



Collective Study on Housing Management Practices of Kenguri Sheep Farmers under Intensive and Extensive Rearing Systems in Yadgir District of Karnataka, India

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Authors' contributions

This work was carried out in collaboration among all authors. Author KMG designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors SM and CJ managed the analyses of the study. Authors SNA, ENR and Kartik managed the literature searches and minor grammatical changes. All authors read and approved the final manuscript.

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ABSTRACT

The main domains of housing management practices followed by Kenguri sheep farmers were analyzed during the research. Twenty sheep farms in intensive and extensive were pointed out based on the accessibility in the respective study location Yadgir (Northern Eastern dry agro-climatic zone) district of Karnataka, India. The examination was carried out during the months of January to February in the year 2022. The objectives of housing practices were assessed by computing frequency percentage values and average descriptive values. The majority of intensive sheep farmers had wooden type of flooring (60.00%) and whereas, mud flooring (100.00%) is the only option for extensive sheep farmers. All intensive sheep farms had galvanized roofing (100.00%), in contrast all extensive sheep farms were with no roofing. Sheep in intensive rearing had trough water sources (45.00%) majorly and in extensive rearing they had natural water source (70.00%) accessibility. Most of the intensive sheep farmers maintained proper commercial feed (60.00%) access for the sheep, but fodder (65.00%) was the key food type for sheep reared under an extensive system. The advantage of fans for better ventilation (40.00%) was seen in intensive rearing systems, whereas, only natural ventilation (100.00%) was observed in extensive rearing system. The good space availability and pen dimensions are the only concerns with an intensive rearing system. The outcomes of this work will help the sheep farmers become accustomed to the better housing management practices in the near times.

Keywords: Housing management practices; Kenguri sheep; flooring; roofing; ventilation; space availability.

1. INTRODUCTION

The main objective of this study is to evaluate the different aspects of housing management practices adapted by sheep farmers in the particular study area that is Yadgir district of Karnataka state, India. As most of the sheep farmers are rearing the sheep under extensive rearing systems freely as pastoralists because of poverty issues. Under Indian conditions, as the sheep farmers used a kutcha kind of floor in their sheep sheds, which was made of locally available moorum and gravel for a much lower cost than concrete, timber, or rubber mat flooring, which were more expensive. Although less expensive to install, this sort of flooring had the disadvantage of being unsanitary [1,2].

According to the Livestock Census 2019 [3], India had 74.26 million sheep overall, ranking third globally. The total number of sheep has grown by 14.13% from the 2012 [4] Livestock Census [5]. According to a recent estimate from 2020, there were 6.7 lakh Kenguri sheep in Karnataka [6].

Utilization of thatch as their roof material by 64.41% of farmers, followed by an asbestos sheet (35.24%) and tiles (0.35%), with concrete and galvanized roofing being the most cost-effective. Lamb enclosures made of bamboo sticks were found in 82.12% of the sheep sheds, protecting the lambs from predators after

delivery. Similar form of protection was noticed by Casamassima et al. [7].

The possibility of unrestricted access to outer regions [8], protection from thermal extremes [9], and adequate space are necessary to ensure the well-being and health of production species [10].

According to research, sheep's performance and social behaviour are impacted by space allowance [11]. The vast grazing region causes animals to invest more energy looking for food and water [12].

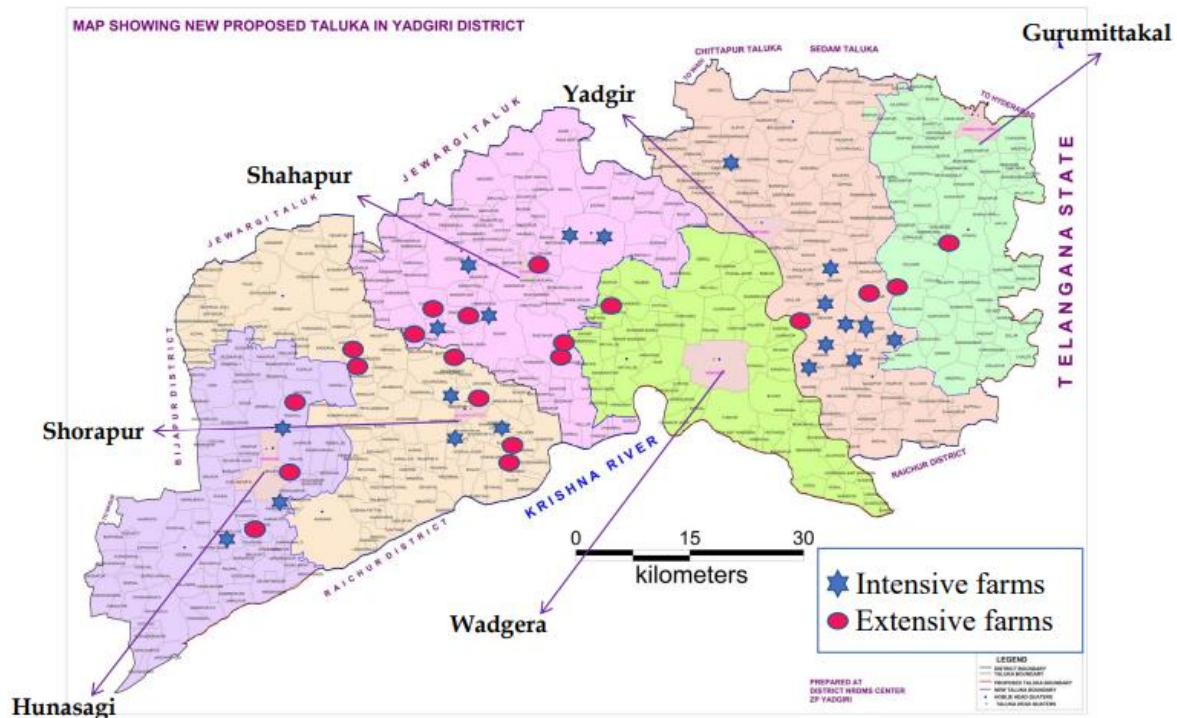
High building expenditures are associated with housing the sheep in an insulated structure with regulated mechanical ventilation that maintains an ambient temperature of 1.5–8.6 °C [13].

In general, access to drinking water was limited [14] and shepherds had to travel large distances in search of potable water or rely on open sources [6]. Sheep prefer 50% grasses, 30% fodder, and 20% shrubs, according to Gowane et al. [15]. So, this study will help the sheep farmers to reorganize their housing and feeding practices as needed for better sheep production values.

2. MATERIALS AND METHODS

2.1. Sheep Farm Visit

Over the course of two months, in January and February of 2022, the study was conducted.



Talukas: Yadgir, Gurumittakal, Wadgera, Shahapur, Hunasagi, Shorapur

Fig. 1. Geographical map of Yadgir district (study area) and locations of farms selected for the experiment

(https://en.wikipedia.org/wiki/Yadgir_district#/media/File:Yadagiri_district.png)

Yadgir, the research area, is situated 389 meters above average sea level in the Northern Eastern Dry Zone of Karnataka. Its latitude is 16° 15' N and its longitude is 77° 20' E [16]. This region receives between 640 and 810 mm of rain on average each year [11]. Total 40 sheep farms including intense and extensive sheep farms that were chosen randomly for analysis from this study area that is Yadgir, as the availability of shepherds rearing this popular native mutton breed known as kenguri is found more in the districts of Koppal, Raichur, and Yadgir in the northeastern part of the state of Karnataka [17,10]. The typical flock size in extensive farms is between 25 and 1480, whereas in intensive farms it ranges from 35 to 300. Through teleconference, the farmers were informed in advance about the visits to every sheep farm.

2.2. Method of Data Collection

The structured questionnaire created for the study was used to collect data from the sheep farmers as per their willingness by live assessment under field conditions in the chosen study area.

2.3. Statistical Analysis

The results were obtained through statistical tools such as frequency percentages, mean (average), standard deviation, Chi-square test (P-value) by using IBM SPSS version 16.0 software.

3. RESULTS AND DISCUSSION

3.1 Flooring and Roofing

In intensive rearing system, majority of the sheds were provided with wooden (60.00%) type of flooring followed by concrete (20.00%), mud (10.00%) and rubber mat/plastic slates (10.00%). In extensive system all the sheds were having mud (100.00%) flooring system. In intensive system all the sheds were provided with galvanized (100.00%) roofing. In extensive system there was no roofing (100.00%) system (Table 1). The data analysis for type of flooring in intensive system found that, majority of the sheds had wooden type of flooring followed by concrete, mud and rubber mat types, whereas mud flooring was commonly observed in

extensive sheep rearing systems. Regarding type of roofing in case of intensive rearing all the sheds had galvanized type of roofing whereas all pens in extensive system had no proper roofing. These findings are in line with the findings of Rajanna et al. [1], Sevi et al. [2], Casamassima et al. [7].

3.2. Water Source

With respect to intensive rearing system, most of the farmers provided trough water (45.00%) as water source followed by automatic drinker (35.00%) and bucket water (20.00%) to sheep; when compared to extensive system the type of water source provision had altered with following results as sheep had access to natural water

source (70.00%) majorly followed by bucket water (15.00%) and trough water (15.00%) provision (Table 1). The type of water source in intensive system was majorly seen as trough water whereas in extensive system it was of natural source like open flowing streams. These findings were in agreement with the leads of Hallad et al. [14], Sevi et al. [2], Shanwad et al. [18].

3.3. Feed Source and Ventilation

Under intensive rearing system, major farmers provided leguminous and roughage feed (60.00%) followed by fodder (20.00%) and supplements (20.00%) for sheep; when compared to extensive system the feeding

Table 1. Housing management practices of Kenguri sheep farmers

Particulars	Intensive (n=20)		Extensive (n=20)	
	F	%	F	%
Type of flooring				
Mud	2	10.00	20	100.00
Concrete	4	20.00	0	00.00
Wooden	12	60.00	0	00.00
Rubber mat/plastic slates	2	10.00	0	00.00
Type of roofing				
Thatched	0	00.00	0	00.00
Concrete	0	00.00	0	00.00
Galvanized	20	100.00	0	00.00
No roof	0	00.00	20	100.00
Type of water source				
Bucket	4	20.00	3	15.00
Trough	9	45.00	3	15.00
Automatic drinker	7	35.00	0	00.00
Natural source (Open flowing streams)	0	00.00	14	70.00
Feeding types				
Feed (Legumes and roughage)	12	60.00	7	35.00
Fodder	4	20.00	13	65.00
Supplements	4	20.00	0	00.00
Type of ventilation				
Fans provision	8	40.00	0	00.00
Natural	12	60.00	20	100.00

n- Sample size, F- Frequencies, %- Percentage

Table 2. Space availability and pen dimensions of sheep shed

Particulars	Intensive (n=20)	Extensive (n=20)	P- value
Space availability			
Open area (m ²)	2.49 ± 0.16 ^a	0.00 ± 0.02 ^b	0.0001
Closed area (m ²)	0.77 ± 0.09 ^a	0.00 ± 0.05 ^b	0.0001
Pen/shed dimensions			
Shed length (m)	21.31 ± 3.01 ^a	0.00 ± 0.01 ^b	0.0001
Shed width (m)	10.56 ± 0.45 ^a	0.00 ± 0.04 ^b	0.0001
Shed height (m)	3.45 ± 0.26 ^a	0.00 ± 0.06 ^b	0.0001

Mean values with different superscripts (a, b) within the row differ significantly (p<0.05)

pattern was changed as sheep had been provided with fodder (65.00%) followed by leguminous and roughage feed (35.00%) with no provision of supplements [19,20,21]. In intensive system most of the sheds were provided natural (60.00%) ventilation and other sheds were having fans provision (40.00%). Whereas in contrast in case of extensive system all pens had access to natural (100.00%) ventilation with no provision of fans (Table 1). The leguminous and

roughage feed supply was the major contributor as a feeding source for sheep in intensive but in case of extensive system fodder was the major feed resource. Most of the sheds were having natural ventilation with minimum per cent of sheds having fans provision in intensive rearing whereas in extensive system all the pens were having natural ventilation. These results were in competence with the outcomes of Appannavar et al. [17], Gowane et al. [15].



Fig. 2. Sheep feeding in manger



Fig. 3. Galvanized roofing with slatted flooring



Fig. 4. Sheep in open fence



Fig. 5. Sheep in closed shed



Fig. 6. Trough water for sheep in shed



Fig. 7. Fan ventilation in sheep shed

3.4 Space Availability and Pen Dimensions

The mean open area and closed area were (2.49 ± 0.16) m² and (0.77 ± 0.09) m², respectively in intensive rearing for sheep. Sheep shed had mean length (21.31 ± 3.01) m, mean width (10.56 ± 0.45) m, and mean height (3.45 ± 0.26) m in intensive rearing system (Table 2). Space availability and pen dimensions are only related to intensive rearing system. These results were partly in concurrence with the leads of Basic Animal Husbandry Statistics [8].

4. CONCLUSION

By this study it can be conclude that, the major housing practices like flooring, roofing, feeding and watering, ventilation and space provision are compromised in extensive sheep farms because of lame management practices of extensive sheep farmers but are well managed in intensive sheep farms by the farmers. But, natural access to feed and water, free space and air for movements and breathing are well witnessed in extensive rearing system. Finally, the overall housing practices of intensive sheep farmers was better compared extensive sheep farmers So, the finer management practices will fetch better profits to sheep farming community in markets in upcoming days.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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