ISSN Print: 2664-844X
ISSN Online: 2664-8458
NAAS Rating (2026): 4.97
IJAFS 2026; 8(8): 230-233
www.agriculturaljournals.com
Received: 24-06-2026
Accepted: 26-07-2026

W Titus Paul
P.G. Scholar, Department of Agricultural Extension and Communication, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Prayagraj, Uttar Pradesh, India

Dipak Kumar Bose
Professor, Department of Agricultural Extension and Communication, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Prayagraj, Uttar Pradesh, India

Corresponding Author:
W Titus Paul
P.G. Scholar, Department of Agricultural Extension and Communication, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Prayagraj, Uttar Pradesh, India

Adoption of new agricultural technology by the badaga tribal farmers of Nilgiri District, Tamil Nadu

W Titus Paul and Dipak Kumar Bose

DOI: https://www.doi.org/10.33545/2664844X.2026.v8.i8c.1777

Abstract
The present study was conducted to assess the adoption of new agricultural technology by the Badaga tribal farming community of Nilgiri district, Tamil Nadu. A descriptive research design was employed with a total sample of 120 respondents selected from the study area. Primary data were collected using a structured interview schedule, and adoption was measured across ten technology domains on a three-point scale (fully adopted, partially adopted, not adopted). The findings revealed that adoption was highest for micro-irrigation systems (85.83% full adoption), improved/recommended crop varieties (83.33%) and modern farm tools or machinery (81.67%), while integrated nutrient management (2.50%), mobile phone/ICT tools (5.83%) and weather-forecast information (6.67%) recorded the lowest full adoption. Overall, 46.67 per cent of respondents recorded a low level of technology adoption, 35.83 per cent a medium level, and only 17.50 per cent a high level, with a mean adoption score of 18.26. Spearman's Rank Correlation Coefficient showed that social participation, land holding, risk bearing ability, farming experience, and mass media exposure were positively and highly significantly associated with adoption at the 1% level, while age was significant at the 5% level. Education, occupation, annual income and family size showed no significant association with adoption.

Keywords: Technology adoption, Badaga tribe, Tribal farmers, Agricultural technology

Introduction
Agriculture continues to be the mainstay of the Badaga tribal community inhabiting the upper plateau of the Nilgiri hills in Tamil Nadu, where farming life is organised around close-knit villages known as “Hattis.” While the community has traditionally cultivated millets, barley and potatoes, and, following the colonial introduction of plantation crops, tea, the increasing complexity of modern agriculture, evolving market demands and climatic uncertainty have made the adoption of appropriate new technologies an important determinant of farm viability and household well-being. Limited extension outreach in remote tribal tracts, however, often leaves a wide gap between mere awareness of new technologies and their actual adoption on the ground. Given the comparatively limited body of research examining the adoption behaviour of the Badaga community specifically, the present study was undertaken to assess adoption of recommended agricultural technologies by this group and to identify the profile characteristics associated with the level of adoption.

Methodology
The study adopted a descriptive research design conducted among the Badaga tribal farming households of Nilgiri district, Tamil Nadu. A total sample of 120 respondents was drawn for the study, and primary data were collected through a pre-structured interview schedule. Adoption of new agricultural technology was assessed across ten technology domains using a three-point scale (fully adopted, partially adopted, not adopted). Respondents were classified into low, medium and high adoption categories using Mean ± Standard Deviation as classificatory cut-offs. Spearman's Rank Correlation Coefficient (rs) was used to examine the association between eleven independent profile variables and the level of technology adoption.

Results and Discussion
A. Socio-economic profile of respondents
The socio-economic profile of the 120 respondents is presented in Table 1.

Table 1: Socio-economic profile of respondents (n = 120)

S. No.	Variable	Category	Frequency	Percentage
1	Age	Up to 35 years (Young)	05	4.17
		36–55 years (Middle-aged)	54	45.00
		Above 55 years (Old)	61	50.83
2	Education	Illiterate	31	25.83
		Primary school	26	21.67
		Middle school	22	18.33
		High school	17	14.17
		Higher secondary school	12	10.00
		Graduate and above	12	10.00
3	Occupation	Farming	79	65.83
		Farming + Animal Husbandry	39	32.50
		Farming + Agricultural labour	02	1.67
4	Annual Income	Below Rs 50,000	10	8.33
		Rs 50,001 – Rs 1,00,000	107	89.17
		Above Rs 1,00,000	03	2.50
5	Land Holding	Marginal (< 1.0 acre)	76	63.33
		Small (1.0–2.5 acres)	30	25.00
		Medium (2.5–5.0 acres)	14	11.67
6	Family Size	Small	97	80.83
		Medium	18	15.00
		Large	05	4.17
7	Farming Experience	Up to 10 years	01	0.83
		11–20 years	37	30.83
		Above 20 years	82	68.33
8	Social Participation (level)	Low	86	71.67
		Medium	32	26.67
		High	02	1.66
9	Scientific Orientation (level)	Low	18	15.00
		Medium	90	75.00
		High	12	10.00

Exactly half of the respondents (50.83%) were above 55 years of age, and a quarter (25.83%) were illiterate. A majority (65.83%) were engaged solely in farming, and nearly nine in ten (89.17%) fell in the moderate annual-income bracket of ₹50,001 to ₹1,00,000. Marginal landholdings of less than one acre were held by 63.33 percentage of respondents, and 80.83 percentage belonged to small-sized families, a pattern consistent with Wadekar et al. (2016), who similarly reported a preponderance of marginal landholdings among Warli tribal farmers of Thane district, Maharashtra. More than two-thirds (68.33%) had farming experience above 20 years. Institutional social participation was low for the large majority (71.67%), whereas scientific orientation was clustered at the medium level for 75.00 percentage of respondents. This profile broadly indicates an older, long-experienced, but institutionally under-engaged farming population operating largely on small and marginal holdings.

B. Adoption of New Agricultural Technology by the Respondents

The actual adoption behaviour of respondents was examined across ten technology domains, and the statement-wise distribution is presented in Table 2.

Table 2: Distribution of respondents according to adoption of agricultural technologies (n = 120)

S. No.	Statement	Fully Adopted F (%)	Partially Adopted F (%)	Not Adopted F (%)
1	Use of improved/recommended crop varieties	100 (83.33)	8 (6.67)	12 (10.00)
2	Fertilizer application based on soil test recommendations	37 (30.83)	59 (49.17)	24 (20.00)
3	Integrated nutrient management in crop cultivation	3 (2.50)	13 (10.83)	104 (86.67)
4	Integrated pest and disease management methods	10 (8.33)	28 (23.33)	82 (68.33)
5	Use of drip or sprinkler irrigation systems	103 (85.83)	10 (8.33)	7 (5.83)
6	Use of bio-fertilizers and bio-pesticides	13 (10.83)	13 (10.83)	94 (78.33)
7	Use of modern farm tools or machinery	98 (81.67)	13 (10.83)	9 (7.50)
8	Use of weather forecast information for farm decisions	8 (6.67)	22 (18.33)	90 (75.00)
9	Use of mobile phones/ICT tools for agricultural information	7 (5.83)	38 (31.67)	75 (62.50)
10	Participation in government-supported technology programs	10 (8.33)	9 (7.50)	101 (84.17)

Adoption patterns varied considerably across technology domains. Improved crop varieties recorded the second-highest full adoption (83.33%), reflecting easy access to seed material through local markets and government supply chains, while drip/sprinkler irrigation recorded the highest full adoption of all technologies studied (85.83%), confirming micro-irrigation as the most successfully diffused technology in the study area. Modern farm tools and machinery were also widely adopted (81.67% full adoption), reflecting the labour-saving value of mechanisation for the community's small, ageing family workforce. In contrast, integrated nutrient management was almost entirely unadopted (2.50% full adoption; 86.67% not adopted) the lowest figure recorded in the study and

integrated pest and disease management similarly showed low adoption (8.33% full adoption). Bio-fertilizers/bio-pesticides (10.83%), weather-forecast information (6.67%) and mobile phone/ICT tools (5.83%) also recorded minimal full adoption, consistent with the community's limited digital and mass-media exposure. Notably, government-supported technology programs showed only 8.33% full participation despite comparatively high awareness of such schemes, indicating a considerable awareness-to-participation gap likely rooted in procedural or accessibility barriers.

Table 3: Distribution of respondents according to level of technology adoption (n = 120)

S. No.	Category	Frequency	Percentage
1	Low (14–17)	56	46.67
2	Medium (18–20)	43	35.83
3	High (21–24)	21	17.50
	Total	120	100.00

** = Significant at 1% level of probability; * = Significant at 5% level; NS = Non-significant

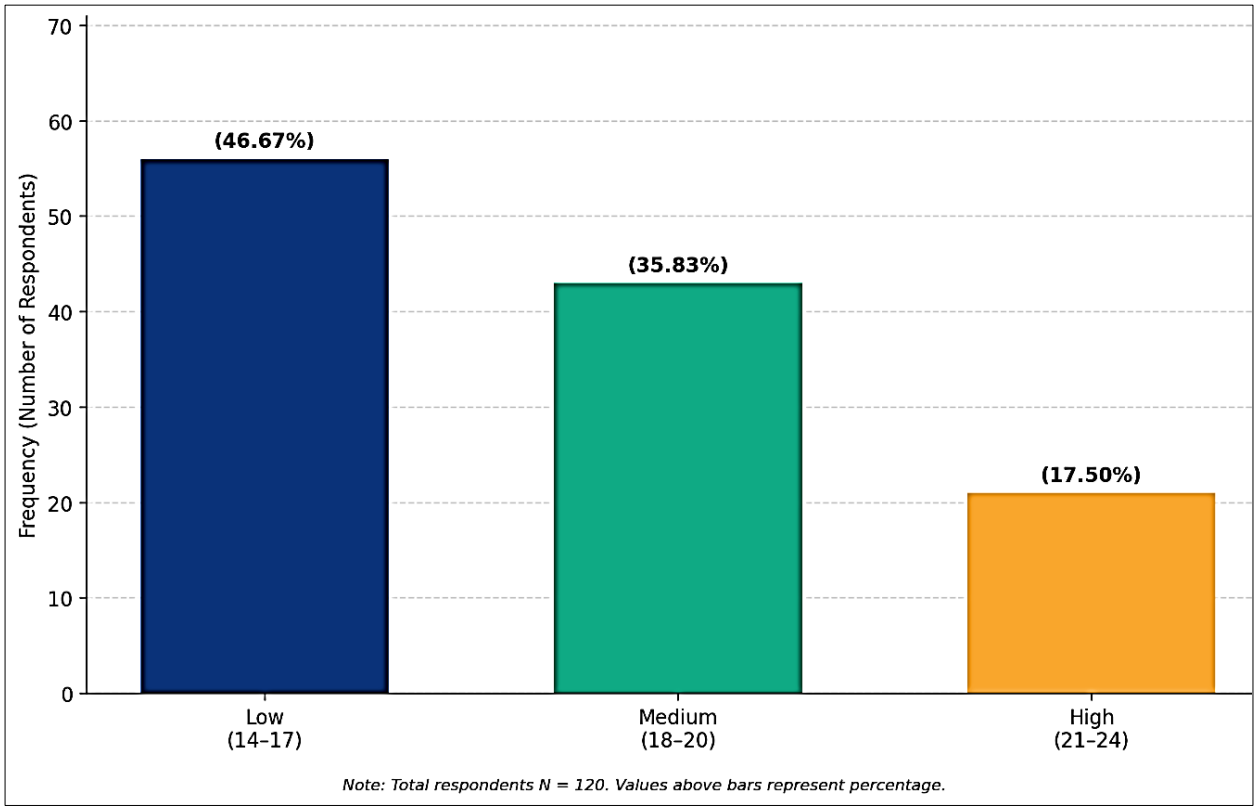

Fig 1: Distribution of respondents according to level of technology adoption

Nearly half of the respondents (46.67%) recorded a low level of overall technology adoption, 35.83 percentage a medium level, and only 17.50 percentage a high level, with a mean adoption score of 18.26 (Range = 10). This confirms that, while awareness of certain technologies such as irrigation, machinery, and government schemes is fairly widespread among the Badaga community, actual adoption lags behind, particularly for knowledge- and capital-intensive practices such as integrated nutrient/pest management, bio-inputs, and digital advisory tools. The gap between awareness and adoption observed throughout this analysis points to persistent barriers of cost, training, and last-mile institutional support rather than a lack of basic awareness.

C. Association of Profile Variables with Adoption

To ascertain the relationship between the profile characteristics of respondents and their level of technology adoption, Spearman's Rank Correlation Coefficient was calculated. The results are presented in Table 4.

Table 4: Correlation between profile variables and adoption of new agricultural technology

S. No.	Profile Variable	rs (Adoption)
1	Age	+0.188*
2	Education	+0.129NS
3	Occupation	-0.089NS
4	Annual Income	+0.324**
5	Land Holding	+0.347**
6	Family Size	+0.035NS
7	Farming Experience	+0.268**
8	Risk Bearing Ability	+0.320**
9	Mass Media Exposure	+0.266**
10	Social Participation	+0.459**
11	Scientific Orientation	+0.245**

** = Significant at 1% level of probability; * = Significant at 5% level; NS = Non-significant

Social participation recorded the strongest association with adoption (rs = +0.459, significant at 1%), followed by annual income (rs = +0.324), land holding (rs = +0.347) and risk bearing ability (rs = +0.320), both significant at the 1

percentage level. This indicates that farmers with larger landholdings, greater risk tolerance, and stronger community/institutional engagement are considerably more likely to translate awareness into actual adoption an intuitive finding given that several technologies studied, such as irrigation systems and machinery, require capital investment that is more feasible on larger holdings. Farming experience (rs = +0.268) and mass media exposure (rs = +0.266) were also significant at the 1 precentage level, while age (rs = +0.188) was significant at the 5 percentage level. Education, occupation and family size showed no significant relationship with adoption, suggesting that formal education and income level, though influential for building awareness, do not by themselves guarantee translation into adoption behaviour among the Badaga farming community.

Conclusion

It is concluded that respondents are predominantly older, moderately educated farming population with limited landholding and modest income: half (50.83%) were above 55 years of age, about a quarter (25.83%) were illiterate, and 65.83 percent depended solely on farming, while marginal landholdings of less than one acre characterized 63.33 percent of the sample. Overall, nearly half of the respondents (46.67%) recorded a low level of adoption, with a mean adoption score of 18.26, reflecting an adoption profile that lags behind the community's broader awareness of these technologies. Social participation, land holding, risk bearing ability, farming experience, and mass media exposure were found to be positively and significantly associated with adoption, whereas education, occupation, annual income, and family size showed no significant association. It is suggested that strengthening institutional/community participation platforms and expanding practical, demonstration-based extension support particularly around nutrient management, pest management, and digital advisory tools could meaningfully improve the level of technology adoption among Badaga farmers.

References

1. Wadekar, et al. Adoption of selected rice-crop technologies among Warli tribal farmers of Thane district, Maharashtra. 2017.
2. Sinha, et al. Technology adoption across farm types in tribal villages of Jharkhand. 2022.
3. Puppala, et al. Barriers to adoption of unmanned aerial vehicles for precision agriculture in India. 2023.
4. Patil, Chellattan Veettil. Farmers' risk attitude and technology adoption in eastern India. 2024.
5. Guriya, Mazhar. Adoption of modern farming practices among tribal farmers of Hazaribag district, Jharkhand. 2025.
6. Hebsale Mallappa, Pathak. Awareness and adoption of agricultural technology among tribal farmers. 2023.
7. Tasnim A, Ahmed JU, Khan MJA, Al-Noman MA, Jannat A, Islam MM, et al. The role of livelihood diversification in agricultural modernization among tribal farmers in Bangladesh. 2025.
8. Massresha SE, Lema TZ, Neway MM, Degu WA. Perception and determinants of agricultural technology adoption in North Shoa Zone, Amhara Regional State, Ethiopia. Cogent Econ Finance. 2021;9(1):1956774.
9. Meena DC, Kumari M, Kishore P, Bangararaju TSV, Bishnoi R. Do socio-economic conditions and personal behaviour influence the adoption of climate change mitigating measures. Indian J Ext Educ. 2023;59(2):22–25.