*. (2012) findings that 90 per cent of the Berari goat keepers were from backward communities.

Table 1: Distribution of respondents according to their socio-economic profile

Sl. No.	Parameters	Number of farmers			Overall (250)	Chi-square
		Small (n=182)	Medium (n=59)	Large (n=9)		
Gender						
1	Male	94 (51.60)	29 (49.20)	5 (55.60)	128 (51.20)	0.18^{NS}
2	Female	88 (48.40)	30 (50.80)	4 (44.40)	122 (48.80)	
Age						
1	Below 30 years	26 (14.30)	5 (8.50)	0	31 (12.40)	7.28^{NS}
2	30-50 year	112 (61.5)	31 (52.50)	5 (55.60)	148 (59.20)	
3	Above 50 years	44 (24.20)	23 (39.00)	4 (44.40)	71 (28.40)	
Educational status						
1.	Illiterate	67 (36.80)	19 (32.20)	3 (33.30	89 (35.60)	11.68^{NS}
2.	Primary (up to V standard)	68 (37.40)	29 (49.20)	4 (44.40)	101 (40.40)	
3.	Secondary (VI to X)	8 (4.40)	6 (10.20)	1 (11.10)	15 (6.00)	
4.	Higher secondary (XI-XII)	26 (14.30)	1 (1.70)	1 (11.10)	28 (11.20)	
5	College / Professionals	13 (7.10)	4 (6.80)	0	17 (6.80)	
Occupation						
1.	Goat Farming only	61 (33.50)	24 (40.70)	3 (33.30)	88 (35.20)	12.28**
2.	Agriculture + Goat farming	66 (36.30)	25 (42.40)	1 (11.10)	92 (36.80)	

3.	Integrated Farming system	15 (8.20)	1 (1.70)	0	16 (6.40)	
4.	Secondary	40 (22.00)	9 (15.30)	5 (55.60)	54 (21.60)	
Family Type						
1.	Nuclear Family	164 (90.10)	46 (78.00)	8 (88.90)	218 (87.20)	5.91**
2.	Joint Family	18 (9.90)	13 (22.00)	1 (11.10)	32 (12.80)	
Income						
1.	<10,000 .00	178 (97.80)	33 (55.93)	1 (11.11)	212 (84.80)	99.93**
2.	>10,000.00	4 (2.19)	26 (44.06)	8 (88.88)	38 (15.20)	
Social status						
1.	OC	2 (1.10)	0	1 (11.10)	3 (1.20)	16.17**
2.	BC	28 (15.40)	4 (6.80)	0	32 (12.80)	
3.	MBC	128 (70.30)	40 (67.80)	6 (66.70)	174 (69.60)	
4.	SCST	24 (13.20)	15 (25.40)	2 (22.20)	41 (16.40)	
Land holding						
1.	Landless	67 (36.80)	20 (33.90)	2 (22.20)	89 (35.60)	4.70^{NS}
2.	Small Farmers (up to 2.5 acres)	100 (54.90)	30 (50.80)	6 (66.70)	136 (54.40)	
3.	Marginal Farmers (up to 5 acres)	7 (3.80)	4 (6.80)	0	11 (4.40)	
4.	Large Farmers (>5 acres)	7 3.80)	5 (8.50)	1 (11.10)	13 (5.20)	
Goat Farming Experience						
1.	< 5years	96 (52.70)	20 (33.90)	2 (22.20)	118 (47.20)	20.09**

2.	5-10 years	41 (22.50)	11 (18.6)	2 (22.20)	54 (21.60)	
3.	10-15 years	19 (10.40)	5 (8.50)	2 (22.20)	26 (10.40)	
4.	> 15 years	26 (14.30)	23 (39.00)	3 (33.30)	52 (20.80)	

Figures in parentheses indicate respective proportions in per cent
NS - Non significant ** - Significant (P < 0.01)

4. Conclusion

The present study provides a comprehensive insight into the various aspects of goat farming in this region. The study gives overall information about the Thanjavur Black goat management practices followed and the socio-economic profile of farmers. The socio-economic profile shows that farmers were rearing this goat along with agriculture, mostly small farmers holding up to 2.5 acres of land. Besides the management practices, goats were kept in either the owner's house or part of the house, grazed with concentrated feed like soaked oil cake water and rice gruel, mated on grazing land with other herd mates, and routine deworming and vaccinations were carried out to maintain the animal's health. A pilot step was taken to get first hand primary data about this goat to register in the NBAGR, Karnal. The study aimed to identify the genetic characteristics of this goat breed and promote its conservation. The data collected from this pilot study will help in the development of a breeding programme for this breed and also aid in the identification of unique traits that can be utilized for improving the overall productivity and sustainability of goat farming. It is important to conserve indigenous goat breeds like this one, as they are well adapted to local environments and play a crucial role in ensuring food security and the livelihoods of small-scale farmers. This initiative can also help in the development of breeding programmes and improve the overall productivity of the breed.

References

Deshpande, S. B., G. P. Sabapara, P. K. Malik, D. K. Sadana, P. K. Singh, Gurmej Singh and B. K. Joshi, 2010. Morpho-metric characteristics of Surti goats and socio-economic status of Surti goat keepers. *Indian Journal of Animal Sciences*, 80(6): 575-577.

ICAR-NBAGR, 2016. Guidelines for Management of Animal Genetic Resources of India. ICAR-NBAGR, Karnal, Haryana.

ICAR-NBAGR, 2022. Guidelines for Management of Animal Genetic Resources of India. ICAR-NBAGR, Karnal, Haryana.

Jain, A., G. Sahana, N. Kandasamy and A.E. Nivsarkar, 2000. Kodi Adu- a new goat breed of Tamil Nadu. *Indian J. Anim. Sci.*,70: 649-651.

Kumar, S. V., V. Ramesh Saravana Kumar, J. Muralidharan, N. Murali and P. Vasanthakumar, 2014. Socio-economic status of goat farmers in southern agro-climatic region of Tamil Nadu. *Indian Journal of Veterinary Sciences & Biotechnology,* 9(4): 89-91.

Manadal, A., M. Karunakaran, P. K. Rout and R. Roy, 2014. Conservation of threatened goat breeds in India. *Animal Genetic Resources/Resources Génétiques Animales/Recursos Genéticos Animales*, 55: 47-55.

Mohan, B., Khushyal Singh and A. K. Dixit, 2012. Socio-economic status of goat farmers in semi-arid zone of Uttar Pradesh. *Indian Research Journal of Extension Education,* 12(2): 128-131.

Report, 2014. 19th Livestock Census - 2012, All India Report. Ministry of Agriculture, Dept. of Animal Husbandry, Dairying and Fisheries, New Delhi.

Report, 2019. 20th Livestock Census - 2019, All India Report. Ministry of Agriculture, Dept. of Animal Husbandry, Dairying and Fisheries, New Delhi.

Singh, S.K., R. Singh, M.K. Mandal and G. Pandey, 2018. Socio-economic profile and existing flock structure of goat farmers in villages of Jabalpur District. Journal of Pharmacognosy and phytochemistry, spi: 1080-1083.

Singh, V.P., R.P. Singh, Avanish Singh, R.K. Singh, S.P. Upadhyay and A.K. Srivastava, 2021. Socio-economic status of farmers in Gorakhpur district of Uttar Pradesh. *Indian Journal of Animal Sciences*, 91(4): 318-320.

Siyak, S., M. Gurjar, M.C. Sharma, Rohitash Kumar and Dushyant Dev Bhal, 2020. Socio-Economic Characteristic of Goat Keepers in Marwar Region of Rajasthan State, India. *Int.J.Curr.Microbiol.App.Sci.* 9(6):2795-2803.

Thiruvenkadan, A.K. 2012. Kodi Adu Goat – A Monograph. Tamil Nadu Veterinary and Animal Sciences University and International Foundation for Science, Sweden.

Thiruvenkadan, A. K. and K. Karunanithi, 2006. Characterisation of Salem Black goats in their home tract. *Animal Genetic Resources/Resources génétiques animales/Recursos genéticos animals,* 38: 67-75.

Verma, N.K., S.P. Dixit, Dinesh Kumar, R.A.K. Aggarwal, R. Sharma and S.P.S. Ahlawat, 2005. Jakhrana – A high potential milch goat breeds of semi-arid region. Monograph, 12. National Bureau of Animal Genetics Resources. Karnal.

Verma, N.K., S.P. Dixit, P.S. Dangi, R.A.K. Aggarwal, S. Kumar and B.K. Joshi, 2009. Malabari goats: Characterization, management, performance and genetic variability. *Indian J. Anim. Sci.*, 79(8): 813-818.

Verma, N.K., S.V. Kuralkar, R.A.K. Aggarwal, S.P. Dixit, Priyanka Mishra, P. Kuralkar, P.S. Dangi and B.K. Joshi, 2012. Berari – An important goat germplasm of Vidarbha. Monograph, 76. National Bureau of Animal Genetics Resources. Karnal.