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Farmers' Perception towards Agricultural Development in Southern Odisha

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ABSTRACT

The study examined farmers' attitudes towards agricultural extension services, perceptions of organisational support, and willingness to participate in agricultural development activities in the tribal-dominated districts of Gajapati and Rayagada, Odisha. Using an ex-post-facto design, 120 respondents were randomly selected from six blocks and interviewed through a structured schedule. Data were analysed using frequency, percentage, mean, standard deviation, correlation, and multiple regression. Most respondents exhibited moderately favourable attitudes towards extension services (57.5%), perceived moderate organisational support (60%), and demonstrated moderate willingness to participate (40%). Attitude was significantly associated with age, education, organisational membership, housing condition, annual income, outside contact, and economic motivation. Participation willingness was significantly influenced by cropping pattern, landholding, outside contact, and information-seeking behaviour. Inadequate irrigation, low productivity, limited access to agricultural innovations, and climate variability emerged as major constraints. Decentralised extension delivery, climate-resilient interventions, improved irrigation, and farmer-centred capacity building are therefore essential for agricultural development in tribal Odisha.

Keywords: Agricultural development, Agricultural extension, Farmers' attitude, Organisational support, Southern Odisha, Willingness to participate.

1. INTRODUCTION

According to Moseley and Malcolm (2003) and Ahmad (2023), rural development is a process that addresses the economic welfare and overall development of people

residing in relatively remote and sparsely populated areas. Agricultural development is an important part of rural development, involving a multidimensional process of enhancing the material and social welfare of

agricultural communities through improved production methods, extension services, infrastructure, and market linkages (Terzo, 2024). Given that India has a majority of its population in rural areas. It relies heavily on the agriculture sector; strengthening agriculture is a key priority in the national development strategy (World Bank, 2023).

With the third-highest Scheduled Tribe population in the state, Odisha faces unique challenges in the tribal-dominated southern districts (Routray & Mishra, 2022). The rain-fed farming system remains dominant in Gajapati and Rayagada districts. At the same time, farmers have limited access to markets and limited exposure to modern technologies, institutional extension services, and practices (Kumar et al., 2022). Recent studies from Gajapati and Rayagada districts have similarly identified limitations related to technical knowledge, training, market access, communication behaviour, and institutional support as important constraints affecting agricultural development in Southern Odisha (Das et al., 2025). To develop extension strategies that are locally responsive and not generically top-down, one needs to understand farmers' perceptions of ongoing development activities, their attitudes towards extension services, their perceptions of organisational support, and their willingness to participate (Bahubalendra et al., 2023).

In the last few years, there has been an increasing number of studies examining farmers' attitudes towards extension and development interventions across various Indian and South Asian settings. Moderate to positive attitude of rice farmers towards Good Agricultural Practices (Hoque et al., 2024), towards ICT-based extension services in West Bengal (Mukherjee et al., 2022), towards regulated markets in Odisha (Behera & Modak, 2022) and towards national horticulture missions in Haryana (Kaur et al., 2023) have been reported. The socio-economic and institutional factors which influence farmers' involvement in development and financing programmes have also been discussed in complementary studies (Kan et al., 2022; Zhou & Ding, 2022), and other studies have identified structural barriers to agricultural production such as irrigation, transportation and market access in similar tribal and hilly regions (Pruthviraj et al., 2022; K Ravi, 2023). Although recent studies have examined livelihood security, agripreneurial constraints, and communication behaviour among farming communities in Southern Odisha, comparatively less attention has been given to the combined assessment of farmers' attitudes towards extension services, perceptions of organisational support, and willingness to participate in agricultural development activities (Ghosh et al., 2025). In this backdrop, the present study aims to fulfil three specific objectives as follows: (i) to study the attitude of

farmers towards agricultural development in Southern Odisha; (ii) to understand the willingness of farmers towards agricultural development in Southern Odisha, and (iii) to identify the problems faced by farmers and to suggest some remedies for agricultural development in the region.

2. MATERIALS AND METHODS

The study was carried out in Gajapati and Rayagada districts of Southern Odisha, India, in 2023-24. Three blocks were selected randomly from each district, namely R. Udayagiri, Gumma and Rayagada from Gajapati district and Rayagada, Gunupur and Muniguda from Rayagada district, which have predominantly tribal and agriculture-dependent populations (Nayak & Bhuiyan, 2022). Data were collected from 3-4 villages, each selected from the three chosen blocks.

The research design adopted was the ex-post-facto design because the phenomena studied (farmers' attitudes, perceptions, and willingness) had already occurred and could not be manipulated. The total number of respondents was 120 farmers (60 from each district), selected through simple random sampling.

A pretested structured interview schedule was used; data were collected through direct personal contact with respondents. Standardised measurement scales were adapted from previously developed scales in extension research with a few modifications. Twenty six independent variables were included, socio personal: age, gender, educational qualification, religion, caste, family type, marital status, socio economic: land holding, annual income, household expenditure, borrowing pattern, communication and institutional contact: mass media exposure, information seeking behaviour, outside contact, personal visit by development personnel, social participation, need related: need perceived and need fulfilled across ten agricultural operations. Three dependent variables were measured: attitude of the farmers towards extension services, their perception of the change (or not) of the farmers caused by the organisational support, and their willingness to participate in activities within the agricultural development of the village.

Collected data were coded, tabulated, and analysed using descriptive statistics (frequencies, percentages, means, and standard deviations) to describe the sample and its perceptions. The bivariate relationships between the independent and dependent variables were examined at the 1% and 5% levels of significance using the Karl Pearson correlation coefficient, and the combined relationship of the independent variables with each dependent variable was assessed using multiple linear regression analysis.

3. RESULTS AND DISCUSSION

3.1 Socio-Demographic and Farm Profile

The majority of respondents were middle-aged farmers (35-50 years; 63%), whereas young farmers (up to 35 years) accounted for 22% and older farmers (above 50 years) for 15%. Men represented 62% of the respondents. Literacy levels were low, with 55% of respondents having completed only primary education and 17% being illiterate, similar to the low literacy rate reported in tribal blocks in Odisha (Routray & Mishra, 2022). Most of the respondents (96%) were Hindu, 56% were from the Scheduled Caste category, and 59% lived in joint families. When asked about farming background, 71% of the respondents had 0-10 years' experience with allied farming behaviour. In comparison, 88% of respondents were engaged in monocropping, which is correlated with the low level of implementation of diversified or integrated farming systems reported elsewhere in similar agro-climatic zones (Kumar & Sharma, 2022). Landholdings were also low, with 85% of farmers having 0-5 acres, and people were generally living in thatched housing, with 67% of farmers.

3.2 Communication, Institutional Contact, and Economic Profile

The level of institutional involvement was mostly sporadic and infrequent. The involvement with specialised extension bodies was weak: 62.5% of respondents visited

KVK/ATMA occasionally; 86.7% had not joined any farmers' club; 79.2% had not visited any cooperative society; and 59.2% had not visited any NGO or Farmer Producer Organisation, with the Department of Agriculture staff visiting once a month. The limited participation in formal extension and collective institutions is consistent with other studies on weak farmer-institution linkages in other Indian contexts (Bahubalendra et al., 2023; Masanja et al., 2023). Similar communication patterns have recently been reported among tomato growers in Southern Odisha, where mobile phones and television were frequently used while extension publications and several conventional information channels were less frequently accessed (Amar et al., 2025). The analysis revealed that input dealers were the most important source of information for the smallholders (80% of the respondents) compared with newspapers (14.2%) and mobile phones (25.5%), which, as in other underserved regions, continue to be important information sources for smallholders (Mukherjee et al., 2022). The relatively limited use of mobile phones observed in the present study also highlights the scope for strengthening digital extension channels, as digital technologies can facilitate more timely access to agricultural information when farmers and rural intermediaries have adequate connectivity, digital competence, and access to suitable platforms (Masso & Prusty, 2026). More broadly, evidence from tribal farming communities in Odisha indicates that agricultural information transfer is influenced by farmers' socio-personal and experiential characteristics, reinforcing the need for locally adapted communication strategies (Saha et al., 2026). Financially, 79.2% of the farmers had availed loans from financial institutions; 87% reported

Table 1. Socio-demographic and farm profile of respondents (n = 120)

Variable	Category	Frequency (f)	Percentage (%)
Age	Young (≤35 yrs)	26	22
	Middle (35–50 yrs)	76	63
	Old (>50 yrs)	18	15
Gender	Male	74	62
	Female	46	38
Education	Illiterate	20	17
	Primary level	66	55
	High school level	34	28
Religion	Hindu	115	96
Caste	Scheduled Caste	67	56
Family type	Joint family	71	59
Farming experience	0–10 years	85	71
	11–20 years	44	37
Cropping pattern	Monocropping	106	88
Land holding	0–5 acres	102	85
Housing	Thatched house	80	67

Table 2. Institutional contact, information sources, and economic profile (n = 120)

Indicator	Category	Percentage (%)
Market visit	Visited (any frequency)	76.7
KVK/ATMA visit	Occasional	62.5
Farmers' club membership	Never joined	86.7
Cooperative society visit	Never visited	79.2
NGO/FPO visit	Never/rarely visited	59.2
Dept. of Agriculture visit	Monthly (personnel visit)	53.3
Primary information source	Input dealers	80
Information source	Mobile phones	25.5
Information source	Newspapers (regular)	14.2
Borrowing	Borrowed from financial institutions	79.2
Annual income/ expenditure	≤ Rs. 50,000	87
Economic motivation	Medium level	55

income and expenditure in the range of ₹50,000 or less per year; and 55% of the farmers showed a medium level of economic motivation.

3.3 Attitude towards Extension Services

The majority of the respondents (57.5%) had a moderate attitude towards agricultural extension services, 17% had a very high attitude, and 16.6% had a very low attitude. The prevalence of a moderate attitude is consistent with that of farmers in Bangladesh who grow aromatic rice and their attitudes towards Good Agricultural Practices (Hoque et al., 2024) as well as farmers in Haryana growing horticultural crops and their attitudes towards the national horticulture mission interventions (Kaur et al., 2023), which indicates a largely consistent attitude of farmers towards extension programming across South Asian smallholder contexts. The results of multiple regression analysis showed that the independent variables explained 45.3% of the variance in attitude ($R^2 = 0.4529$). The results indicated that age, educational qualification, organisational membership, housing condition, annual income, outside contact, and economic motivation were significant positive predictors. At the same time, applied-activity experience, social participation, and participation in extension activities were significant negative predictors. This finding may be interpreted as farmers with exposure to extension services having extensive experience with service quality issues and gaps, making them more negative.

3.4 Perception of Organisational Support

60% of respondents had a moderate perception of the changes induced by organisational support, 25% a low perception, and 15% a high perception. The independent variables accounted for the most variance in the regression outcome ($R^2 = 0.5685$), while the other two had explanatory power of 53.9% ($R^2 = 0.5393$) and 48.9% ($R^2 = 0.4885$). This result aligns with evidence indicating that farmers' perceptions of institutional value are closely associated with the accessibility and responsiveness of institutional support. Evidence from tribal communities in Odisha further shows that social capital, local leadership, community trust, cultural sensitivity, and participatory governance can substantially influence institutional effectiveness (Masanja et al., 2023; Rout et al., 2026).

3.5 Willingness to Participate in Agricultural Development

The willingness of the farmers to participate in agricultural development activities at the village level was mostly moderate (40%), low (33%), or high (27%). The independent variables accounted for 30.6% of the

variance in willingness ($R^2 = 0.3056$), the lowest among the three models, suggesting that unmeasured contextual and psychological factors may have a relatively greater impact on willingness to participate. Family type, organisational membership, cropping pattern, landholding, outside contact, information-seeking behaviour, and input availability were significant positive predictors. In contrast, age, gender, educational qualification, housing condition, and annual income were significant negative predictors of willingness. These findings broadly support recent evidence that the drivers of farmers' willingness to engage in collective agricultural activities extend beyond mere demographic characteristics to encompass socio-economic endowments and institutional connectedness (Kan et al., 2022; Zhou & Ding, 2022). Recent evidence from tribal farmers in South Odisha likewise demonstrates that livelihood outcomes are shaped by interacting socio-economic and behavioural characteristics rather than by isolated demographic factors alone (Ghosh et al., 2025).

Table 3. Distribution of respondents by level of attitude, perception, and willingness (n = 120)

Dependent variable	Low (%)	Moderate (%)	High (%)
Attitude towards extension services	16.6	57.5	17
Perception of organisational support	25	60	15
Willingness to participate in development	33	40	27

Table 4. Summary of multiple regression analysis for the three dependent variables

Dependent variable	R ² value	Variance explained (%)	Key significant predictors
Attitude towards extension services	0.4529	45.3	Age, education, membership, housing, income, outside contact, economic motivation (+); applied-activity experience, social participation, extension participation (-)
Perception of organisational support	0.5685	56.9	Cropping pattern, activity experience, housing, income, outside contact, social participation, extension participation, economic motivation, input availability, need perceived/fulfilled (+)
Willingness to participate	0.3056	30.6	Family type, membership, cropping pattern, land holding, outside contact, information-seeking behaviour, input availability (+); age, gender, education, housing, income (-)

3.6 Problems Faced by Farmers

The farmers' constraints, ranked by mean score, were: irrigation facilities, production and productivity, agricultural innovations, climate variability, transportation, availability of resources, marketing facilities, electricity supply (joint rank), land facilities, and school and education problems (rank X, with the lowest mean score). Recent evidence from vegetable growers in South Odisha similarly indicates that agricultural enterprise development is constrained by interconnected institutional, financial, technological, input-related, and market factors, including untimely input availability, inadequate credit and training, and unfavourable market conditions (Chandra et al., 2026). Irrigation emerged as the most significant constraint, since most cultivations are rainfed and only a few farmers have access to motor pumps or sprinkler sets, forcing them to draw water from lakes or canals, which are rarely available during non-monsoon periods. Likewise, continued reliance on traditional cultivation practices, farmer-saved seed without any treatment, and imprecise use of fertilisers and pesticides were closely associated with low productivity, similar to the productivity constraints documented for smallholders in other rainfed tribal regions in eastern India (Kumar et al., 2022; Pruthviraj et al., 2022). Comparable constraints have been reported among farmers in Odisha, including inadequate knowledge of recommended production technologies, insufficient technical training, and limited knowledge concerning appropriate fertiliser and pesticide practices (Prusty & Mohapatra, 2021). However, limited adoption of agricultural innovations has been blamed on the infrequent visits by extension personnel. Previous research in Odisha has also demonstrated the importance of extension-led training for improving farmers' knowledge of improved agricultural technologies and recommended production practices (Prusty et al., 2020).

Table 5. Problems faced by farmers, ranked by mean score (n = 120)

Rank	Problem	Mean score
I	Irrigation facilities	2.40
II	Production and productivity	1.96
III	Agricultural innovations	1.90
IV	Climate variability	1.71
V	Transportation problem	1.66
VI	Availability of resources	1.59
VII	Marketing facilities	1.55
VIII	Electricity supply	1.55
IX	Land facilities	1.45
X	School and education problems	1.42

The physical distance between KVK/ATMA centres and many villages, and the impact of climate variability on both yield and pest and disease incidence were reported, in line with the broader evidence on the production risks faced by Indian smallholders due to climate variability (Ray & Pullabhotla, 2023).

3.7 Strategies for Agricultural Development

Based on the problem ranking and literature review, several directions are suggested for the study area. The most critical need is the expansion of decentralised irrigation infrastructure, such as minor irrigation, groundwater recharge, and low-cost drip/sprinkler systems, which is especially important given the first constraint: irrigation. The productivity gap can be directly addressed through soil-health-card-based nutrient management, quality seed replacement, and conservation agriculture practices. In contrast, climate-smart farming practices such as agroforestry, short-duration crop varieties, and optimised sowing dates can help farmers adapt to climate variability (Asim et al., 2024). Greater reach and frequency of last-mile access to KVK, ATMA and other National Agricultural Research and Extension System (NARES) institutions through field visits, demonstrations and farmer training would help improve farmers' access to agricultural innovations and technical knowledge (Prusty et al., 2020; Nag et al., 2023). Conventional field-based extension can also be complemented by digital decision-support systems. Evidence from Odisha demonstrates substantial farmer exposure to AI-enabled pest advisories under the National Pest Surveillance System, although the gap between advisory receipt and actual compliance indicates that digital information provision alone may not ensure adoption (Kumar et al., 2025). In the short term, structured extension training for input dealers and retailers on the existing package of practices can significantly increase the impact of extension knowledge, particularly for input dealers, who are the most important source of information for farmers (Mukherjee et al., 2022). Targeted investment in roads, storage facilities and market linkages in rural areas, along with empowering Farmers Producer Organisations and strengthening co-operatives, would further enhance farmers' bargaining power and minimise post-harvest losses. Such interventions are consistent with recent recommendations from South Odisha emphasising improved market regulation, flexible credit systems, post-harvest infrastructure, farmer organisation, and stronger institutional support for sustainable agricultural enterprises (Chandra et al., 2026). Capacity-building interventions should also integrate technical skill development, access to finance, market information and expert advisory support, as these have been identified as

Table 6. Problem-linked strategies for agricultural development

Priority problem	Recommended strategy
Irrigation facilities	Minor irrigation and groundwater recharge schemes; low-cost drip/sprinkler systems for hilly terrain; mulching and contour farming to retain soil moisture
Production and productivity	Soil health cards, quality/treated seed replacement, balanced fertiliser use, and conservation agriculture practices
Agricultural innovations	More frequent KVK/ATMA field visits, localised demonstrations, and Cluster Frontline Demonstrations under NARES institutions
Climate variability	Agro-forestry and climate-smart agriculture; short-duration crop varieties; adjusted sowing and harvesting schedules; intercropping
Transportation and marketing	Rural road and storage infrastructure; cold chains and food-processing units; strengthened FPOs and cooperatives for collective bargaining
Information access	Structured training of input dealers/retailers as extension multipliers, given their role as farmers' dominant information source

important requirements for overcoming agripreneurial constraints in Gajapati and Rayagada districts (Das et al., 2025).

4. CONCLUSION

This study on farmers' perceptions of agricultural development in Gajapati and Rayagada districts of Southern Odisha shows that farmers are neither apathetic nor convinced by the existing agricultural extension and development activities, as most farmers have a moderate attitude, perceive organisational support, and are willing to participate in agricultural development. They are moderate orientations that emerge from a specific set of socio-economic, institutional, contact, and information availability conditions that can, in principle, be influenced by policy. The key constraints that emerged as dominant are: irrigation, productivity, limited access to innovation and climate variability, and suggest a set of practical priorities: increasing irrigation infrastructure adapted to the hilly area, improving the effectiveness of last-mile extension services, creating farmer capacity through demonstrations and training, and introducing climate-resilient practices into local farming practices. In conclusion, the psychological, cultural, and trust-building aspects of farmer participation that are not captured by the study's socio-economic and institutional dimensions would benefit from further investigation in future studies. The overall results indicate that a mix of physical infrastructure investments and ongoing, locally based extension engagement is likely to be most effective for tribal agricultural development projects in Southern Odisha.

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Declaration of Conflicting Interests

The authors declare no conflict of interest.

Declaration of Generative AI and AI-assisted Technologies in the Writing Process

During the preparation of this manuscript, the authors have not used generative AI or AI-assisted technologies. The authors independently developed the conceptual framework and scholarly arguments and remain fully responsible for the accuracy, originality, and integrity of the manuscript.

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