



## Housing Management Practices of Backyard Indigenous Chickens in Kannur and Kozhikode Districts of Kerala, India

P. Girish Kumar<sup>1</sup>, P. Ezhil Praveena<sup>2</sup> and R. Richard Churchil<sup>3\*</sup>

<sup>1</sup>Regional Poultry Farm, Kerala State Animal Husbandry Department, Mundayad, Kannur District, Kerala, INDIA

<sup>2</sup>ICAR-Central Institute Brackishwater Aquaculture, 75, Santhome High Road, Chennai, Tamil Nadu, INDIA

<sup>3</sup>Department of Poultry Science, Madras Veterinary College, Chennai, Tamil Nadu, INDIA

\*Corresponding author: R Richard Churchil; E-mail: drchurchil@gmail.com

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### ABSTRACT

A study was conducted to document the housing practices of native chicken farmers in Kannur and Kozhikode districts of Kerala, India, with emphasis on provision of night shelter (coops), construction materials, placement, dimensions and floor space of coops, and other housing features. A total of 63 coops were assessed through farmer surveys and direct observations. Almost all households (98.44%) provided night shelters, reflecting their importance in preventing predation, particularly in this hilly region. Wood was the predominant flooring material (52.38% in Kannur; 66.67% in Kozhikode), while roofing material differed between districts, with tiles more common in Kannur and thatch in Kozhikode. Wooden walls were more prevalent, although wire mesh use was significantly ( $P < 0.05$ ) higher in Kannur. Coop placement generally balanced easy accessibility for monitoring with distance to minimize odour. Most of the coops located within 10 m from the household. Elevation above ground was practiced variably, with benefits recognized for reducing termite damage and waterlogging. Significantly ( $P < 0.01$ ) more coops in Kannur (38.1%) exceeded 2 ft in height compared with Kozhikode ( $P < 0.01$ ), where shorter coops predominated. Larger coop areas ( $>8$  sq. ft) were also more common in Kannur (57.14%) than Kozhikode (16.67%), indicating district-level variation in housing capacity. Floor space per bird was generally low, with 57–60% of farmers providing only 0.5–1.0 sq. ft. Other practices included provision of nest boxes, perches in only 11% of coops, and use of sand as litter material rarely. Overall, the study indicates that although farmers rely on inexpensive, locally available materials, there is considerable scope for improving coop design, floor allocation, and durability to enhance bird welfare, productivity, and returns.

### HIGHLIGHTS

- Widespread use of shelters highlights their role in protecting indigenous chickens from predators.
- Regional differences exist in coop dimensions and construction materials between Kannur and Kozhikode.
- Coop space is limited to 0.5–1.0 sq. ft. per bird, as housing is provided only during nighttime.

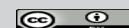
**Keywords:** Indigenous chicken, Kerala, night shelter, construction materials, coop space

India is endowed with a rich diversity of indigenous chicken germplasm, comprising 20 registered breeds (NBAGR, 2025) along with several uncharacterized ecotypes. Although indigenous chickens constitute only 29% of the total layer population in India, they dominate the backyard poultry sector, representing 77.8% with 74 million out of 95 million layers (Churchil, 2022). The average annual egg production of indigenous chickens is around 109 eggs per hen. Despite their relatively low

productivity, indigenous chickens are valued for their broodiness and excellent mothering ability that make them suitable for smallholder scavenging and family poultry systems (Kumar *et al.*, 2013a).

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Backyard poultry in India has grown rapidly in recent years. Between 2012 and 2020, its population increased by 45.8%, reaching 317.07 million birds, whereas the commercial poultry population grew by only 4.5% to 534.74 million (Churchil, 2022). This growth highlights the increasing importance of indigenous chickens in supporting rural nutrition and livelihoods. Despite their significant population, indigenous chickens contribute only 12.3 billion eggs out of the total 141.32 billion produced in the country, accounting for just 12.78% of national egg production. (BAHS, 2024).

In Kerala, agriculture remains the backbone of rural livelihoods, and mixed crop–livestock farming systems are widely practiced. Within these systems, native chickens are an integral entity, offering both nutritional security and supplementary income, particularly to women and marginalized households (Sonaiya, 2005). Backyard poultry production largely depends on household waste and agricultural byproducts, effectively recycling them into high-quality animal protein (Kumar *et al.*, 2013b). These systems are predominantly extensive and free-range, with chickens depending heavily on scavenging. While such practices demand minimal inputs, they are often associated with slower growth rates, seasonal feed scarcity, and relatively high mortality during the growing and laying stages (Kumar *et al.*, 2013b; Kumar & Churchill, 2025a).

The Tellichery breed, native to Kerala's Malabar region, is among the state's most recognized indigenous chicken breeds (NBAGR, 2025). Adapted to diverse agro-climatic conditions, Tellichery and other indigenous chickens exhibit resilience to diseases and can thrive on scavenged resources and household leftovers. Indigenous chickens produce high-quality lean meat that is highly valued for its distinctive flavor and taste (Kumar *et al.*, 2013a).

Smallholder and village chicken production systems in Africa is often under low-input, free-range systems supply over 70% of poultry products like egg and meat in rural areas, (Gueye, 2009; Abdelqader *et al.*, 2007). In Southeast Asia, traditional backyard chickens also play a major role in household food security and cultural practices, though productivity is constrained by poor housing, feed scarcity, and disease outbreaks (Dolberg, 2008; Dessie *et al.*, 2013). In such contexts, housing has been recognized as a

key management factor influencing survival, productivity, and protection against predators. Studies in Ethiopia and Tanzania reported that lack of proper housing is a major constraint, leading to high mortality and production losses in indigenous flocks (Dessie & Ogle, 2001; Alders and Pym, 2009). These findings emphasize the need to evaluate region-specific housing practices in Kerala to identify gaps and potential interventions.

Improving village chicken production necessitates a comprehensive understanding of regional and traditional husbandry practices, as well as the identification of key production constraints (Sonaiya and Swan, 2004). Without such insights, efforts to improve rural livelihoods through poultry initiatives may not succeed. Common challenges in village chicken farming include disease prevalence, predation, feed shortages, and inadequate housing. While previous studies have investigated disease prevalence and predation levels among indigenous chicken in Kannur and Kozhikode districts of Kerala (Kumar *et al.*, 2016; Kumar and Churchill, 2025a), the current study focuses on management practices, particularly housing of indigenous chickens.

## MATERIALS AND METHODS

A survey study was conducted among the native chicken farmers in the Thrippangottur Panchayat of Kannur district and the Chekkiad Panchayat of Kozhikode district of Kerala to assess the practices of housing management of indigenous chicken. A total of 21 native chicken farming households in Thrippangottur and 43 households in Chekkiad were randomly selected for this study, ensuring that only those maintaining pure indigenous birds were included.

To study the housing management, the chicken coops used for night shelter were examined and measurements were taken. A pre-tested questionnaire was used to independently collect the data like the type of construction materials used for building the floor, wall and roof of the coops, the distance of coop from the house, elevation of coop from the ground, dimension of the coop (height and total floor area) and maximum number of birds housed by the households. The average floor space provided per bird was calculated for individual coops using the following formula:

Floor space per bird (sq.ft.) =

$$\frac{\text{Total Floor area of the coop (sq. ft.)}}{\text{Maximum number of adult birds housed}}$$

The data collected were categorized into relevant classes, and frequency distributions based on sex and district were examined using *Z*-tests to identify differences associated with sex and location, in accordance with the procedures outlined by Zar (2010).

$$Z = \frac{(\hat{p}_1 - \hat{p}_2)}{\sqrt{\hat{p}(1 - \hat{p}) \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

Where,

$\hat{p}_1$ : proportion of sample 1, with sample size  $n_1$ ;  $\hat{p}_2$ : proportion of sample 2, with sample size  $n_2$ ;  $\hat{p}$ : pooled proportion calculated as  $(x_1 + x_2)/(n_1 + n_2)$ , where  $x_1$  and  $x_2$  are the number of successes in each sample.

## RESULTS AND DISCUSSION

The observations on chicken coops used as night shelter by the indigenous chicken farmers is presented in Table 1 and the pictures of the coops are depicted in Figure 1.

### Provision of night shelter

The survey conducted among native chicken farmers revealed that nearly all households (94.44%) provided coops for night shelter, with the exception of one household where birds roosted in trees overnight. Similar findings were reported by Nath *et al.* (2012), where 100% of backyard poultry farmers in Sikkim provided night shelters, and by Thakur *et al.* (2013), who observed that 69.81% of farmers in Himachal Pradesh used night shelters. Kwong *et al.* (2024) reported that 97.5% of backyard chicken farmers in Bangladesh provided night shelters for their flocks. Similarly, Mujyambere *et al.* (2022) observed this practice among 95% of farmers in Zimbabwe, while Ngogo *et al.* (2023) reported a comparable figure of 93.33% in Tanzania. Similar patterns of night housing were documented by Tantia *et al.* (2005) in Kashmir and by Halima *et al.* (2007) in north-west Ethiopia. In Ethiopia, Assefa *et al.* (2019) found that only 52.5% of farmers housed their chickens in separate coops,

while the remaining 47.5% relied on improvised shelters such as inverted bamboo baskets or perches erected within their homes.

Kumar *et al.* (2016) reported that indigenous Tellicherry chickens in the study area are capable of flying up to 3.97 m, a behavioural trait that enables them to roost in tall trees when coops are not available. Given that Kannur and Kozhikode districts have extensive forest cover of 55.86% and 61.28% of their total geographical areas, respectively; the provision of secure night shelters is especially critical due to the high prevalence of nocturnal predators from nearby forests. Hence, night shelters must be constructed robustly to withstand predator attacks as well as adverse climatic conditions (Banerjee and Ghosh, 2021).

### Construction materials of coops

Wood was the predominant flooring material used in chicken coops in both Kannur (52.38%) and Kozhikode (66.67%). Other flooring materials reported included bamboo slats (4.76% and 11.90% in Kannur and Kozhikode, respectively), mud (14.29% and 19.05%), and cement (28.57% and 2.38%). The use of cement was popular in Kannur compared to Kozhikode. Kumar *et al.* (2013b) had earlier reported that wood was the most common flooring material in chicken coops of this region. Similar use of wooden enclosures for housing indigenous chickens has been documented in Zimbabwe (McAinsh *et al.*, 2004) and in the Uttarakhand state of India (Kumar & Kumar, 2007). This preference can be attributed to the fact that wood is inexpensive and abundantly available in the hilly areas with dense vegetation where the study was conducted.

Regarding roofing materials, tiles were more common in Kannur (42.86%), whereas thatch was prevalent in Kozhikode (30.95%). Other materials included plastic sheets, wood, concrete, stone with mud, and asbestos. Comparable findings were reported by Kumar *et al.* (2013b), who noted that tiles (33.3%) and thatch (23.8%) were the most frequently used roofing materials in the area. Literature also shows thatched roofing is widely used for native chicken housing in India (Tantia *et al.*, 2005; Vij *et al.*, 2005) and other countries (McAinsh *et al.*, 2004). Backyard poultry farmers in South Africa commonly construct shelters using a combination of materials such as wire with zinc mesh, wood with bricks, or bricks with

**Table 1:** Building materials and measurements of coops used for indigenous chicken

Sl. No.	Parameters	Classes	District-wise data		
			Kannur % (no.)	Kozhikode % (no.)	Z - statistics
1	Flooring materials	Bamboo slat	4.76 (1)	11.90 (5)	0.91
		Wood	52.38 (11)	66.67 (28)	1.10
		Mud	14.29 (3)	19.05 (8)	0.47
		Cement	28.57 (6)	2.38 (1)	3.12**
		Total	100.00 (21)	100.00 (42)	
2	Roofing materials	Tiles	42.86 (9)	28.57 (12)	1.13
		Thatch	9.52 (2)	30.95 (13)	1.88
		Plastic sheet	14.29 (3)	14.29 (6)	0.00
		Concrete	9.52 (2)	2.38 (1)	1.26
		Wood	9.52 (2)	7.14 (3)	0.33
		Stone with mud	9.52 (2)	16.67 (7)	0.76
		Asbestos	4.76 (1)	0.00 (0)	1.43
		Total	100.00 (21)	100.00 (42)	
3	Wall materials	Wood	57.14 (12)	76.19 (32)	1.55
		Bricks	19.05 (4)	9.52 (4)	1.07
		Wire mesh	14.29 (3)	0.00 (0)	2.51*
		Wood with wire mesh	0.00 (0)	4.76 (2)	1.02
		Stone with mud	9.52 (2)	9.52 (4)	0.00
		Total	100.00 (21)	100(42)	
4	Distance between coop and house (m)	0.0 (attached)	9.52 (2)	14.29 (6)	0.54
		Up to 5.0	71.43 (15)	38.10 (16)	2.49*
		5.1 to 10.0	9.52 (2)	38.10 (16)	2.37*
		10.1 to 15.0	9.52 (2)	9.52 (4)	0.00
		Total	100.00 (21)	100.00 (42)	
5	Elevation (ft)	0.0 (ground level)	47.62 (10)	30.95 (13)	1.30
		0.1 to 1.0	9.52 (2)	14.29 (6)	0.54
		1.1 to 2.0	23.81 (5)	23.81 (10)	0.00
		2.1 to 3.0	14.29 (3)	23.81 (10)	0.88
		Above 3.0	4.76 (1)	7.14 (3)	0.37
		Total	100.00 (21)	100.00 (42)	
6	Coop height (ft)	Up to 1.0	9.52 (2)	7.14 (3)	0.33
		1.1 to 1.5	23.81 (5)	33.33 (14)	0.78
		1.6 to 2.0	28.57 (6)	52.38 (22)	1.79
		Above 2.0	38.10 (8)	7.14 (3)	3.05**
		Total	100.00 (21)	100.00 (42)	
7	Average coop area (sq. ft)	2.1 to 4.0	9.52 (2)	14.29 (6)	0.54
		4.1 to 6.0	14.29 (3)	38.10 (16)	1.94
		6.1 to 8.0	19.05 (4)	30.95 (13)	1.00
		More than 8.0	57.14 (12)	16.67 (7)	3.30**
		Total	100.00 (21)	100.00 (42)	
8	Coop area per bird (sq. ft)	Up to 0.5	19.05 (4)	23.81 (10)	0.43
		0.51 to 1.0	57.14 (12)	59.52 (25)	0.18
		1.1 to 1.5	19.05 (4)	11.90 (5)	0.76
		Above 1.5	4.76 (1)	4.76 (2)	0.00
		Total	100.00 (21)	100.00 (42)	

\* Significant (P&lt;0.05); \*\* Significant (P&lt;0.01)

iron sheets, while iron sheets are predominantly used for roofing (Idowu *et al.*, 2018). In the present study area, coconut plantations dominate local agriculture (Kumar and Churchil, 2025b), and coconut leaves provide a readily available, inexpensive thatching material. However, farmers are increasingly shifting toward tile roofing due to its greater durability and the possibility of reusing partially damaged tiles from household structures.

Wood was also the primary material used for constructing coop walls in both Kannur (57.14%) and Kozhikode (76.19%). The use of wire mesh was significantly ( $P < 0.05$ ) higher in Kannur (14.29%) compared to Kozhikode (0.00%). Other wall materials included bricks (19.05% vs. 9.52%), wood combined with wire mesh (0.00% vs. 4.76%), and stone with mud (9.52% vs. 9.52%) in Kannur and Kozhikode, respectively. Kumar *et al.* (2013b) found that nearly 70% of chicken coops in the region had wooden walls. Previous studies have similarly reported the use of locally available materials such as mud, wood, wire mesh, and bamboo for constructing backyard poultry coops (Singh *et al.*, 2021). The use of wood for wall construction has also been documented in Uttarakhand (Kumar and Kumar, 2007) and Zimbabwe (McAinsh *et al.*, 2004). Given the mountainous topography of this area, wood remains the cheapest and most accessible construction material.

The construction of poultry houses using locally available materials is a common practice worldwide. For example, Thomas *et al.* (2025) reported the use of sheds, barricades, and cages made from mud, bamboo, plastic, corrugated iron, tin, and other materials in Bangladesh. Similarly, Thakur *et al.* (2013) observed that poultry sheds in the hilly regions of Himachal Pradesh were typically constructed with mud, wood, wire mesh, and bamboo. Although these shelters are economical and utilize readily available resources, they must be constructed and maintained to withstand predator attacks. Poorly maintained night shelters are particularly vulnerable, leading to higher bird losses due to predation (Desta, 2021).

### Placement and elevation of coops

In Kannur, 71.43% of coops were situated within 0.1 to 5.0 m of the house. Whereas, the coops were evenly distributed between 0.1 to 5.0 m (38.1%) and 5.1 to 10 m (38.1%) in Kozhikode district. Only 9.52 and 14.29% of coops were

attached directly to the houses in Kannur and Kozhikode districts respectively and 9.52% of the coops in both the districts were located at distant location of 10.1 to 15 m from the house. In a similar study, Kumar *et al.* (2013b) reported that the average distance between independent coops and farmers' house in the study area was 5.45 m. The farmers noted that situating coops at a certain distance from their homes is crucial to minimize issues related to poultry ectoparasites and unpleasant odors from poultry droppings. However, they ensure the coops are not too far away, allowing for easy monitoring to reduce predation risks. Additionally, limited landholdings in the area often result in coops being placed relatively close to the houses.

A higher proportion of coops were constructed at ground level in both Kannur (47.62%) and Kozhikode (30.95%), which agreed with the earlier report of 36.5% in the study area (Kumar *et al.*, 2013b). Coops elevated between 1.1 to 2.0 ft. accounted for 23.81% in both Kannur and Kozhikode districts, and those between 2.1 to 3.0 ft. made up 14.29 and 23.81% respectively. The coops with lower elevations of 0.1 to 1.0 ft. (9.52 and 14.29% respectively) and higher elevations of above 3.0 m (4.76 and 7.14% respectively) were less common in these districts. In another study, the height of the coops from the ground was reported to be slightly higher at 2.30 ft. (Vij *et al.*, 2007). The elevation of shelter for local chicken of Zimbabwe, as reported by McAinsh *et al.* (2004), was one meter from the ground. The farmers opined that constructing the coops above the ground level can prevent the damage caused by termites on wooden parts and also rusting of metallic parts like wire mesh. They also felt that this prevents the water seepage in the floor and water splashing into the coop during rainy season.

Based on the practical experience of backyard poultry keepers, maintaining a distance of 8–10 m between the house and the coops is considered ideal, as it balances accessibility while minimizing odor and noise issues. Furthermore, a well-chosen coop location should provide both sun and shade, ensuring winter sunlight and summer shade for optimal bird comfort (Kumar, 2025).

### Coop dimensions

A higher proportion of coops in Kannur had a height of more than 2 ft. (38.1%) compared to only 7.14% in Kozhikode, with a significant ( $P < 0.01$ ) difference between



**(a)** Laterite brick and tiled roof (attached to house)



**(b)** Laterite brick and concrete roof (attached to house)



**(c)** Wood



**(d)** Wood and thatched roof



**(e)** Wood and tiled roof



**(f)** Wood and metal + plastic sheet roof



(g) Wood, weld mesh and metal sheet roof



(h) Brick with cement and metal sheet roof

**Fig. 1:** Coops for night shelter for indigenous chicken in the survey area

the two districts. In contrast, the majority of coops in Kozhikode fell into the 1.6 to 2.0 ft. category, whereas only 23.81% of coops in Kannur were in this range. The data also revealed that a considerable number of coops in both Kannur and Kozhikode were in the 1.1 to 1.5 ft. category (23.81% and 33.33%, respectively), while very few coops measured less than 1 foot in height (9.52% in Kannur and 7.14% in Kozhikode). Kumar *et al.* (2013b) reported the average height of coops in the study area as 2.0 ft. The advantage of more height was that the farmers can provide perches inside; therefore, more birds can be accommodated even if the floor area was less.

A higher proportion of coops in Kannur (57.14%) had a total area of more than 8 sq.ft. compared to only 16.67% in Kozhikode, with a significant ( $P < 0.01$ ) difference between the two districts. In contrast, a greater number of coops in Kozhikode (38.10%) fell into the 4.1 to 6.0 sq. ft. category, whereas only 14.29% of coops in Kannur were in this range. The study also revealed that a considerable number of coops in both districts fell into the 6.1 to 8.0 sq. ft. category (19.05% in Kannur and 30.95% in Kozhikode), while very few coops had an area of 2.1 to 4.0 sq. ft. (9.52% in Kannur and 14.29% in Kozhikode). Kumar *et al.* (2013b) reported that the average floor area of coop in the study area ranged from 1.94 to 15.28 sq. ft with an overall mean of 8.15 sq. ft. Thakur *et al.* (2012) reported that wooden coops for indigenous chicken farmers in Himalayan region had two tiers, one for younger chicks and the other for adults. Rathod (2020) recommended

night shelter dimensions for a backyard chicken flock of 10 birds as 4 ft in length, 3 ft in width, and 3.5 ft in height, with the structure elevated 1.5–2 ft above the ground.

#### Floor space per bird

Most farmers in Kannur (57.14%) and Kozhikode (59.52%) provided 0.5 to 1.0 sq. ft. of floor space per bird. A notable proportion of farmers offered less than 0.5 sq. ft. per bird (19.05% in Kannur and 23.81% in Kozhikode), whereas, only a small fraction of farmers provided more generous floor space of 1.1 to 1.5 sq. ft. (19.05 and 11.90 % respectively) or more than 1.5 sq. ft. (4.76 and 4.76% respectively) per bird. Kumar *et al.* (2013b) reported that the indigenous farmers in the same study area provided a mean coop floor space of 0.89 sq. ft. per bird. This floor space is much less when compared to two sq. ft. normally given for adult layer type chicken under intensive deep litter system for commercial layers (Panda and Mohapatra, 1989).

#### Other housing practices

Majority of the farmers did not provide any nests to the hens for egg laying. Some farmers provide wooden crates (tomato boxes) spread with paddy straw. Birds usually lay their eggs on paddy straws in the cattle barns or inside the house. Some of the farmers confine the birds under bamboo baskets when they are in search of nesting place for egg laying; they will be set free just after laying. Kumar



*et al.* (2013b) reported that some farmers in the study area utilize their coops as the place for natural incubation of native chicken eggs using broody hens.

Out of the total 63 coops studied, seven coops (11%) were provided with perches. This enables the farmers to accommodate more number of birds in a given floor space and also allow the bird to express their natural perching behaviour. Perching behavior supports the development of the musculocutaneous system and helps reduce the incidence of footpad dermatitis and lesions (Bist *et al.*, 2023).

Sand as litter material was spread on the floor over a plastic sack in two wooden coops (3.17%) out of total 63.

## CONCLUSION

The present study underscores the critical role of housing practices in sustaining backyard poultry production in Kerala. Nearly universal provision of night shelters reflects farmers' awareness of predation risks, particularly in forested landscapes. However, variations between Kannur and Kozhikode in coop size, height, and construction materials suggest district-specific adaptations based on resource availability and farmer priorities. The widespread reliance on wood, thatch, and tiles demonstrates the practicality of using locally available materials, though durability and predator resistance remain challenges. Suboptimal floor space per bird and limited adoption of welfare-enhancing features such as perches and nests highlight areas requiring intervention. Training programs emphasizing optimal coop design, adequate space allocation, and improved structural standards could enhance both bird health and productivity. Strengthening housing practices will not only reduce mortality and predation losses but also improve the economic viability of backyard poultry, which remains an important livelihood activity for rural households.

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