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Constraints to sustainable sheep farming in Tamil Nadu, India: An ex-post facto analysis

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Abstract

Sheep farming is a vital component of the agrarian economy in Tamil Nadu, India, providing essential resources such as meat, wool, skin, and manure. Despite its potential, the sector faces numerous constraints that limit its sustainability and profitability. This study examines the key challenges in sheep farming in Tamil Nadu, identifying technological, infrastructural, marketing, socio-economic, managemental, and environmental factors that hinder productivity. Through a survey of 1,160 sheep farmers across the state's seven agro-climatic zones, the study explores 37 constraints perceived as most limiting to sheep farming. Using Garrett's Ranking Technique, the study identifies the most pressing issues and calls for targeted interventions to address these challenges. The results highlight significant technological barriers, such as insufficient technical support and limited training programs; infrastructural issues, including inadequate veterinary care and transportation; and marketing challenges, particularly exploitation by middlemen and unscientific price fixation. Socio-economic factors like the high cost of breeding stock and limited land availability intensify these issues, while environmental constraints, including reductions in grazing area, animal disease outbreaks and drought conditions, further threaten the sector's stability. Improved veterinary services, better infrastructure, organized marketing systems, and climate-resilient farming practices are critical to enhancing the sustainability and resilience of sheep farming in Tamil Nadu. The findings provide a foundation for policy recommendations aimed at improving the livelihood of smallholder farmers engaged in sheep rearing.

Keywords: Sheep farming, Tamil Nadu, constraints, sustainable agriculture, socio-economic factors, technological challenges, infrastructure, marketing, climate resilience

Introduction

Sheep possess a multi-faceted utility providing meat, wool, skin, manure, and to some extent milk, contributing to the farmers livelihood [1,2]. It plays an important role in the Indian agrarian economy. A crop of lambs may be marketed from 5-6 months onwards (at least within one year), bringing rather a quick return. Mutton is one kind of meat towards which there is no prejudice by any community in India.

Sheep farming is a good source of livelihood in arid zones where crop production is an uncertainty and thus it suitably fits in dry land development by protecting them from the vagaries of drought and famine. It is suitable to utilize the sparse vegetation in dry land areas through rangeland management and reseeded pasture. Unlike goats, sheep hardly damage any tree. Since sheep eat more different type of plants than any other kind of livestock, they can turn waste into wealth and at the same time improve the appearance of many farms. Because of their close grazing nature and ability to utilize very low-set vegetation which no other animal can utilize and their capacity to cover long distances in search of forage and water, they have often been associated with climate resilient adaptability.

As of 2019, India's sheep population stood at 74.56 million, accounting for 4.03% of the global sheep population, reflecting a 14.1% increase compared to the previous census [3]. In contrast, Tamil Nadu saw a slight decline in its sheep population, from 4.47 million in 2012 to 4.50 million in 2019. Across India, sheep farming remains a vital source of livelihood for smallholder and marginalized farmers, especially in rural areas, where it is often practiced under extensive or semi-intensive systems with minimal input. Sheep are particularly valued for their ability to withstand the challenges of fluctuating climate, feed and water shortages, and tropical diseases. These animals are well-suited for dryland regions, where they can effectively utilize sparse vegetation through rangeland management and reseeding of pastures [4,5]. In Tamil Nadu, sheep farming is not only economically viable but also serves as an important subsidiary occupation for many livestock keepers [6]. Recently, the reduction in grazing land and changes in crop patterns have made sheep farming increasingly vulnerable. The traditional migration of sheep is primarily driven by drought and famine-like conditions in the region [7,8].

Given the potential of sheep farming and its role in enhancing livelihoods, this study aims to analyze the key

constraints faced by sheep farmers in Tamil Nadu, identifying both socio-economic and operational challenges to inform targeted interventions for improving the sustainability and profitability of the sector.

Methodology

The present study on constraints in sheep farming was referred to the general constraints faced by the sheep farmers. The research design for the present study was ex-post facto design since the event had already occurred. The respondents were selected based on multistage random sampling technique representing all the seven agro-climatic zones of Tamil Nadu for the study. From among the seven agro-climatic zones of Tamil Nadu one or two districts which had the highest sheep population was selected. Thus 12 districts were identified for the study. From these districts two blocks were chosen based on sheep population. From each block a cluster of villages involved in sheep farming were selected and 220 sheep farmers were randomly selected in all zones except in high altitude and high rainfall zone wherein 30 respondents were selected each since the sheep population was comparatively very low in these two zones. Thus, a total of 1160 sheep farmers were selected for the study.

An interview schedule was selected as the most appropriate tool for data collection from respondents. The schedule was initially prepared in English and administered in vernacular language Tamil to facilitate ease of understanding. Precautions were taken to ensure that the questions in the schedule were clear, unambiguous, complete, and comprehensive. The constraints identified in sheep farming were categorized into seven sub-heads: management, socio-economic, infrastructural, technological, marketing, situational, and migration-related issues. Data on these constraints were gathered by soliciting responses from sheep owners regarding a predefined list of challenges. A total of 37 constraints, post-stratified into the aforementioned categories, were developed based on input from extension workers, sheep farmers, subject matter specialists, and relevant past studies. Respondents were asked to rank the constraints within each category that were perceived to limit sheep production activities. Garrett's Ranking Technique was employed to analyze the challenges faced by sheep farmers. Respondents were asked to rank the factors limiting their sheep farming activities. The ranks provided by the respondents were then converted into numerical values using the following formula:

$$\text{Per cent position} = \frac{100*(Rij - 0.5)}{Nj}$$

Where, R_{ij} –Rank given for i^{th} factor by j^{th} individual; N_j – Number of factors ranked by j^{th} individual.

The percentage position corresponding to each rank was then converted into scores based on the table provided by Garrett and Woodworth [9]. For each factor, the individual scores were summed and divided by the total number of respondents to obtain the mean score. The mean scores for all factors were arranged in descending order, and ranks were assigned accordingly. The factors with the highest mean scores were identified as the most limiting.

Results and Discussion

A list of seven major areas of constraint prepared in consultation with extension workers and subject matter specialists to ascertain the perception on respondents' constraints in rearing sheep was analysed and presented in this section.

1. Technological Constraints

The Garrett's rank analysis of technological constraints (Table 1) in sheep farming indicated insufficient technical support as highest-ranking constraint, with a score of 73.33, indicating it as the most significant challenge. This was followed by limited availability of training programs (score: 72.14) and low adoption of scientific practices by sheep farmers with a score of 69.56. Inadequate veterinary care ranked fourth with a score of 67.18, while rapid urbanization was ranked fifth, with a slightly lower score of 67.04. These findings highlight the critical areas requiring attention to improve sheep farming practices.

Majority of the sheep farmers did not get the service of veterinarians to take care of their sick animals. The long distance and interior location to reach sheep farmers for grazing and migratory nature resulted in the non-availability of regular consultancy and reduced veterinary support to them. Also, government aided support in terms of scientific marketing and lack of assistance in shearing made the respondent perceive this as a major constraint.

Though a number of training programmes are regularly organized through outreach centers of the State Veterinary University viz., Krishi Vigyan Kendras, Veterinary University Training and Research Centers and Farmers Training Centers it was noticed that sheep farmers underwent less training when compared to dairy, goat, and other livestock and poultry enterprises. The need for training among sheep farmers was not assessed and hence specific programmes were not planned for them. Also, they have not expressed their need due to their poor contact with extension agency.

Sheep farmers being traditional in nature and those who continue to follow ancestral profession did not concentrate on scientific sheep rearing which eventually led to low productivity and income. Hence, they did not follow scientific rearing which fell under major constraint. There is a great demand for mutton in Tamil Nadu, scientific rearing would help to meet this demand and encourage sheep farmers to retain sheep farming due to its assured market as a potential source of livelihood.

Preventive veterinary health care was a major necessity for sheep, which requires regular deworming and vaccination. At present most farmers practiced deworming irregularly. However, vaccination was done only by few and during disease outbreaks. The para-health care personnel viz., vaccinators and health assistants were less in number and could not reach all the farmers resulting in the perception of poor preventive health care. Solving health problems would help to save the life of sheep by keeping away from diseases and by reducing parasitic load which would result in increased weight gain to fetch better market price. In such situations it is necessary that veterinary community health care assistants need to be identified in each village and trained. They could provide better preventive health coverage towards increased productivity.

With industrialization catching up in all parts of the world, Tamil Nadu is no exception. Industrialization took shape to modernization and development which led to land pressure in urban areas and expansion of peri-urban areas. This eventually reduced the agricultural land and grazing area for sheep which the respondents perceived to be a major constraint.

2. Marketing Constraints

The analysis of marketing constraints in sheep farming identified exploitation by middlemen with highest score of 75.89 as the most pressing constraint, followed by unscientific price fixation, with a score of 72.44 and absence of organized marketing agents with a score of 69.72. Inadequate infrastructure at local markets (shandies) was ranked fourth with a score of 68.96, and low prices paid for products ranked fifth with a score of 66.81. Long distance to market, with a score of 63.14, was ranked sixth, while lack of specialized markets ranked seventh, with a score of 60.49.

Sheep marketing is to a very great extent unorganized in the State of Tamil Nadu which eventually made the farmers feel so. The prices were not fixed based on weight or age of the animal. It was arbitrary and the farmers generally sell their animals during distress resulting in low price for their products. Most shandies do not have facilities to pen their sheep with waterers and mangers resulting in stress during sale. The local shandy needs to be provided basic infrastructure that would cater to the animal shelter, water and feed requirements. The local bodies need to act on these issues for development. Since sheep farmers are located in rural areas most of them have less transportation facilities, also they have to travel a long way by foot to sell their sheep resulting in stress to the animal. Hence, they perceived it to be a major constraint.

The farmers preferred to have exclusive shandy for selling of sheep which they perceived as a minor constraint. The availability of such shandy would help them to be recognized and facilitate better marketing. This would also act as a reliable source of marketing and thereby provide encouragement to the sheep farmers.

3. Infrastructural Constraints

The examination of infrastructural constraints in sheep farming identified several significant issues, ranked by Garrett scores. The absence of doorstep extension services was identified as the most pressing challenge, with a score of 71.16. This was followed by limited transport facilities (score: 68.68). The third major constraint, inadequate and delayed preventive healthcare, garnered a score of 67.24. High input costs ranked fourth with a score of 66.51, while lack of institutional support ranked fifth, with a score of 61.74.

During the time of sickness and regular preventive health care, farmers preferred to have door step service, which in most cases was lacking, hence perceived as a major constraint. Also, since they were located in interior rural areas, most of them felt that they lacked transportation facilities, especially to carry sick animals and inputs. The farmers preferred to have regular preventive health care assistance to deworm and vaccinate their animals. Since it was not regular, farmers perceived it as a constraint. Also, the cost of inputs in terms of feed, medicines and vaccines if taken from private agency was high which they perceived as major constraint.

The sheep farmers felt that in early 80's and 90's they were provided with major developmental schemes by the governments. However, in the past three decade's developmental schemes for sheep farmers has reduced and there is less institution catering to their development in terms of specific projects / schemes. In addition to government, few non-governmental institutions also cater to their need, which they perceived it to be a scattered and isolated.

4. Problems During Migration

The Garrett ranking analysis of problems faced during migration highlighted several key challenges, of which the most significant issue was the challenges in choosing migratory routes, which received the highest score of 78.12, followed by night halts in unsecured locations, with a score of 73.95. The third-ranking constraint, stressful and poor living conditions for shepherds, had a score of 70.34. Lack of concentrate feeds ranked fourth with a score of 64.15, while inadequate food for shepherds was ranked fifth, with a score of 58.87. The risk of animal disease outbreaks was sixth, with a score of 57.42, and limited healthcare for the flock ranked seventh with a score of 55.28.

The sheep farmers had difficulty in selecting migrating route, since it required co-operation from land owners, organizing food, selecting halting place, negotiation of rates to halt their animals etc. The next major constraint was night halt in unsecured areas. Most times they have to make their night halt in the open fields along with the flock. This situation kept them under the threat of harmful reptiles and problems related to theft. Since they travelled for long hours during the migration and grazing, they felt that they were under stress and in poor environment which was exhibited as a constraint. They did not provide concentrate feed to their sheep during migration which was of concern to them. The shepherds prepared their own food during migration which was due to problems to access hotels. Disease out-breaks during migration put farmers in crisis, since getting veterinary care during migration was difficult and costly. Hence these factors were perceived to be major constraint.

Health care of the flock during migration was felt as a minor constraint. Since the sheep was under stress with poor preventive health care, improper feed and shelter, the farmer perceived it to be a minor constraint. Only during disease outbreak, they remain a threat to the flock.

5. Managemental Constraints

Under managemental constraints, the most significant challenge was the scarcity of drinking water, which received the highest score of 74.28, which was followed by labour shortages (73.16) and absence of recognized breeds (69.94). Inadequate or unavailable grazing land was ranked fourth with a score of 68.78, while lack of insurance support was ranked fifth, with a score of 63.47. Due to industrialization, most labourers sought industrial / mason jobs which they felt as socially recognized and time bound. Also, drought and reduced water resources put them under difficulty to manage sheep. It was unfortunate that sheep farmers could not procure recognized breeds from organized institutions

which resulted to be a major constraint. Though some institutions possessed recognized breeds, it was not available in large numbers to meet their requirement. Inadequate grazing land and lack of insurance support were minor constraints. This is due to the growing land pressure and urbanization. Also, the procedural difficulty in documenting and making claims for insurance made it difficult for sheep farmers to avail insurance facilities. Hence, they avoided insurance though they knew about its advantages.

6. Socio-Economic Constraints

Among the socio-economic constraints, the high cost of breeding stock emerged as the most significant issue (71.18), followed by insufficient land availability (70.24), and lack of recognition and support (69.22). Theft and security issues ranked fourth (67.16), while the high cost of medicines and treatment ranked fifth (65.75). These socio-economic barriers highlight the need for interventions aimed at improving the financial and institutional viability of sheep farming.

7. Environmental and Operational Constraints

On the environmental and operational front, ongoing reductions in grazing area was identified as the most pressing issue, receiving the highest score of 70.16, followed by the animal disease outbreaks (59.71) and drought conditions (56.47). These environmental challenges underscore the urgent need for targeted interventions to mitigate their impact and ensure the sustainability of sheep farming. Together, these findings emphasize the necessity of addressing both socio-economic and environmental factors to enhance the overall viability and resilience of sheep farming operations.

Table 1: Perceived constraints of the respondents in rearing sheep

S. No.	Constraints	Garret Score	Rank
1.	**Technological constraints**		
	Insufficient technical support	73.33	I
	Limited availability of training programs	72.14	II
	Low adoption of scientific practices by sheep farmers	69.56	III
	Inadequate veterinary care	67.18	IV
	Rapid urbanization	67.04	V
2.	**Marketing constraints**		
	Exploitation by middlemen	75.89	I
	Unscientific price fixation	72.44	II
	Absence of organized marketing agents	69.72	III
	Inadequate infrastructure at local markets (shandies)	68.96	IV
	Low prices paid for products	66.81	V
	Long distance to market	63.14	VI
	Lack of specialized markets	60.49	VII
3.	**Infrastructural constraints**		
	Absence of doorstep extension service	71.16	I
	Limited transport facilities	68.68	II
	Inadequate and delayed preventive health care	67.24	III
	High input costs	66.51	IV
	Lack of institutional support	61.74	V
4.	**Problems during migration**		
	Challenges in choosing migratory routes	78.12	I
	Night halts in unsecured locations	73.95	II
	Stressful and poor living conditions for shepherds	70.34	III
	Lack of concentrate feeds	64.15	IV
	Inadequate food for shepherds	58.87	V
	Risk of animal disease outbreaks	57.42	VI
	Limited healthcare for the flock	55.28	VII
5.	**Managemental Constraints**		
	Scarcity of drinking water	74.28	I
	Labour shortages	73.16	II
	Absence of recognized breeds	69.94	III
	Inadequate or unavailable grazing land	68.78	IV
	Lack of insurance support	63.47	V
6.	**Socio-economic constraints**		
	High cost of breeding stock	71.18	I
	Insufficient land availability	70.24	II
	Lack of recognition and support	69.22	III
	Theft and security issues	67.16	IV
	High cost of medicines and treatment	65.75	V
7	**Environmental and Operational Constraints**		
	Ongoing reduction in grazing area	70.16	I
	Animal disease outbreaks	59.71	II
	Drought conditions	56.47	III

Conclusion

Sheep farming in Tamil Nadu is a crucial component of the rural economy, providing essential resources such as meat, wool,and manure, and serving as a significant livelihood source for many smallholder farmers. However, the sector faces numerous constraints that limit its growth and sustainability. The primary challenges identified include technological constraints such as insufficient technical support, lack of training programmes and low adoption of scientific practices; infrastructural constraints, including inadequate transportation, limited veterinary care and the absence of doorstep extension services; and marketing barriers such as exploitation by middlemen, unscientific price fixation and lack of organized marketing channels. Socio-economic constraints such as the high cost of breeding stock and insufficient land availability, further intensify the difficulties faced by farmers. Also, environmental challenges, including reduced grazing land, animal disease outbreaks and drought conditions, pose significant risks to productivity. These findings underscore the need for targeted interventions to address both operational and socio-economic constraints. Strategic improvements in veterinary services, infrastructure, marketing systems, and climate-resilient practices are essential for enhancing the sustainability, profitability, and resilience of sheep farming in Tamil Nadu.

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