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Adoption of improved backyard poultry management practices among tribal farmers in Wayanad, Kerala

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ABSTRACT

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Tribal communities in India, officially recognized as "Scheduled Tribes," often reside in rural areas and face socio-economic challenges. Livestock farming, including poultry rearing, plays a pivotal role in their livelihoods. This study investigates the adoption of improved backyard poultry management practices among tribal farmers in Wayanad, Kerala. An *ex-post facto* research was conducted, involving randomly selected 40 tribal farmers with permission from the Directorate of Scheduled Tribes Development Department, Government of Kerala. An adoption index developed by Patel *et al.* (2022) was used with suitable modifications to study the extent of adoption. The study reveals that over two-thirds of the respondents fell into the low adoption category of improved poultry production practices, with none in the high category. Notably, practices such as professional veterinary care and artificial incubation were not adopted by any of the respondents. In contrast, the provision of night shelter exhibited the highest adoption rate. This research underscores the urgent need for targeted interventions to bridge the gap in adopting scientific backyard poultry farming practices among tribal communities. Such efforts can significantly contribute to the extent of adoption, nutritional security, economic empowerment and overall well-being of these communities.

Keywords: Adoption, Backyard Poultry, Farming, Tribal Farmer

INTRODUCTION

Tribals, considered indigenous inhabitants as per Mathew and Umesh (2019), are officially recognized in India as "Scheduled Tribes" under Article 342 of the Indian Constitution. These communities consist of families who share a common identity, language and territory. India holds the second position globally in terms of tribal population, next to African nations (Rajeev and Hosure, 2020). According to the latest population census, India's tribal population is 104.3 million, comprising 8.6 percent of the total populace. They are predominantly residing in rural areas (89.97%), tribal communities are among the most marginalized in society. In Kerala, tribal people are commonly referred to as "Adivasis." The state is home to 37 tribal communities, with a population of 4,84,839, constituting 1.45 percent of the total population (Menon, 2013). Every district in Kerala has a tribal population, but Wayanad district stands out as it has one-third of the tribal population and is the only district in Kerala included in the NITI Aayog's Aspirational District Programme, earning it the title of "tribal hamlet of Kerala." Many tribal farmers have traditionally involved in animal husbandry activities, as outlined by Nisha *et al*. (2019). Beyond generating monetary income, livestock farming also yields non-monetary benefits in the form of self-consumption of livestock and its commodities (Somagond *et al.,* 2019).

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While traditional backyard poultry farming offers the benefits of providing a balanced diet and improving the economic status of rural communities, it may not be advisable due to its limited production potential (Krishna *et al.,* 2020). The poultry farming sector has generated significant competition and has enticed major corporate players due to its rapid and substantial growth. As this competition has intensified, there is a heightened emphasis on generating surplus outputs while maintaining minimal profit margins and curbing production losses (Hafez and Attia, 2020). To mitigate production losses, farmers are encouraged to adopt scientific and recommended poultry farming technologies. This adoption aims to address issues such as high mortality rates, diminished growth rates, delayed disease detection and challenges related to accessing improved chicks and balanced feed thus leads to increased productivity and income (Patel *et al.,* 2022). With this background the study was conceived to study the extent of adoption of improved poultry management practices by the tribal farmers of Wayanad district of Kerala.

MATERIALS AND METHODS

Considering the objectives of the study, an *ex-post facto* research design was adopted. A sample size of 40 tribal farmers engaged in livestock farming activities was selected using the random sampling method comprising 20 farmers each from Vythiri and Sulthan Bathery taluks of the Wayanad district. Necessary permission to carry

out the present study was obtained from the Director, Directorate of Scheduled Tribes Development Department, Government of Kerala. An adoption index developed by Patel *et al.* (2022) was used with suitable modifications. Ultimately 25 statements related to scientific farming practices applicable to backyard poultry farming system among the tribal farmers were selected to study the extent of adoption.

The responses to the above selected statements were obtained from the respondents of the final study on a three point continuum *viz.*, fully adopted, partially adopted and not adopted with corresponding scores 2, 1 and 0, respectively. Now total adoption score (TAS) of each respondent was calculated by summing up the responses to each statement. The minimum and maximum obtainable score by the respondent was 0 and 50, respectively. The mean adoption score (MAS) and adoption index (AI) were calculated by the formula

$$\text{Mean Adoption score} = \frac{\text{Total adoption score (TAS) obtained}}{\text{Total number of statements}}$$

$$\text{Adoption index} = \frac{\text{Total adoption score (TAS) obtained}}{\text{Maximum obtainable score}} \times 100$$

Accordingly, the TAS, MAS and AI for each statement were calculated for individual item wise analysis. The respondents were categorized into three groups *viz.*, low, medium and high level of adoption based on the TAS (Semmaran *et al.*, 2008). Chi-square statistics were used to compare the extent of adoption between two taluks.

RESULTS AND DISCUSSION

Findings of the current study revealed that slightly over two-thirds of the respondents (67.75%) fell into the low adoption category of improved backyard poultry production practices, while the remaining one-third (32.50%) belonged to the medium adoption category (Table 1). Notably, none of the respondents in the study fell within the high adoption category. The analysis indicated that there was no discernible association between the adoption level and the taluk ($p > 0.05$). The adoption patterns of individual management practices were detailed in Table 2. It was observed that the provision of night shelter (MAS-1.95) had the highest adoption rate, followed by frequent egg collection (MAS-1.68). Kumar *et al.* (2013) documented similar results, stating that within the northern midlands agro-ecological zone of Kerala, all the farmers they surveyed provided night time shelter for their poultry in coops. Conversely, practices such as seeking professional veterinary care for sick birds, artificial incubation of eggs, turning of eggs once or twice daily, providing artificial light for 4 hours per day during the laying period and offering laying boxes in quiet and comfortable places were not adopted by any of the farmers in the study area (MAS-0). Adoption indices, Total Adoption Scores (TAS), and Mean Adoption Scores (MS) for each management practice were provided in Table 3.

The results of the current study align with the findings of Patel *et al.* (2022), observed that none of the respondents who were not part of the Poultry Producer Company in Madhya Pradesh fell into the high adoption category. Furthermore, the findings indicated that nearly two-thirds of these respondents were categorized as having low adoption levels, while the remaining participants were classified under the medium adoption category. Similar findings were also reported by Dumrya *et al.* (2015), among backyard poultry farmers in Sundarban region of West Bengal. Further, the results of the present study align with those of Churchil (2022), who documented that poultry birds reproduce through natural incubation and brooding, and their primary source of nutrition involves grazing, along with occasional supplementation from household grains readily available

Table 1: Distribution of the respondents based on the extent of adoption of the improved backyard poultry production management practices

Adoption level	Vythiri (N=20)	Sulthan Bathery (N=20)	Pooled (N=40)
Low(Less than 16.67 TAS)	11(55.00)	16(80.00)	27(67.75)
Medium(Between 16.68 and 33.33 TAS)	09(45.00)	04(20.00)	13(32.50)
High(Above 33.34 TAS)	00(00.00)	00(00.00)	00(00.00)
Mean	16.45	12.85	14.65
SD	5.63	5.31	5.70
SEM	1.26	1.19	0.90
Chi-Square Statistic		2.849^{ns}	
P value		0.091 (df – 1)	

Figure in parentheses indicate percentage
Percents may not sum to hundred due to rounding
TAS-Total Adoption Score; SD– Standard Deviation; SEM– Standard Error of Mean; df– Degrees of freedom
ns-Nonsignificant

Table 2: Adoption behaviour of individual backyard poultry production management practices

Sl. No.	Statement	Vythiri (N = 20)			Sulthan Bathery (N = 20)			Pooled (N = 40)		
		FA	PA	NA	FA	PA	NA	FA	PA	NA
1.	Improved backyard poultry breeds	13(65.00)	06(30.00)	01(05.00)	08(40.00)	01(05.00)	11(55.00)	21(52.50)	07(17.50)	12(30.00)
2.	Provision of night shelter	20(100.00)	00(00.00)	00(00.00)	19(95.00)	00(00.00)	01(05.00)	39(97.50)	00(00.00)	01(02.50)
3.	Providing litter material	16(80.00)	02(10.00)	02(10.00)	12(60.00)	00(00.00)	08(40.00)	28(70.00)	02(05.00)	10(25.00)
4.	Provision of feeders	02(10.00)	09(45.00)	09(45.00)	12(60.00)	04(20.00)	04(20.00)	14(35.00)	13(32.50)	13(32.50)
5.	Provision of waterers	02(10.00)	06(30.00)	12(60.00)	12(60.00)	04(20.00)	04(20.00)	14(35.00)	10(25.00)	16(40.00)
6.	Additional concentrate/ grain feeding	03(15.00)	12(60.00)	05(25.00)	12(60.00)	05(25.00)	03(15.00)	15(37.50)	17(42.50)	08(20.00)
7.	Provision for adequate clean water supplement	02(10.00)	07(35.00)	11(55.00)	14(70.00)	01(05.00)	05(25.00)	16(40.00)	08(20.00)	16(40.00)
8.	Minerals/ vitamins supplement to the birds	00(00.00)	06(30.00)	14(70.00)	04(20.00)	01(05.00)	15(75.00)	04(10.00)	07(17.50)	29(72.50)
9.	Calcium supplementation (To reduce shell breakage)	00(00.00)	11(55.00)	09(45.00)	01(05.00)	00(00.00)	19(95.00)	01(02.50)	11(27.50)	28(70.00)
10.	Artificial light (4 hours per day) during laying period	00(00.00)	00(00.00)	20(100.00)	00(00.00)	00(00.00)	20(100.00)	00(00.00)	00(00.00)	40(100.00)
11.	Provision of laying box in quiet and comfortable place	00(00.00)	00(00.00)	20(100.00)	00(00.00)	00(00.00)	20(100.00)	00(00.00)	00(00.00)	40(100.00)
12.	Frequent collection of eggs	17(85.00)	03(15.00)	00(00.00)	15(75.00)	02(10.00)	03(15.00)	32(80.00)	05(12.50)	03(07.50)
13.	Storage of eggs at uniform cool temperature	14(70.00)	04(20.00)	02(10.00)	01(05.00)	00(00.00)	19(95.00)	15(37.50)	04(10.00)	21(52.50)
14.	Turning of eggs once or twice daily	00(00.00)	00(00.00)	20(100.00)	00(00.00)	00(00.00)	20(100.00)	00(00.00)	00(00.00)	40(100.00)
15.	Testing of eggs by immersing egg in bowl of water/ candling	01(05.00)	00(00.00)	19(95.00)	00(00.00)	00(00.00)	20(100.00)	01(02.50)	00(00.00)	39(97.50)
16.	Eggs set for hatching within 10 days of collection	14(70.00)	00(00.00)	06(30.00)	00(00.00)	02(10.00)	18(90.00)	14(35.00)	02(05.00)	24(60.00)
17.	Incubate the eggs using artificial incubator	00(00.00)	00(00.00)	20(100.00)	00(00.00)	00(00.00)	20(100.00)	00(00.00)	00(00.00)	40(100.00)
18.	Reduce broodiness of the hen by dipping broody hen repeatedly in cold water	02(10.00)	00(00.00)	18(90.00)	00(00.00)	00(00.00)	20(100.00)	02(05.00)	00(00.00)	38(95.00)
19.	Care the chicks from predators	10(50.00)	07(35.00)	03(15.00)	05(25.00)	07(35.00)	08(40.00)	15(37.50)	14(35.00)	11(27.50)
20.	Brooding practice	03(15.00)	05(25.00)	12(60.00)	00(00.00)	00(00.00)	20(100.00)	03(07.50)	05(12.50)	32(80.00)
21.	Treating the sick birds by qualified veterinarians	00(00.00)	00(00.00)	20(100.00)	00(00.00)	00(00.00)	20(100.00)	00(00.00)	00(00.00)	40(100.00)
22.	Following vaccination schedule	03(15.00)	01(05.00)	16(80.00)	00(00.00)	00(00.00)	20(100.00)	03(07.50)	01(02.50)	36(90.00)
23.	Deworming	02(10.00)	00(00.00)	18(90.00)	00(00.00)	00(00.00)	20(100.00)	02(05.00)	00(00.00)	38(95.00)
24.	Dipping (To reduce ticks/ lice)	01(05.00)	00(00.00)	19(95.00)	00(00.00)	00(00.00)	20(100.00)	01(02.50)	00(00.00)	39(97.50)
25.	Debeaking (To reduce pecking)	01(05.00)	00(00.00)	19(95.00)	00(00.00)	00(00.00)	20(100.00)	01(02.50)	00(00.00)	39(97.50)

Figure in parentheses indicate percent; Percents may not sum to hundred due to rounding; FA – Fully Adopted; PA- Partially Adopted; NA – Not Adopted

Table 3: Item-wise analysis of improved backyard poultry production management practices

Sl. No.	Category	Vythiri (N=20)			Sulthan Bathery (N=20)			Pooled (N=40)		
		TAS	MAS	AI	TAS	MAS	AI	TAS	MAS	AI
1.	Improved backyard poultry breeds	32	1.60	80.00	17	0.85	42.50	49	1.23	61.25
2.	Provision of night shelter	40	2.00	100.00	38	1.90	95.00	78	1.95	97.50
3.	Providing cage	34	1.70	85.00	24	1.20	60.00	58	1.45	72.50
4.	Provision of feeders	13	0.65	32.50	28	1.40	70.00	41	1.03	51.25
5.	Provision of waterers	10	0.50	25.00	28	1.40	70.00	38	0.95	47.50
6.	Additional concentrate/ grain feeding	18	0.90	45.00	29	1.45	72.50	47	1.18	58.75
7.	Provision for adequate clean water supplement	11	0.55	27.50	29	1.45	72.50	40	1.00	50.00
8.	Minerals/ vitamins supplement to the birds	06	0.30	15.00	09	0.45	22.50	15	0.38	18.75
9.	Calcium supplementation (To reduce shell breakage)	11	0.55	27.50	02	0.10	05.00	13	0.33	16.25
10.	Artificial light (4 hours per day) during laying period	00	0.00	00.00	00	0.00	00.00	00	0.00	00.00
11.	Provision of laying box in quiet and comfortable place	00	0.00	00.00	00	0.00	00.00	00	0.00	00.00
12.	Frequent collection of eggs	35	1.75	87.50	32	1.60	80.00	67	1.68	83.75
13.	Storage of eggs at uniform cool temperature	32	1.60	80.00	02	0.10	05.00	34	0.85	42.50
14.	Turning of eggs once or twice daily	00	0.00	00.00	00	0.00	00.00	00	0.00	00.00
15.	Testing of eggs by immersing egg in bowl of water/ candling	02	0.10	05.00	00	0.00	00.00	02	0.05	02.50
16.	Eggs set for hatching within 10 days of collection	28	1.40	70.00	02	0.10	05.00	30	0.75	37.50
17.	Incubate the eggs using artificial incubator	00	0.00	00.00	00	0.00	00.00	00	0.00	00.00
18.	Reduce broodiness of the hen by dipping broody hen repeatedly in cold water	04	0.20	10.00	00	0.00	00.00	04	0.10	05.00
19.	Care the chicks from predators	27	1.35	67.50	17	0.85	42.50	44	1.10	55.00
20.	Brooding practice	11	0.55	27.50	00	0.00	00.00	11	0.28	13.75
21.	Treating the sick birds by qualified veterinarians	00	0.00	00.00	00	0.00	00.00	00	0.00	00.00
22.	Following vaccination schedule	07	0.35	17.50	00	0.00	00.00	07	0.18	08.75
23.	Deworming	04	0.20	10.00	00	0.00	00.00	04	0.10	05.00
24.	Dipping (To reduce ticks/ lice)	02	0.10	05.00	00	0.00	00.00	02	0.05	02.50
25.	Debeaking (To reduce pecking)	02	0.10	05.00	00	0.00	00.00	02	0.05	02.50

TAS – Total Adoption Score; MAS – Mean Adoption Score; AI – Adoption Index

in their environment.

Since, none of the farmers studied were engaged in commercial native chicken enterprises and their flock sizes consistently remained below ten, they did not opt for practices like artificial incubation of eggs, providing artificial light for 4 hours per day during the laying period and offering comfortable laying boxes. The lower adoption rates of risk mitigation measures like vaccination, dipping, deworming and treatment of sick birds, can be attributed to the fact that only commercial operations typically require risk mitigation strategies. In the context of the prevalent subsistence smallholder farming system in the area, where households typically maintain small flocks, potential production losses due to risks may not significantly impact the livelihoods of resource-poor tribal livestock farmers. Hence, the lower adoption rate mirrors the subsistence-oriented nature of farming in this region.

CONCLUSION

The results of the study revealed that a significant majority of the tribal farmers (67.75%) were categorized as having low adoption rates of improved backyard poultry production practices, while the remaining 32.50 percent fell into the medium adoption category. It's noteworthy that none of them had a high level of adoption for these practices. Considering the above findings, it is recommended to prioritize efforts aimed at raising awareness regarding the advantages of practices with low adoption rates. Sensitizing these farmers about the significance of non-adopted practices and building their capacity in scientific poultry production practices is essential. Conducting workshops, training sessions and awareness campaigns can play a pivotal role in promoting broader adoption of these practices. Therefore, the results of the study underscore the importance of implementing awareness programs and targeted interventions to enhance knowledge about improved poultry production practices among tribal farmers. Further, schemes on backyard poultry rearing with cent percent capital subsidy may be implemented in tribal areas to popularize backyard poultry rearing among tribal farmers.

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