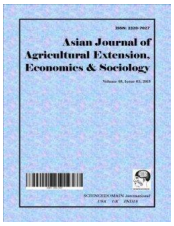

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Housing and Management System Practiced by Tribal Farmers in Rajasthan

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The aim of the study was to assess the floor, feeding and watering space(s) and other housing management practice of goats followed by farmers in Rajasthan. A total of 120 tribal goat farmers were selected from 12 villages from 6 blocks in 3 tribal dominated districts viz., Banswara, Dungarpur and Udaipur. Ten farmers from each village were selected purposively based on the number of goats. The selected goat farmers were grouped into three categories based on flock size as small (<25 goats, N= 60), medium (26-50 goats, N = 36) and large (>50 goats, N = 24). The floor space and other housing practices at the farmer's flocks were recorded *in-situ*. The average flock size for small, medium and large categories of the farmer was 22.63± 0.210, 33.72± 1.05 and 58.54 ±1.28 respectively. The overall proportion of milking goats, dry goats, goatlings, kids and bucks were 12.52 ± 0.31 (32.63%), 8.62 ± 0.30 (22.50%), 6.64 ± 0.27 (17.33%), 9.52 ± 0.29 (24.85%) and 0.79 ± 0.06 respectively. Across flock size categories most of the large farmers and a sizable majority of medium and small farmers (75, 66.67 and 60 per cent respectively) housed their goat in one shed, whereas rest of the farmers in all three categories housed their goats in different

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sheds. It was observed that a huge majority of farmers (82.50%) did not have separate managers for the feeding of goats. The available managers were made of either mud (11.6%) or cement concrete (5.8%). The roof in case of a large majority of farmers across flock size categories was made of thatch (61.67%) followed by iron sheet (21.66%) and asbestos sheets (16.67%). There was no major variation in the type of roofing material among the three flock size categories of goat farmers. The average floor space available for milking goats, dry goats, goatlings, kids and breeding bucks were 1.68 ± 0.02, 1.58± 0.06, 0.97± 0.07, 0.50± 0.05 and 2.79± 0.39 sq meter respectively. The average floor space was significant (p<0.05) higher in small flock size category of farmers followed by medium and large farmers among milking goats, dry goats and goatlings. Overall floor space available for milking goats, dry goats, goatlings, kids and breeding bucks were 1.68 ± 0.02, 1.58± 0.06, 0.97± 0.07, 0.50± 0.05 and 2.79± 0.39 respectively. It was concluded that housing practices were mostly traditional without much regard to scientific recommendations. However, these management practices, in general, were better in the case of small farmers as compared to medium and large farmers.

Keywords: Goat farming; floor space; feeding and watering space; tribal goat farmers.

1. INTRODUCTION

Goats are the world's oldest and among the first ruminants to be domesticated by human beings in South-Western Asia (Iran and Iraq) between 10000 and 6000 years BC. Around 80 per cent of global goat population is in the developing countries. Among them, India ranks second in the world population of a goat. With the present population of 135.2 million, goats account for more than 25 per cent of the total livestock in the country and contribute Rs 106335 million annually to the national economy [1]. They provide food and nutritional security to the millions of marginal and small farmers and agricultural labourers by providing animal protein through meat and milk. There are about 34 well defined and recognized breeds of goats in India [2]. Goats are among the main meat-producing animals in India, whose meat (chevon) is one of the preferred meats having huge domestic demand. Besides meat, goats, a multifunctional/purpose animal which provides other products like milk, skin, fibre and manure. Goat contributed 5.05 million tons of milk (3.67% of total milk production of 137.685 million tons) and 0.97 million tons of meat (15.56% of total production) during the year 2013-2014 [3].

In India, Rajasthan was ranked first in the goat population with a population of 21.66 millions, (37.53%) of the total livestock population in the state. Sirohi goat is the most preferred goat breed over other breeds in Rajasthan (Marwari and Jhakhrana). Goats are the backbone of the rural economy particularly, in the arid, semi-arid and mountainous regions of Rajasthan. Goat farming is a suitable option for revenue generation for the small scale farmers and tribal people as it requires very low investment and can efficiently survive and sustain sparse vegetation and extreme climatic conditions. Best known as the "poor man's cow" or "mini cow" these magnificent animals are the best alternative source of additional income and milk contributing immensely to the poor man's economy. In pastoral and agricultural subsistence societies in India, goats are kept as a source of insurance against disaster. Goats are generally managed under extensive production system and semi-intensive system, where only at night shelter is provided. A major part of their fodder requirement is met out through grazing at the waste and other common community lands.

India is a conventional home for about 645 tribal communities [4]. They are dispersed in almost all the states and union territories. The areas populated by tribals are mostly underdeveloped. They mostly reside in secluded villages or hamlets. The population of tribal in the country is 104 millions, which is 8.2 per cent of the total population of the country whereas; the Scheduled Tribe (ST) population of Rajasthan State is 7,097,706 constituting 8.4 percent of the total ST population of India [4]. The Scheduled Tribes of the State constitute 12.6 percent of the total population (68548437) of the state. According to [1] goats population in the districts of Banswara, Dungarpur and Udaipur which have been categorized as tribal districts in Rajasthan state (study area) is was 38.52% of the total livestock population in Rajasthan.

2. MATERIALS AND METHODS

A total of 120 tribal goat farmers were selected from 12 villages from 6 blocks in 3 tribal

dominated districts viz., Banswara, Dungarpur and Udaipur. Ten farmers from each village were selected purposively based on the number of goats. The selected goat farmers were grouped into three categories based on flock size as small (<25 goats, N= 60), medium (26-50 goats, N = 36) and large (>50 goats, N = 24). The floor space and other housing practices at the farmers' flocks were recorded on-farm.

3. RESULTS AND DISCUSSION

The data on different housing management practices recorded from the 3 categories of farmers are presented in Table 1.

(1) Site of goat houses: On the whole 87.50 percent of goat farmers housed their goats attached to their residence and 12.50 percent goat farmers housed their animals away from their dwellings. Category wise the per cent of small, medium and large farmers who housed their animal attached with human dwellings was 86.67, 88.89 and 87.50 per cent respectively and remaining goat farmers housed their animals away from their dwellings. The result showed that a majority of goat farmers (87.50%) can be housed their animals in a shed attached to their residence. The findings are in agreement with the reports of several authors [5,6,7,8,9,10].

(2) Mode of housing: Perusal of data in Table 1 indicated that overall the most of farmers (65%) housed all categories of goats in one shed whereas, 35 per cent goat farmers adopted the practice of housing goats in separate sheds based on their age and sex.

Across flock size categories most of the large farmers and a sizable majority of medium and small farmers (75, 66.67 and 60 per cent respectively) housed their goat in one shed, whereas rest of the farmers in all three categories housed their goats in different sheds. The proportion of goat farmers who practices housing all goats in one shed decreased with an increase in flock size. Results were closely in agreement with the report by [8] and [11]. It was observed that a huge majority of farmers (82.50%) did not have separate managers for the feeding of goats. If available the managers were made of either mud (11.6%) or cement concrete (5.8%). Similar findings were observed by [8]. Overall 70.00 percent farmers had biological type boundary wall (made of biological material by growing cactus plant/dry acacia branches) followed by 30.00 percent kuchha/mud type. The proportion of farmers having both kaccha and biological boundary wall increased with increase in flock size. However, the reverse trend was observed for farmers having kuchha fencing. The findings are in agreement with the results reported by [7,8,9,10].

(5) Protection from animals in adverse climatic condition: Data presented in the Table 1 indicated that 80.83 percent of all farmers provided protection against adverse climatic condition through different methods while only 19.17 percent farmers do not protect their flock against the adverse climatic condition. The proportion of goat farmers who protected flock against cold/hot increased with increase in flock size.

(6) Type of roofing material: The type of roof in case of a large majority of farmers across flock size categories was made of thatch (61.67%) followed by iron sheet (21.66%) and asbestos sheets (16.67%). There was no major variation in the type of roofing material among the three flock size categories of goat farmers. These findings are in close agreement with the observations of several authors [6,7,8,9,10,12, 13,14,15].

(7) Floor space availability

The data pertaining to average floor space availability in goat houses are presented in Table 2. The average flooring space available for milking goats, dry goats, goatlings, kids and breeding bucks were 1.68 ± 0.02, 1.58± 0.06, 0.97± 0.07, 0.50± 0.05 and 2.79± 0.39 sq meter respectively. Floor space was highly significant (p<0.05) in small flock size of farmers followed by medium and large farmers among milking goats, dry goats and goatlings and non-significant difference among kids and bucks. The availability of floor space was almost equal to the recommended floor space in milking goats, dry goats, goatling and bucks in case of a small and medium group of farmers, whereas lower in milking goats, dry goats, goatling and kids in case of large group of farmers as compared to BIS Standards recommendations. Floor space availability for breeding bucks was higher in small, medium farmers as compared to standard recommendations but lower in case of large farmers.

Table 1. Housing management practices

S. no.	Variables	Small		Medium		Large		Overall	
		Freq	%	Freq	%	Freq	%	Freq	%
1.	**Site of housing for goats**								
	Within human dwellings	52	86.67	32	88.89	21	87.50	105	87.50
	Outside human dwellings	8	13.33	4	11.11	3	12.50	15	12.50
2.	**Mode of housing**								
	All flock mixed together	36	60.00	24	66.67	18	75.00	78	65.00
	Separated into different groups	24	40.00	12	33.33	6	25.00	42	35.00
4.	**Type of manger**								
	Made of cement concrete	2	3.33	4	11.11	1	4.17	7	5.83
	Made of mud	6	10.00	6	16.67	2	08.33	14	11.67
	Manger not available	52	86.67	26	72.22	21	87.50	99	82.50
5.	**Boundary wall**								
	Made of mud	15	25.00	12	33.33	9	37.50	36	30.00
	Made of biological material (by growing cactus plant/dry acacia branches)	45	75.00	24	66.67	15	62.50	84	70.00
6.	**Protection from adverse climatic condition**								
	By use of plastic sheet/ thatch made of date palm leaves	52	86.67	32	88.89	21	87.50	97	80.83
	No protection measure used	8	13.33	04	11.11	3	12.50	23	19.17
7.	**Roofing material**								
	Thatch	32	53.33	24	66.66	18	75.00	74	61.67
	Asbestos sheet	12	20.00	6	16.67	2	8.33	20	16.67
	G. I. (Galvanized iron) sheet	16	26.67	6	16.67	4	16.67	26	21.66

Table 2. Average floor space (sq m) available in goat pens

Sr. no.	Animal category	Flock size			Overall	Recommended floor space (BIS, 2015)
		Small	Medium	Large		
1.	Milking goats	1.9^{a}± 0.04	1.83^{b}±0.08	1.48^{c}±0.09	1.68±0.02	2
2.	Dry goats	2.08^{a}± 0.12	1.89^{b}±0.27	1.28^{c}±0.05	1.58±0.06	2
3.	Goatlings	1.16^{a}± 0.09	0.96^{b}±0.33	0.84^{b}±0.09	0.97±0.07	1
4.	Kids	0.52 ± 0.02	0.49 ±0.03	0.50± 0.04	0.50±0.05	0.75(0.5 to 1)
5.	Bucks	2.77± 0.06	2.96± 0.05	2.66± 0.05	2.79±0.39	2.5 (2-3)

Means bearing different superscript in a row differ significantly

Fig. 1. Pucca goat house with tin roof and tiles

Fig. 2. Measurement of goat house dimensions

4. CONCLUSION

It is concluded that housing practices were mostly traditional without much regard to scientific recommendations. The proportion of farmers having both kaccha and biological boundary wall increased with increase in flock size. However, the reverse trend was observed for farmers having kuchha fencing. However, these management practices, in general, were better in the case of small farmers as compared to medium and large farmers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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