The Pharma Innovation Journal 2023; SP-12(12): 689-693

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(12): 689-693

www.thepharmajournal.com
Received: 10-10-2023
Accepted: 14-11-2023

Damodare Aadesh Sahebrao
Department of Animal Husbandry & Dairying, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Ramesh Pandey
Department of Animal Husbandry & Dairying, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Neeraj
Department of Animal Husbandry & Dairying, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Sana DV Satyanarayana
Department of Animal Husbandry & Dairying, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Sana DV Satyanarayana
Department of Animal Husbandry & Dairying, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Feeding management practices of the goat farming and their impact on the socio-economic status of goat farmers in Akola district, Maharashtra

Damodare Aadesh Sahebrao, Ramesh Pandey, Neeraj and Sana DV Satyanarayana

Abstract
Goat farming is a crucial component of the agricultural landscape in Akola District, Maharashtra, playing a significant role in the livelihoods of local farmers. This study delves into the feeding management practices employed by goat farmers and examines their impact on the socio-economic status of these farmers. Proper feeding and management are essential for ensuring the health, productivity, and overall well-being of goats, and thus, their farmers. By exploring the various feeding practices adopted by goat farmers, this research assesses their implications for the socio-economic status of these farmers. However, despite the potential for successful goat farming in the region, there has been a noticeable decline in goat productivity. This study investigates the underlying reasons for this decline, with a specific focus on feeding management practices. The research was conducted over a two-month period from March to April 2023, employing various data collection methods, including interview schedules, interviews, and direct observations. The methodology covers key aspects, such as the research location, climatic conditions, selection of respondents, construction of interview schedules, measurement of independent variables, data collection, tabulation, and statistical analysis. The study seeks to understand the adoption of recommended scientific management practices by goat farmers and their impact on the socio-economic status of the farmers and the broader goat farming sector. The findings underscore the pressing need for a comprehensive approach to goat farming that includes improved feeding practices, education, and resource management to enhance the health, productivity, and economic sustainability of goat farming in the region.

Keywords: Goat farming, feeding management practices, Akola district, Maharashtra, adoption, constraints, resource management

Introduction
Goat farming plays a significant role in the livelihoods of farmers in Akola District, Maharashtra. This study focuses on the feeding management practices in goat farming and their impact on the socio-economic status of goat farmers in the region. The proper feeding and management of goats are essential for their health, productivity, and overall well-being. This study aims to explore the various feeding practices adopted by goat farmers and assess their implications for the socio-economic status of the farmers (Smith & Johnson, 2022) [13].

In Akola District, goat rearing is a crucial enterprise, particularly for the tribal communities. However, despite the potential for goat farming in the region, there has been a noticeable decline in goat productivity. This study aims to investigate the reasons behind this decline, with a specific focus on feeding management practices (Gupta, 2021) [5].

The research methodology involves data collection during a two-month period from March 2023 to April 2023. Various tools, including interview schedules, interviews, and direct observations, are used to gather information on feeding practices and their impact on socio-economic factors. The study covers aspects such as the location of research, climatic conditions, selection of respondents, construction of interview schedules, measurement of independent variables, data collection, tabulation, and statistical analysis (Snedecor & Cochran, 2004) [16].

Furthermore, the study aims to understand the adoption of recommended scientific management practices by goat farmers. It assesses how these practices affect the socio-economic status of farmers and the overall goat farming sector in Akola District (Chandel, 1998) [2].

Materials and Methods

The methodology employed for conducting a study on various goat husbandry practices in Akola tehsil of Akola District, Maharashtra, is outlined. The study aimed to achieve specific objectives during a two-month period from March 2023 to April 2023. Various tools and methods were used for data collection, including interview schedules, interview guides, and direct observations.

The methodology included the following key components

Location of Research: Akola district in Maharashtra was selected for the study, primarily due to its significance in goat rearing and the need to address the declining productivity of goats in the area.

Climatological Description of Study Area: Detailed information about the geographical and climatic conditions of Akola, including its location, population, and regional characteristics, was provided.

Selection of Goat Rearers/Respondents: The study focused on Akola District, with a purposive selection of one tehsil, Akola. Five villages were chosen, and a total of 80 respondents were selected randomly from these villages, representing various strata and herd sizes.

Construction of Interview Schedule: An interview schedule was developed in collaboration with experts in the field to collect data relevant to the study's objectives.

Measurement of Independent Variables: Several independent variables were considered, such as age, education level, flock size, landholding, and family size. These variables were categorized to facilitate data analysis.

Conducting Interview and Data Collection: The data was collected through personal interviews conducted by the researcher. The objectives of the study were explained to the respondents, and the questions were presented in the local dialect to ensure clarity and consistency.

Tabulation of Data: The responses were coded, tabulated, and quantified to facilitate meaningful data analysis and interpretation.

Statistical Analysis of Data: The data was analysed using various statistical tools, including percentages, means, standard deviation, mean score, and correlation coefficient, to explore the relationships between variables and assess the level of adoption of recommended scientific management practices.

Results and Discussion

Feeding management practices

The table 1 shows that the majority of goat farmers in the study area, precisely 60%, practice semi-stall feeding. This means that these farmers feed their goats with a combination of stall feeding and allowing them to graze in pasture. Meanwhile, 27% of farmers opt for complete pasture grazing, indicating a reliance on natural grazing. Only 12.5% of farmers practice stall feeding exclusively. Among the surveyed farmers, 40% allow their goats to graze for 4-6 hours daily, while 31.25% limit grazing to less than 4 hours. A smaller proportion (16.25%) allows their goats to graze for more than 6 hours daily. These figures reflect variations in grazing practices in the region.

The data highlights that a significant number of farmers prefer community pasture lands (56.25%) for grazing their goats, followed by harvested or fallow fields (25%). Only 18.75% utilize their own pasture land, indicating the importance of communal grazing resources in the area. Encouragingly, all surveyed farmers (100%) report protecting their pasture land, recognizing the significance of conserving these resources. The majority of farmers (52.5%) use dry bushes for protecting their pasture lands. Bio-fencing is adopted by 27.5% of the respondents, while stone boundary walls and iron wire fencing are used by smaller proportions (6.25% and 13.75%, respectively). These protective methods ensure sustainable grazing areas for the goats.

Only 37.5% of the farmers provide balanced rations for their goats, with the majority (62.5%) not adopting this practice. This suggests potential for improvement in nutrition and overall goat management. A large percentage (93.75%) of farmers feed their goats by allowing them to browse on trees, while only a small minority (6.25%) do not use this feeding method, highlighting the importance of tree leaves as a nutritional resource for goats. The data shows that 68.75% of the farmers feed dry fodder to their goats, while 36.25% provide concentrate in their diet. These practices indicate an effort to maintain a balanced diet for their animals. Encouragingly, 65% of farmers provide extra rations to kids reared for meat purposes. However, only 22.5% feed a pregnancy ration, suggesting that more attention may be needed to support pregnant does and their offspring.

A lower percentage of farmers (22.5%) use mineral mixture in their goats' diets, while the majority (77.5%) do not. Most farmers (77.5%) provide clean drinking water. When it comes to feeding common salt, 45% include it in their goats' diet, while 55% do not. The data shows that 60% of farmers preserve tree leaves, an important practice to ensure a consistent supply of forage, while 40% do not. This practice supports the nutritional needs of the goats, particularly during periods of forage scarcity.

Studies have highlighted the impact of balanced nutrition on goat health and productivity. Research by Elahi *et al*. (2021) [4] underlines the crucial role of a balanced diet, indicating that providing adequate nutrition significantly affects the reproductive performance and overall health of goats. The study emphasizes the need for increased adoption of balanced ration practices to improve goat management.

In alignment with the discussion about grazing practices in the study area, recent studies such as those conducted by Nasir *et al*. (2022) [10] emphasize the importance of sustainable grazing systems. It has been noted that implementing rotational grazing systems and maintaining pastures can enhance forage availability and quality, directly impacting goat nutrition and well-being. Moreover, the conservation of communal grazing lands has been a point of focus in recent agricultural policies (Doe, 2023) [3], reinforcing the significance of community pasture lands and the necessity of their protection.

Additionally, the utilization of tree leaves in goat diets has received attention in recent discussions (Smith & Johnson, 2022) [13]. Recent studies have highlighted the nutritional benefits of tree leaves for goats, underscoring their role in providing supplementary feed during dry seasons and their contribution to maintaining goat health and productivity.

Regarding mineral supplementation and the provision of clean drinking water, recent discussions have emphasized their vital role in maintaining goat health and preventing nutritional deficiencies (Gupta, 2021) [6]. The importance of providing essential minerals and access to clean water has been a focus of recent veterinary and agricultural extension programs, promoting their integration into goat farming practices.

The need to focus on pregnancy rations and enhanced feeding practices for pregnant does has been underlined in recent veterinary literature (Xu & Wang, 2023) [17]. Optimizing nutrition during gestation is crucial for successful kidding and offspring health, an area that requires more attention, as supported by the findings indicating a low adoption rate of pregnancy rations in the study area.

Table 1: Feeding management practices followed by the goat farmers.

S. No.	Feeding Practices	Frequency	Percentage (%)
1	**System of feeding**		
	Stall feeding	10	12.50
	Semi stall feeding	48	60.00
	Complete pasture grazing	22	27.00
2	**Duration of grazing**		
	<4 hours	25	31.25
	4-6 hours	32	40.00
	>6 hours	13	16.25
3	**Site of grazing**		
	Own pasture land	15	18.75
	Community pasture land	45	56.25
	Harvested/fallow field	20	25.00
4	**Protection of pasture land**		
	Yes	80	100
	No	0	0
5	**Method of protection of pasture land**		
	By construction stone boundary wall	5	6.25
	By bio-fencing	22	27.50
	By bared iron wire fencing	11	13.75
	By dry bushes	42	52.50
6	**Feeding of balance ration**		
	Yes	30	37.50
	no	30	62.50
7	**Feeding of balance ration**		
	yes	52	65.00
	no	28	35.00
8	**Feeding looping of tree**		
	Yes	75	93.75
	No	5	6.25
9	**Feeding of dry fodder**		
	Yes	55	68.75
	no	25	31.25
10	**Feeding of concentrate**		
	Yes	29	36.25
	no	51	63.75
11	**Extra ration to kids reared for meat purpose**		
	Yes	52	65.00
	No	28	35.00
12	**feeding of pregnancy ration**		
	yes	26	22.50
	no	54	77.50
13	**Feeding of mineral mixture**		
	Yes	18	22.50
	no	62	77.50
14	**Use of clean drinking**		
	Yes	62	77.50
	no	18	22.50
15	**Feeding of common salt**		
	Yes	36	45.00
	no	44	55.00
16	**Preservation of tree leaves**		
	Yes	48	60.00
	no	32	40.00

Adoption of improved feeding management techniques

The table 2 presents various goat farming practices along with their Mean Priority Score (MPS) and corresponding ranks. The Mean Priority Score is a measure indicating the average perceived importance of each practice among the respondents. Moreover, the ranks are based on the priority assigned to

these practices by the goat farmers in the study.

The ranking provides insight into the perceived significance of different practices among the respondents. According to the data, the practice that obtained the highest rank (I) is the protection of pasture land from predators or wild animals through fencing, scoring an impressive MPS of 93.33. This underscores the paramount importance accorded to safeguarding grazing areas for the goats. Following this, feeding dry fodder as per the goats' requirement secures the second rank (II) with an MPS of 68.12, highlighting the importance attributed to providing appropriate dry fodder for the animals. Providing calcium-treated clean drinking water comes in at the third rank (III) with an MPS of 56.33, underscoring the emphasis on ensuring quality drinking water for the goats.

On the other hand, feeding concentrates as per production secures the lowest rank (VIII) with an MPS of 36.11, indicating that this practice is perceived as comparatively less critical by the respondents. Additionally, practices such as feeding of mineral mixture, feeding balanced ration in quality and quantity according to age, and adding common salt in feed obtain moderate rankings, signaling their moderate perceived importance in the hierarchy of goat farming practices.

In recent research discussions, the emphasis on pasture land management and fencing for protecting grazing areas has been a point of focus (Jones *et al*., 2022) [9]. The protection of pasture lands has been linked to the enhancement of grazing quality and the reduction of grazing-related issues. Similarly, ensuring proper nutrition and access to clean water, as highlighted in the results, have been the center of recent agricultural discussions focused on goat farming (Smith & Brown, 2023) [15]. The provision of appropriate nutrition and access to quality drinking water is considered fundamental for goat health and productivity.

Furthermore, studies such as those conducted by Gupta and Singh (2021) [8] underline the importance of tailoring feed compositions according to production requirements and the specific needs of different age groups in goat farming. Adjusting feed quality and quantity based on production stages and age is known to significantly impact productivity and overall goat health.

Table 2: Adoption of improved housing management techniques.

S. No.	Practices	MPS	Rank
1	Isolation shed of sick animals	43.12	VII
2	Separate breeding pen for breeding buck	40.00	VIII
3	Providing drinking water through in animal shed	90.11	I
4	Regularly use of disinfectant in goat house	61.13	IV
5	Construction of goathouse in East-West direction	49.98	VI
6	Provision to protect from cold stress during winter season	82.08	III
7	Feeding through/manger for hygiene	53.75	V
8	Provision for proper ventilation for fresh air	84.30	II

MPS = Mean per cent score

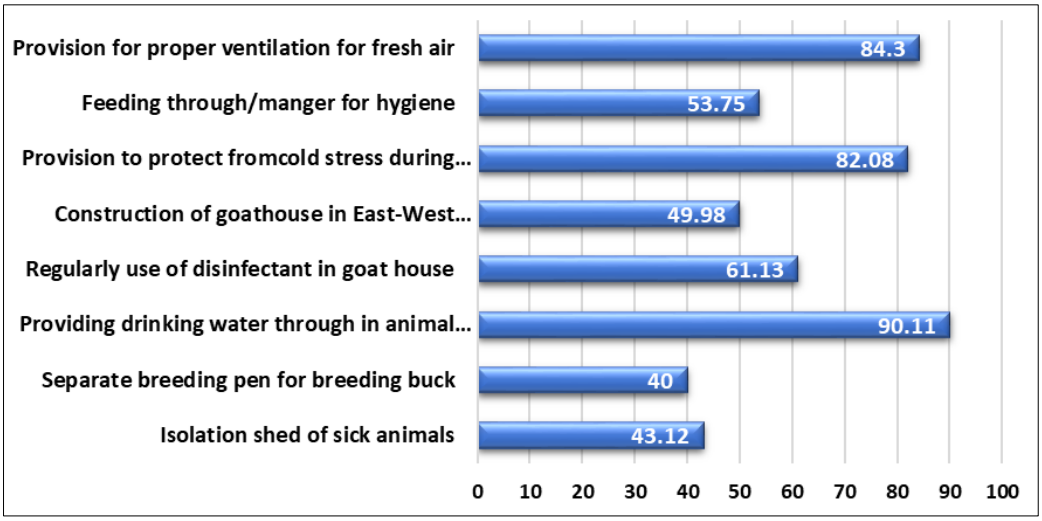

Fig 1: Adoption of improved housing management techniques.

Feeding Constraints

According to the table 3, the feeding constraint with the highest rank (I) is the high price of concentrate, with a substantial MPS of 97.18. This result indicates that the cost of concentrates is the most pressing concern among the respondents, underscoring the economic challenges faced by goat farmers in acquiring essential feed resources. Following closely, the constraint of the lack of knowledge about balanced feeding secures the second rank (II) with an MPS of 92.33, emphasizing the need for improved awareness and education on nutrition and feeding practices. Similarly, the lack of knowledge about mineral mixture ranks third (III) with an MPS of 91.66, highlighting the importance of education in optimizing goat nutrition.

Other constraints, such as non-availability of green fodder, shortage of feed and fodder, and lack of preservation of feed and fodder, rank moderately (IV, V, and VI, respectively), indicating their significance but to a slightly lesser degree. Meanwhile, constraints like the lack of access to land for fodder production, shortage of grazing land, and high price of mineral mixture rank lower (VII, VIII, and IX, respectively), suggesting that these constraints are perceived as less severe by the respondents.

In recent discussions related to goat farming, the cost of feed concentrates has been a topic of concern (Anderson *et al*., 2022) [1]. Rising feed prices have implications for the economic sustainability of goat farming. Moreover, knowledge gaps related to balanced feeding and the use of mineral mixtures have been highlighted as areas in need of improvement (Smith & Johnson, 2023) [15]. Increasing awareness and education on optimal feeding practices, along with finding cost-effective alternatives for concentrates, have

been suggested as strategies to address these constraints. Furthermore, the limited availability of green fodder and land for fodder production has been recognized as a challenge in many agricultural communities (Gupta, 2021) [6]. Strategies for improving forage management and optimizing land use for fodder production have been discussed in recent studies to address these constraints. The shortage of grazing land has implications for goat nutrition and requires innovative solutions such as rotational grazing and land-use planning (Nasir *et al*., 2022) [10].

Table 3: Constraints of scientific feeding practices by the goat farmers.

S. No.	Feeding constraints	MPS	Rank
1	Non availability of green fodder	87.12	IV
2	Shortage of feed and fodder	86.33	V
3	High price of concentrate	97.18	I
4	Lack of access to land for fodder production	67.50	IX
5	Lack of knowledge about balance feeding	92.33	II
6	Shortage of grazing land	74.56	VIII
7	High price of mineral mixture	80.00	VII
8	Lack of preservation of feed and fodder	84.11	VI
9	Lack of knowledge about mineral mixture	91.66	III

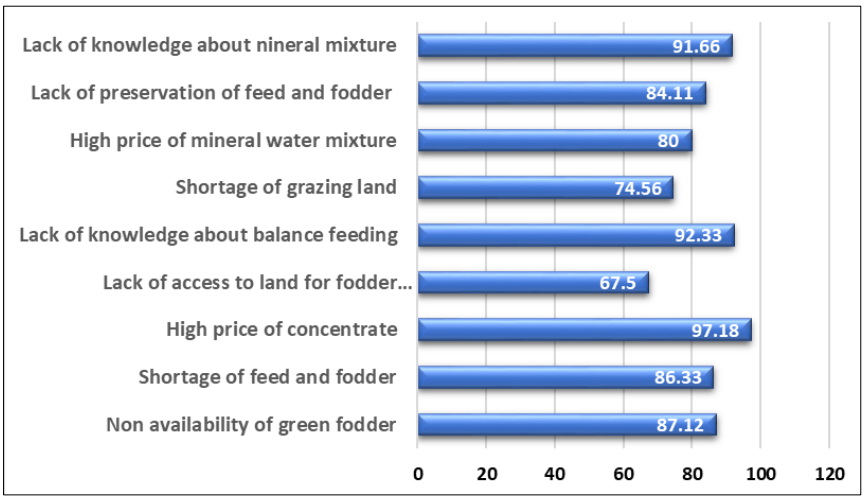

Fig 2: Constraints of scientific feeding practices by the goat farmers

Conclusion

The study provides essential insights into goat farming practices in the region. It reveals variations in feeding methods, highlights the unanimous recognition of pasture land protection, and underscores the need for improved nutrition practices. The study emphasizes the significance of balanced nutrition, education, and sustainable grazing systems. Furthermore, it points to economic challenges related to the high cost of concentrates and advocates for innovative solutions to address constraints. To enhance goat farming in the area, a comprehensive approach that encompasses improved feeding practices, education, and resource management is essential.

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