**A COMPREHENSIVE PROFILE ANALYSIS OF PADDY FARMERS IN ANDHRA PRADESH: A SOCIAL AND ECONOMIC PROFILE ANALYSIS**

# ABSTRACT

# The COVID-19 pandemic significantly increased consumer health consciousness, driving demand for organic rice and prompting farmers in Andhra Pradesh to adopt certified organic paddy cultivation. This study, conducted in 2023 using an ex-post facto research design, aimed to construct a sustainability index and profile 200 certified organic paddy farmers from Nellore, Visakhapatnam, and Vizianagaram districts through proportionate stratified random sampling. The findings indicate that these farmers are predominantly middle-aged (53%), moderately educated (53% with medium educational years), and experienced in farming (59.5% with medium experience, averaging 25.22 years). They typically operate small (39%) to marginal (33.5%) land holdings, with limited annual family income (88.5% low income, averaging ₹5,11,702.60). Farmers exhibited moderate levels of social participation (67% medium), mass media exposure (63.5% medium), extension contact (65.5% medium), scientific orientation (58% medium), innovativeness (60% medium), and resilience (56% medium). Cropping intensity was largely low to medium (59% medium, 40.5% low, averaging 159%). A significant observation was the minimal formal training received, with 61% of respondents having undergone no training, and farmers reported medium exposure to climate variability (48% medium). This comprehensive profile provides essential baseline data on the demographic, socio-economic, and personal characteristics of organic paddy farmers in Andhra Pradesh, laying a foundation for future comparative studies and policy planning in the organic farming sector.

**Keywords:** Andhra Pradesh, certified organic farmers, organic paddy cultivation, rural sociology, socio-economic profile

# INTRODUCTION

Agriculture remains the backbone of the Indian economy, supporting livelihoods and ensuring food security for a large segment of the population. The Green Revolution enabled India to become self-sufficient in food production, especially in staple crops like rice and wheat. However, the extensive use of chemical fertilizers and pesticides that accompanied this success has had unintended consequences. Environmental degradation—such as soil fertility loss, water pollution, and pest resistance—alongside health risks like cancer and cardiovascular diseases, have raised serious concerns about the sustainability of conventional agriculture. These challenges have led to increasing awareness among farmers and consumers, and a shift toward alternative farming systems, most notably organic farming.

Organic agriculture offers a sustainable alternative to conventional methods. Defined by the FAO (1999) as a system that integrates ecological processes, biodiversity, and local cycles rather than relying on synthetic inputs, organic farming promotes environmental health, economic resilience, and human well-being. Globally, the organic sector has expanded considerably. As of 2019, around 187 countries practiced organic farming across 72.3 million hectares, representing 1.5% of total agricultural land (FiBL and IFOAM Year Book, 2020). The COVID-19 pandemic further boosted the demand for organic products, with health-conscious consumers seeking chemical-free alternatives.

India is home to 30% of the world’s organic producers (3.10 million), yet it accounts for only 2.59% of the global organic area (Willer *et al*., 2021). Government initiatives such as the National Programme for Organic Production (NPOP) and the Paramparagat Krishi Vikas Yojana aim to expand the organic footprint. In 2020–21, India exported 8.9 lakh tonnes of organic products worth 1041 million USD (APEDA, 2021). Nevertheless, out of the 4.3 million hectares of certified organic land, only 2.6 million hectares are actually cultivated, with the remainder being wild harvest areas (FiBL and IFOAM Year Book, 2020). These figures reflect a structural imbalance between certification and actual adoption.

Rice (Oryza sativa) is a key food crop in India, both in terms of production and consumption. As the second-largest global producer and consumer of rice, India contributes significantly to global food security. However, rice cultivation, particularly under conventional systems, is highly resource-intensive. It accounts for substantial greenhouse gas emissions—mainly methane (CH₄) and nitrous oxide (N₂O)—which are 80–83 and 273 times more potent than CO₂, respectively (IPCC AR6, 2021). India's agricultural sector emits 408 million metric tons (MMT) of CO₂ equivalent, with paddy farming contributing 17.5% of these emissions. Additionally, chemical inputs in paddy cultivation leave harmful residues in food and water, exacerbating health risks and environmental strain.

In this context, organic paddy farming emerges as a critical strategy for sustainable food production. By avoiding synthetic inputs, it helps maintain ecological balance, improve soil health, and protect consumer safety. Yet, the widespread adoption of organic rice farming remains constrained by multiple socio-economic factors, including education, landholding size, income, family labor availability, and institutional support.

Andhra Pradesh, a prominent rice-producing state, offers an instructive case study. The state has historically maintained high productivity levels—2891 kg/ha in 2014 and 3733 kg/ha in 2019 (Agricultural Statistics at a Glance, 2014; 2019). However, by 2020–21, its rice productivity declined to 2773 kg/ha, placing it twelfth nationally and contributing just 3.64% to total rice production (Agricultural Statistics at a Glance, 2022). These declining trends point to potential systemic issues within the agricultural sector in the state.

To mitigate these challenges, Andhra Pradesh has advanced organic farming through large-scale institutional support. The state reported 36,801.40 hectares of organic farming land, with 14,458.30 hectares under conversion. Certified organic farmers numbered 1,443,076, organized under 55,160 organic farming groups. The total certified organic area reached 891,780 hectares, reflecting growing policy commitment and farmer involvement (PGS India, 2023).

Despite these achievements, the socio-economic profile of organic paddy farmers in Andhra Pradesh remains underexplored. Factors such as farmer age, education, land ownership, annual income, and access to irrigation or institutional support critically influence the transition to and persistence in organic farming systems. These attributes also determine the ability of farmers to navigate challenges such as high labor requirements, certification hurdles, market fluctuations, and limited access to technical knowledge. Understanding these dimensions is particularly relevant in light of growing rural disinterest in agriculture, youth migration to urban areas, and the continuing distress faced by smallholders.

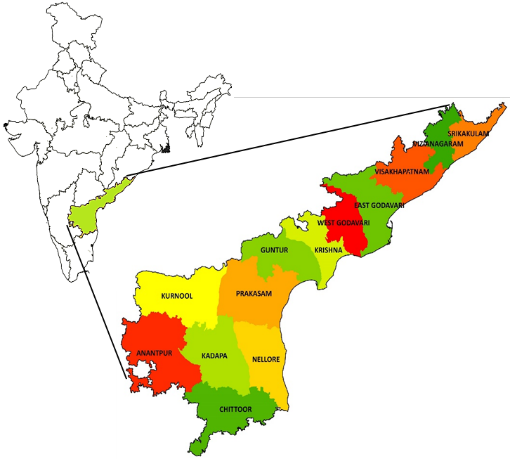
The present study seeks to address this research gap by examining the socio-economic and personal profile of organic paddy farmers in Andhra Pradesh. By focusing on micro-level attributes—age structure, land size, farming experience, family setup, asset ownership, and livelihood patterns—this investigation aims to provide a comprehensive understanding of the organic farming landscape in the state. It also attempts to explore how these characteristics influence farmers’ decisions to adopt and sustain organic paddy cultivation in the face of systemic and environmental challenges.

In doing so, the study not only contributes to the limited body of literature on regional organic agriculture but also provides data-driven insights that can inform policy, improve extension strategies, and foster the long-term viability of organic rice farming in India.

# MATERIALS AND METHODS

## Research Design and Study Area

This study employed an ex-post facto research design to analyze the socio-economic and personal characteristics of certified organic paddy farmers in Andhra Pradesh during 2022-23. Three districts—Nellore, Visakhapatnam, and Vizianagaram—were selected based on their concentration of certified organic paddy farmers as listed in the PGS India database.

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**Figure 1. Study Area**

## Sampling Design and Sample Size

The target population for this study encompassed all certified organic paddy farmers actively practicing in Andhra Pradesh. From this broader population, three key districts—Nellore, Visakhapatnam, and Vizianagaram—were purposively selected as the study strata due to their high concentration of certified organic paddy farmers, as identified in the Participatory Guarantee System (PGS) India database. The sampling frame for the study was established using the comprehensive list of certified organic paddy farmers maintained by PGS India. A total sample size of 200 certified organic paddy farmers was determined for this study, aligning with the research scope and practical feasibility. To ensure a representative selection across the identified strata, a proportionate stratified random sampling method was employed. This involved proportionally allocating the 200 samples based on the total certified farmer population within each district: Nellore (155 farmers, yielding 87 samples), Visakhapatnam (121 farmers, yielding 68 samples), and Vizianagaram (79 farmers, yielding 45 samples). Within each stratum, individual farmers were then selected using a simple random sampling technique. Table 1 provides a detailed breakdown of the district-wise sample distribution, and Figure 2 visually illustrates the step-by-step sampling procedure followed in this study, further enhancing methodological clarity.

1. **Selection of districts and respondents**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **State** | **Districts**  **(Strata)** | **Number of respondents** | **The proportion in each stratum** | **Proportionate sample** |
| **ANDHRA PRADESH** | Nellore (D1) | 155 | 0.437 | 87 |
| Vishakhapatnam (D2) | 121 | 0.341 | 68 |
| Vizianagaram (D3) | 79 | 0.223 | 45 |
| **Total** | **355** |  | **200** |



**Figure 2.** Sampling procedure followed in the study

## **Data Collection**

Primary data were collected via structured, pre-tested, face-to-face interviews with selected certified organic paddy farmers, capturing their demographic, socio-economic, personal, and farming practice details. Additionally, secondary data, specifically the list of certified organic paddy farmers, was obtained from the official Participatory Guarantee System (PGS) India website (PGS India, 2023). This institutional record served as the essential sampling frame for systematic respondent identification and selection for the study.

## **Data Analysis**

Upon data collection, farmer responses were meticulously checked, coded, and organized. All statistical analyses were exclusively performed using IBM SPSS Statistics, Version 26.0. The analysis primarily profiled farmers using descriptive statistics, including frequencies, percentages, means, and standard deviations. Continuous variables like age and experience were categorized into 'low,' 'medium,' and 'high' groups based on their respective mean and standard deviation ranges. Subsequently, the Chi-square (χ²) test of independence was employed to examine statistically significant associations between various categorical profile variables and study outcomes. These tests, conducted at p < 0.05, identified key linkages. This systematic approach ensures the findings' reliability and contributes to methodological transparency.

# RESULT AND DISCUSSION

This section presents the comprehensive profile of the selected 200 certified organic paddy farmers. The findings are organized and presented under the following key thematic categories to enhance clarity and understanding: Demographic Characteristics, Socio-economic Variables, Personal Attributes, and Farming Practices.

**Demographic Characteristics**

1. **Age**

# Age is the Chronological age of the respondent. The data in Table 2 indicated that, 53.00% of the respondents in all the three regions were found to fit in the middle age category followed by 20.00% in the young age and the remaining 27.00% of the respondents in old age category. The Chi-square test of independence for the age distribution of respondents had shown χ2 = 13.751\*\* with p value of 0.01, concluding that the age distribution was related and dependent on the region. The average age was 46.11 years which was contradicting with the results of Sujianto *et al*. (2022), who reported average household head’s age of Organic Rice Farmers as 52.70 years.

1. Distribution of respondents according to their age

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Category** | **Nellore (n=87)** | | | **Visakhapatnam (n=68)** | | **Vizianagaram (n=45)** | | **Andhra Pradesh (n=200)** | |
| **f** | **%** | | **f** | **%** | **f** | **%** | **f** | **%** |
| **1.** | Young age  (up to 35 years) | 22 | 25.29 | | 17 | 25.00 | 1 | 2.22 | 40 | 20.00 |
| **2.** | Middle age  (36-50 years) | 47 | 54.02 | | 33 | 48.53 | 26 | 57.78 | 106 | 53.00 |
| **3.** | Old age  (Above 50 years) | 18 | 20.69 | | 18 | 26.47 | 18 | 40.00 | 54 | 27.00 |
| **Total** | | **87** | **100** | | **68** | **100** | **45** | **100** | **200** | **100** |
| Mean= 46.11 years | | | | χ2=13.751\*\*; p=0.01 | | | | | | |
| \*\*= Significant at 0.01 level of significance | | | | | | | | | | |

The age demographics of farmers play a significant role in understanding organic paddy farming. Younger farmers often opt for non-agricultural occupations due to perceived lack of profitability in organic paddy cultivation. Older farmers tend to pass on their farm responsibilities to their children for various reasons, such as family property settlements. As a result, middle-aged farmers become the core group involved in rice cultivation. They were in a stage where they have gained experience and expertise in farming practices. Additionally, they might have the necessary resources and stability to continue paddy cultivation, making them key contributors to the organic paddy farming.

**Socio-economic Variables**

1. **Educational Years**

Educational years is operationalized as number of academic years the respondent has completed. The Table 3 clearly depicted that, 53.00% of the respondents had medium educational years category, followed by 25.00% of respondents had high educational years and the remaining 22.00% had low educational years. The Chi-square test of independence for distribution of educational years of respondents had shown χ2=30.234\*\* with p value 0.00, concluding that distribution of educational years was significantly associated with the region. The average educational years was 8.94 years which was almost on par with Lal (2017), who reported that mean educational years of the farmers as 8.04 years.

Education plays a significant role in farming, including organic paddy cultivation. Farmers with higher education levels have a better understanding of agricultural practices and technical aspects, leading to improved farming quality. Farmers might have choosen organic farming as their primary economic activity. Older farmers with lower education levels often rely on agriculture as a reliable livelihood option. However, there was a growing trend of younger, highly educated individuals switching over to organic farming for its potential profitability. It is important to consider that successful organic farming requires a balance of education, experience and market knowledge.

1. **Farming Experience**

# Farming experience is operationalized as the number of years of experience the respondent has in farming activities. It can be observed from the Table 3 that, 59.50% of the respondents were having medium level of farming experience followed by 25.00% with low and only 15.50% with high level of experience. The results are on par with Shamna (2015). The Chi-square test of independence for distribution of experience in farming of respondents had shown χ2 =21.385\*\* with p value 0.00, concluding that distribution of experience in farming was related and significantly associated with the region. The average farming experience was 25.22 years. The results are contradicting with Sujianto *et al*. (2022) who reported the mean of experience of respondents in rice farming as about 18 years.

Experience plays a vital role in organic paddy cultivation, shaping farmers’ perceptions and practices. Many farmers gain informal knowledge through daily farm activities, while younger individuals often enter agriculture later, after pursuing education for non-farm careers—resulting in moderate farming experience. Most respondents reported **3 to 5 years of experience**, indicating the recent adoption of organic methods. The rise in consumer demand and awareness has accelerated this shift, with farmers acquiring skills through training, guidance, and hands-on learning. Though still developing, farmer expertise is expected to grow, enhancing sustainability. A combination of experience, education, and training is key to effective organic paddy cultivation.

1. **Land Holding**

# Land-holding is operationalized as the number of acres of land under cultivation by the respondent. It can be noticed from the Table 3 that, 39.00% of the respondents were small farmers. About 33.50% of the respondents were marginal farmers followed by 18.00% medium farmers. A meager of 9.50% were large farmers. The Chi- square test of independence for distribution of total land holding of respondents with region had shown χ2=42.953\*\* with p value 0.00 concluding that distribution of total land holding was related and significantly associated with the region. The average land-holding was 5.86 acres or 2.34 ha with was contradicting results of Methamontri *et al*. (2022) who reported average area of paddy field was 3.6 ha.

Land is a crucial resource for farming, including organic paddy cultivation. Majority of the farmers were small and marginal, relying on agriculture as their primary livelihood due to land fragmentation over generations. Some farmers acquire land through purchase, leading to a few semi-medium and medium-scale farmers. Organic paddy farmers usually cultivate 1-2 acres of land for family consumption and a limited customer base. This was because organic farming requires significant labor and time investment. They prefer cultivating their own land rather than leasing it because efforts made to improve leased land may be wasted if it is subsequently leased to a chemical farmer.

1. **Annual Family Income**

Annual family income is operationalized as the total annual income of the respondent’s family, measured using a schedule developed for the study. An outlook from the Table 3 inferred that, 88.50% of the respondents had low level of annual family income followed by 9.50% with medium and 2.00% with high level of annual family income. The Chi-square test of independence for distribution of annual income of respondents had shown χ2=20.919\*\* with p value 0.00 concluding that distribution of annual family income was related and significantly associated with the region. The average annual family income was 5,11,702.60 rupees.

The income of organic paddy farmers serves as an indicator of their social, economic, and organizational status. Low to medium annual income of farmers could be attributed to the challenges of organic paddy cultivation, including the investment of more effort, time, and money with potentially lower returns. Market constraints and the inability to command premium prices for their produce might contribute to lower income levels. Additional income from other sources, such as cattle rearing or wage employment, were also relatively low. In contrast, farmers with high annual income often may succeeded in marketing, and may have access to their own farm machinery. They may also generate income from off-farm enterprises or other jobs.

1. Distribution of respondents according to their Socio-economic Variables

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Category** | **Nellore (n=87)** | | **Visakhapatnam**  **(n=68)** | | **Vizianagaram (n=45)** | | **Andhra Pradesh (n=200)** | | **Details** |
| **f** | **%** | **f** | **%** | **f** | **%** | **f** | **%** |
| **Educational Years** | | | | | | | | | | |
| **1.** | Low | 7 | 8.00 | 19 | 27.94 | 18 | 40.00 | 44 | 22.00 | Mean=8.935 years |
| **2.** | Medium | 52 | 59.80 | 28 | 41.18 | 26 | 57.80 | 106 | 53.00 | SD=5.45 |
| **3.** | High | 28 | 32.20 | 21 | 30.88 | 1 | 2.20 | 50 | 25.00 | χ2= 30.234\*\* |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** | p=0.00 |
| **Farming Experience** | | | | | | | | | | |
| **1.** | Low | 32 | 36.80 | 17 | 25.00 | 1 | 2.22 | 50 | 25.00 | Mean=25.22 years |
| **2.** | Medium | 47 | 54.00 | 37 | 54.40 | 35 | 77.78 | 119 | 59.50 | SD=14.08 |
| **3.** | High | **8** | 9.20 | 14 | 20.60 | 9 | 20.00 | 31 | 15.50 | χ2=21.385\*\* |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** | p=0.00 |
| **Land Holding** | | | | | | | | | | |
| **1.** | Marginal (<1ha) | 16 | 18.39 | 34 | 50.00 | 17 | 37.78 | 67 | 33.50 | Mean=5.86 acres |
| **2.** | Small (1-2ha) | 40 | 45.98 | 19 | 27.94 | 19 | 42.22 | 78 | 39.00 | χ2=42.953\*\* |
| **3.** | Medium  (2-4ha) | 28 | 32.18 | 8 | 11.76 | 0 | 0.00 | 36 | 18.00 | p=0.00 |
| **4.** | Large (>4ha) | 3 | 3.45 | 7 | 10.29 | 9 | 20.00 | 19 | 9.50 |  |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** |  |
| **Annual Family Income** | | | | | | | | | | |
| **1.** | Low | 67 | 77.01 | 65 | 95.60 | 45 | 100 | 177 | 88.50 | Mean=5,11,702.60 rupees |
| **2.** | Medium | 16 | 18.39 | 3 | 4.40 | 0 | 0.00 | 19 | 9.50 | χ2=20.919\*\* |
| **3.** | High | 4 | 4.60 | 0 | 0.00 | **0** | 0.00 | 4 | 2.00 | p=0.00 |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** |  |
| \*\*= Significant at 0.01 level of significance | | | | | | | | | | |

**Personal Attributes**

1. **Social Participation**

# Social participation is operationalized as the extent of the respondent’s involvement in social and community organizations, measured using a schedule developed for the study. An outlook from the Table 4 inferred that, 67.00% of the respondents had medium level of social participation followed by 18.00% of them with low level of social participation and 15.00% of them with high social participation. The Chi-square test of independence for distribution of social participation of respondents had shown χ2=83.200\*\* with p value 0.00 concluding that distribution of social participation was related and significantly associated with the region. The results are almost on par with Kumari *et al*. (2022) who reported that majority of the respondents had medium level of social participation (94.45%) followed by high (4.44%) and low (1.11%) level of social participation.

Social participation is crucial for organic paddy farmers, but the majority of them had a medium level of engagement. This can be attributed to factors such as time constraints due to labor-intensive farming practices, limited support for organic farming within existing social structures, financial constraints, and geographical dispersion. Despite these challenges, promoting social participation is important for organic paddy farmers to benefit from knowledge sharing, access resources, advocate for organic farming, and foster collaborations. Increased engagement can contribute to the growth and development of the organic paddy farming sector.

1. **Mass Media Exposure**

# Mass media exposure is operationalized as the extent of exposure to mass communication sources such as radio, television, and newspapers, measured through a structured schedule. The Table 4 projected that, 63.50% of the respondents had medium level mass media exposure results are not on par with the Kumari *et al*. (2022) Who reported that 45.56% of the respondents had medium level of mass media exposure, followed by 19.50% with low and only 17.00% with high level of mass media exposure. The Chi-square test of independence for distribution of mass media exposure of the respondents had shown χ2 = 22.343\*\* with p value 0.00 concluded that distribution of mass media exposure was related and significantly associated with the region.

Access to authentic and credible information sources is crucial for the adoption of technology among organic paddy farmers. Mass media plays a vital role in this regard, as farmers often spend most of their time on the farm and face difficulties in contacting extension personnel frequently. Mass media saves time and energy, while also aiding in the recollection of information. However, the mass media exposure of organic paddy farmers was be low to medium due to factors such as an older mindset, illiteracy, and low-income levels within the farming community. Despite these challenges, mass media serves as an invaluable tool, providing timely and credible information on organic farming practices, expert advice, market insights, and community engagement. Efforts should be made to bridge the gaps and ensure that all farmers have access to relevant and accurate information there by empowering them for success, profitability, and the overall growth of the organic paddy farming sector.

1. **Extension Contact**

Extension contact is operationalized as the frequency and level of interaction with agricultural extension personnel, measured using a study-specific schedule. It can be noted from Table 4 that 65.50% of the respondents had medium level of extension contact followed by low (23.00 %) and high (11.50 %) levels of extension contact. The Chi-square test of independence for distribution of extension contact of the respondents with region had shown χ2=61.661\*\* with p value 0.00, concluding that distribution of extension contact was related and significantly associated with the region.

The success of agriculture relies on an effective Transfer of Technology (ToT) system, where farmers seek information from accessible and reliable sources. The low to medium extension contact among farmers could be attributed to factors such as limited access to Transfer of Technology sources, inadequate knowledge levels of village-level extension agents, and reliance on input dealers or fellow farmers for information. Additionally, trust and credibility issues, time and resource constraints, and the influence of peer learning and networks also contributed to the preference for alternative sources of information.

1. **Scientific Orientation**

Scientific orientation is operationalized as the respondent’s inclination towards scientific methods and rational thinking in agriculture, measured through a developed schedule. It can be noted from Table 4 that 58.00% of the respondents had medium level of scientific orientation which was on par with the Kumari *et al*. (2022) Who reported that majority of the respondents had medium level of social participation (55.56%), followed by low (23.00%) and high (19.00%) levels of scientific orientation. The Chi-square test of independence for distribution of scientific orientation of the respondents with region had shown χ2 =16.930\*\* with p value 0.00, concluding that distribution of scientific orientation was related and significantly associated with the region.

Science serves as a guiding principle, leading individuals towards excellence and precision in various fields. It is widely acknowledged as the key to success. For farmers, adopting a scientific orientation is vital to optimize the use of natural resources, improve agricultural practices, and make informed decisions that can significantly contribute to higher yields, suitable to their local conditions and reduced costs. Farmers with low to medium scientific orientation might have limited access to extension services, research scientists, and field visits, which can hinder their exposure to new knowledge and innovative practices. Conversely, farmers with a low scientific orientation may face difficulties due to factors such as illiteracy and reliance on non-technical individuals for farm-related activities.

1. **Innovativeness**

# Innovativeness is operationalized as the respondent’s tendency to adopt new ideas and practices in farming. It can be noted from Table 4 that majority (60.00%) of the respondents had medium level of innovativeness followed by high (24.50 %) and low (15.50 %) levels of innovativeness. The results were on par with Nagaraj *et al*. (2018) who reported that that 39.44 per cent of the paddy growers had medium level of innovative proneness, whereas, 36.67 per cent each of them had high and 23.89 per cent of them had low level of innovative proneness. The Chi-square test of independence for distribution of innovativeness of the respondents with region had shown χ2=46.436\*\* with p value 0.00, concluding that distribution of innovativeness was related and significantly associated with the region.

Organic paddy farmers with moderate to high innovativeness were motivated by their interest in adopting innovative technologies specific to organic farming. Further, They had access to resources and information that support their organic paddy farming practices. However, farmers with low innovativeness might be hesitant due to concerns about costs and uncertainties in organic farming.

1. **Achievement Motivation**

# Achievement motivation is operationalized as the internal drive of the respondent to accomplish farming-related goals, measured through a schedule developed for the study. It can be noted from Table 4 that 59.00% of the respondents had medium level of achievement motivation followed by high (22.50 %) and low (18.50 %) levels of achievement motivation. The results are in line with Bhattacharjee *et al*. (2021) who reported that about 58.20% of organic farmers has belonged to the medium level of achievement motivation, 23.60% of them were in the high category while only 18.20% of them were in a low category. The Chi-square test of independence for distribution of achievement motivation of the respondents with region had shown χ2 =35.162\*\* with p value 0.00, concluding that distribution of achievement motivation was related and significantly associated with the region.

Farmers achievement motivation in organic paddy farming varies with some exhibiting high motivation and others displaying low motivation. Medium to high achievement motivation depicted due to farmers intention to achieve high yields and excel among their peers. Conversely, farmers with low motivation might be discouraged by past experiences of falling short of their targets. Understanding and addressing farmers' achievement motivation can contribute to their success and the overall growth of organic paddy farming.

1. **Resilience**

# Resilience is operationalized as the respondent’s ability to recover from farming-related setbacks and challenges. It can be noted from Table 4 that 56.00% of the respondents had medium level of resilience followed by high (23.50 %) and low (20.50 %) levels of resilience. The results are on par with the Muralikrishnan *et al*. (2022) who reported that, the farmers perception on climate resilience (45.10%) had medium level; followed by high (36.27%) and low (18.63%) level. The Chi-square test of independence for distribution of resilience of the respondents with region had shown χ2 =16.358\*\* with p value 0.00, concluding that distribution of resilience was related and significantly associated with the region.

Resilience is crucial for organic paddy farmers as it enables them to overcome challenges and recover from setbacks. Majority of the organic paddy farmers exhibited medium resilience, which could be attributed to various factors. Organic farming practices, local knowledge, and community support contributed to their ability to adapt to changing conditions and mitigate risks. However, challenges such as climate change and market fluctuations remain. Strengthening the resilience of organic paddy farmers through capacity building and supportive policies is essential for their long-term success.

1. Distribution of respondents according to Personal Attributes

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Category** | **Nellore (n=87)** | | **Visakhapatnam**  **(n=68)** | | **Vizianagaram (n=45)** | | **Andhra Pradesh (n=200)** | | **Details** |
| **f** | **%** | **f** | **%** | **f** | **%** | **f** | **%** |
| **Social Participation** | | | | | | | | | | |
| **1.** | Low | 36 | 41.40 | 0 | 0.00 | 0 | 0.00 | 36 | 18.00 | Mean**=**5.94 |
| **2.** | Medium | 44 | 50.60 | 45 | 66.20 | 45 | 100.00 | 134 | 67.00 | SD**=**3.58 |
| **3.** | High | 7 | 8.00 | 23 | 33.80 | 0 | 0.00 | 30 | 15.00 | χ2=83.200\*\* |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** | p=0.00 |
| **Mass Media Exposure** | | | | | | | | | | |
| **1.** | Low | 11 | 12.60 | 19 | 27.90 | 9 | 20.00 | 39 | 19.50 | Mean=16.06 |
| **2.** | Medium | 51 | 58.60 | 40 | 58.80 | 36 | 80.00 | 127 | 63.50 | SD=7.00 |
| **3.** | High | 25 | 28.70 | 9 | 13.20 | 0 | 0.00 | 34 | 17.00 | χ2=22.343\*\* |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** | p=0.00 |
| **Extension Contact** | | | | | | | | | | |
| **1.** | Low | 0 | 0.00 | 22 | 32.40 | 24 | 53.30 | 46 | 23.00 | Mean= 15.30 |
| **2.** | Medium | 77 | 88.50 | 33 | 48.50 | 21 | 46.70 | 131 | 65.50 | SD=7.85 |
| **3.** | High | 10 | 11.50 | 13 | 19.10 | 0 | 0.00 | 23 | 11.50 | χ2=61.661\*\* |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** | p=0.00 |
| **Scientific Orientation** | | | | | | | | | | |
| **1.** | Low | 12 | 13.79 | 17 | 25.00 | 17 | 37.78 | 46 | 23.00 | Mean=22.00 |
| **2.** | Medium | 51 | 58.62 | 45 | 66.20 | 20 | 44.44 | 116 | 58.00 | SD=5.00 |
| **3.** | High | 24 | 27.59 | 6 | 8.80 | 8 | 17.78 | 38 | 19.00 | χ2=16.930\*\* |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** | p=0.00 |
| **Innovativeness** | | | | | | | | | | |
| **1.** | Low | 5 | 5.70 | 26 | 38.20 | 0 | 0.00 | 31 | 15.50 | Mean=20.4 |
| **2.** | Medium | 55 | 63.20 | 36 | 52.90 | 29 | 64.40 | 120 | 60.00 | SD=5.60 |
| **3.** | High | 27 | 31.00 | 6 | 8.80 | 16 | 35.60 | 49 | 24.50 | χ2=46.436\*\* |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** | p=0.00 |
| **Achievement Motivation** | | | | | | | | | | |
| **1.** | Low | 12 | 13.80 | 25 | 36.80 | 0 | 0.00 | 37 | 18.50 | Mean=23.56 |
| **2.** | Medium | 53 | 60.90 | 38 | 55.90 | 27 | 60.00 | 118 | 59.00 | SD=4.55 |
| **3.** | High | 22 | 25.30 | 5 | 60.00 | 18 | 40.00 | 45 | 22.50 | χ2=35.162\*\* |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** | p=0.00 |
| **Resilience** | | | | | | | | | | |
| **1.** | Low | 10 | 11.50 | 23 | 33.80 | 8 | 17.80 | 41 | 20.50 | Mean=57.16 |
| **2.** | Medium | 60 | 69.00 | 27 | 39.70 | 25 | 55.60 | 112 | 56.00 | SD=9.78 |
| **3**. | High | 17 | 19.50 | 18 | 26.50 | 12 | 26.70 | 47 | 23.50 | χ2=16.358\*\* |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** | p=0.00 |
| \*\*= Significant at 0.01 level of significance | | | | | | | | | | |
|  | | | | | | | | | |  |

**Farming Practices**

1. **Cropping Intensity**

# Cropping intensity is operationalized as the number of crops grown per unit area of land in a year, measured through a schedule developed for the study. It can be noted from Table 5 that 59.00% of the respondents had medium level of cropping intensity followed by low (40.50 %) and high (0.50%) levels of cropping intensity. The results were contradicting with Lal (2017) who reported that the biggest percentage (42.78%) of respondents had low cropping intensity; 34.16 percent of the respondents were having medium cropping intensity; and 23.06 percent of the respondents were falling under high category. The Chi-square test of independence for distribution of cropping intensity of the respondents with region had shown χ2=86.999\*\* with p value 0.00, concluding that distribution of cropping intensity was related and significantly associated with the region. The average cropping intensity was 159 per cent.

Cropping intensity, which indicates the number of crops grown in a given area within a year, is one of the significant factors for organic paddy farmers. It was observed that many organic paddy farmers prefer maintaining a low to medium cropping intensity by cultivating a single crop per year. This approach is often adopted to ensure the quality of the produce and prevent soil fertility depletion. In organic paddy farming, external inputs such as chemical fertilizers and pesticides were not used, which demanded careful management of the soil. Additionally, organic paddy farmers often cultivate traditional varieties that have longer durations, further contributing to the lower cropping intensity. These factors collectively contributed to the prevalence of low to medium cropping intensity among organic paddy farmers.

1. **Training undergone**

Training undergone is operationalized as the number and types of formal trainings attended by the respondent related to agriculture, measured using a structured schedule. It can be noted from Table 5 that majority (61.00%) of the respondents have not received any training which is not on par with Nagaraj *et al*. (2018) who reported that only 47.22% of the paddy growers had not attended any training programme, whereas remaining 39.00% of the respondents had received training, out of which 28.50% of the respondents had received 1-2 trainings followed by 3-4 trainings (8.50%) and greater than 4 trainings (2.00 %). The Chi-square test of independence for distribution of training undergone by the respondents with region had shown χ2 =26.276\*\* with p value 0.00, concluding that distribution of training undergone was related and significantly associated with the region. The average trainings undergone was 1.35.

Training programs are essential for upscaling the knowledge and skills of organic paddy farmers, enabling their growth and development. These programs, organized by institutions like KVKs, RBKs, and NGOs provide valuable insights and capabilities through an institutional mechanism. Lack of training among farmers, with either no training or only 1-2 training sessions, could be attributed to their limited access to training opportunities. This limitation might be stems from factors such as illiteracy and a lack of connectivity with the extension system among the organic paddy farmers.

1. **Climate Vagaries**

# Climate vagaries is operationalized as the extent to which the respondent experiences and copes with unpredictable climatic conditions, measured using a schedule. It can be noted from Table 5 that 48.00% of the respondents had exposed to medium climate vagaries followed by low (45.50%) and high (6.50%). The Chi-square test of independence for distribution of climate vagaries of the respondents with region had shown χ2=14.448\*\* with p value 0.00, concluding that distribution of climate vagaries was related and significantly associated with the region. The results are on par with Lal (2017) who reported that in green revolution belt 49.17% of the respondents faced the wrath of 2-3 climate vagaries, even though 34.44 percent of the respondents were having 0-1 incident of climate vagaries; while less than 1/6th (16.39%) of the respondents were falling under high category. The mean climate vagaries wrath faced by the respondents was 2.12.

The majority of the organic paddy farmers in Andhra Pradesh state had encountered 1 to 3 climate vagaries, such as unseasonal rains, cyclones, and drought, during critical stages over the past five years. This could be attributed to various factors, including the geographical location of the region, the variability of monsoon patterns, the impact of climate change, inadequate resilience measures, and limited access to resources.

1. Distribution of respondents according to Farming Practices

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Category** | **Nellore (n=87)** | | **Visakhapatnam**  **(n=68)** | | **Vizianagaram (n=45)** | | **Andhra Pradesh (n=200)** | | **Details** |
| **f** | **%** | **f** | **%** | **f** | **%** | **f** | **%** |
| **Cropping Intensity** | | | | | | | | | | |
| **1.** | Low | 21 | 24.10 | 15 | 22.06 | 45 | 100 | 81 | 40.50 | Mean=159% |
| **2.** | Medium | 66 | 75.90 | 52 | 76.47 | 0 | 0 | 118 | 59.00 | SD=49.30 |
| **3.** | High | 0 | 0.00 | 1 | 1.47 | 0 | 0 | 1 | 0.50 | χ2=86.999\*\* |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** | p=0.00 |
| **Training undergone** | | | | | | | | | | |
| **1.** | No training | 64 | 73.60 | 32 | 47.10 | 26 | 57.80 | 122 | 61.00 | Mean=1.35 |
| **2.** | 1-2 trainings | 11 | 12.60 | 28 | 41.20 | 18 | 40.00 | 57 | 28.50 | χ2=26.276\*\* |
| **3.** | 3-4 trainings | 8 | 9.20 | 8 | 11.80 | 1 | 2.20 | 17 | 8.50 | p=0.00 |
| **4.** | >4 trainings | 4 | 4.60 | 0 | 0.00 | 0 | 0.00 | 4 | 2.00 |  |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** |  |
| **Climate Vagaries** | | | | | | | | | | |
| **1.** | Low (0-1) | 52 | 59.77 | 24 | 35.29 | 15 | 33.33 | 91 | 45.50 | Mean=1.58 |
| **2.** | Medium (2-3) | 31 | 35.63 | 37 | 54.41 | 28 | 62.22 | 96 | 48.00 | χ2=14.448\*\* |
| **3.** | High (>3) | 4 | 4.60 | 7 | 10.29 | 2 | 4.44 | 13 | 6.50 | p=0.01 |
| **Total** | | **87** | **100** | **68** | **100** | **45** | **100** | **200** | **100** |  |
| \*\*= Significant at 0.01 level of significance | | | | | | | | | | |
|  | | | | | | | | | |  |

# CONCLUSION

This comprehensive profile analysis of organic paddy farmers in Andhra Pradesh reveals their distinct socio-economic and personal characteristics. The study established that organic paddy cultivation is predominantly practiced by middle-aged farmers with moderate education and farming experience, exhibiting medium social participation. The majority are small and marginal farmers with limited annual family income, yet they demonstrate moderate levels of extension contact, scientific orientation, innovativeness, cropping intensity, achievement motivation, and resilience. A significant finding indicates that most respondents have not received formal training in organic farming practices, despite their engagement in such cultivation, and possess medium exposure to climate vagaries.

Based on these findings, it is recommended that policy initiatives focus on providing accessible and practical formal training programs tailored to the needs of organic paddy farmers to enhance their knowledge and adoption of advanced practices. Strategies should also be developed to improve the economic viability for small and marginal organic farmers, potentially through better market linkages or support mechanisms. Furthermore, efforts to build farmers' adaptive capacities to climate challenges, considering their existing exposure, are crucial. For future research, it is suggested to conduct comparative studies with conventional farmers or in different regions to assess the generalizability of these profiles, and to delve deeper into the impact of specific personal attributes on the adoption and sustainability of organic farming practices.

# DECLARATIONS

Ethical Approval: Not applicable.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

# REFERENCES

Agricultural statistics at a glance Directorate of Economics and Statistics, Ministry of Agriculture, Government of India; 2019. <https://eands.da.gov.in/PDF/At%20a%20Glance%202019%20Eng.pdf>

Agricultural statistics at a glance Directorate of Economics and Statistics, Ministry of Agriculture, Government of India; 2022. <https://desagri.gov.in/wp-content/uploads/2023/05/Agricultural-Statistics-at-a-Glance-2022.pdf>

Agricultural statistics at a glance. Directorate of Economics and Statistics, Ministry of Agriculture, Government of India; 2014. <https://eands.da.gov.in/PDF/Agricultural-Statistics-At-Glance2014.pdf>

APEDA, 2021. National Programme for Organic Production, Ministry of Commerce & Industry, Export of Organic Products, accessed on 10 July 2021, available at <https://apeda.gov.in/apedawebsite/organic/Organic_Products.htm>

Bhattacharjee, U., Saha, A., Tiwari, P. K., Dhakre, D. S., & Gupta, R. K. (2021). Achievement motivation of organic farmers of Birbhum District of West Bengal. *Indian Journal of Extension Education*, 57(1), 38–42. <https://epubs.icar.org.in/ejournal/index.php/ijee/article/view/109077>

Fallah-Alipour, S., Boshrabadi, H.M., Mehrjerdi, M.R.Z., Hayati, D. 2018. A framework for empirical assessment of agricultural sustainability: The case of Iran. *Sustainability*. <https://www.mdpi.com/2071-1050/10/12/4823>

FAO (1999), Committee on agriculture, Organic Agriculture, Fifteenth session, 25-29 January, Rome, <http://www.fao.org/3/x0075e/x0075e.htm#P187_32577Ganguli>

FiBL and IFOAM Year Book. 2020. The world of organic agriculture statistics and emerging trends 2020. <https://www.fibl.org/fileadmin/documents/shop/5011-organic-world-2020.pdf>

[IPCC AR6. 2021. *Climate Change 2021: The Physical Science Basis*](https://www.drishtiias.com/daily-updates/daily-news-analysis/climate-change-2021-report-ipcc) <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport_small.pdf>

Kumari, B. K., Prasad, S. V., Sailaja, V., Aarna, B., & Naidu, G. M. (2022). Profile Characteristics of the Farmers Followed Indigenous Agricultural Practices in Rayalaseema Region of Andhra Pradesh. *Asian Journal of Agricultural Extension, Economics and Sociology*. 40(6): 16–21. <https://journalajaees.com/index.php/AJAEES/article/view/1400>

Lal, S.P. 2017. Critical appraisal of farmers’ mental health vis-A-vis agricultural sustainability in green revolution belt in India*. Ph.D. Thesis*. National Dairy Research Institute, Haryana. <https://www.google.co.in/books/edition/Critical_Appraisal_of_Farmers_Mental_Hea/fZUaxQEACAAJ?hl=en>

Methamontri, Y., Tsusaka, T.W., Zulfiqar, F., Yukongdi, V. and Avishek, D. 2022. Factors influencing participation in collective marketing through organic rice farmer groups in northeast Thailand. *Heliyon*, *8*: 1–12. <https://doi.org/10.1016/j.heliyon.2022.e11421>

Muralikrishnan, L., Burman., R.R., Misra, J.R and Padaria, R.N. 2022. Adoption and impact of innovative farmers’ led climate smart agriculture practices in India. *Journal of Community Mobilization and Sustainable Development*. *1*(seminar special issue):1–8. <https://iqac.khalsacollege.edu.in/SSR/admin/pdf/pdf_1689758839.pdf#page=7>

Nagaraj, B., Krishnamurthy, M.T., Lakshminarayana and Nishitha, K. 2018. Personal, Socio-economic, Psychological and Communication Characteristics of the Paddy Growers. *International Journal of Current Microbiology and Applied Sciences*. 7: 4501-4510. <https://www.ijcmas.com/special/7/Nagaraj%20B.%20Krishnamurthy,%20et%20al.pdf>

PGS India. (2023). Certified Organic Farmers List. [https://www.pgsindia-ncof.gov.in](https://www.pgsindia-ncof.gov.in/)

Shamna, N. 2015. A study on farmer’s perception on prospects and problems of Pokkali rice farming in the state of Kerala. *M.Sc. (Ag.) Thesis*. Professor Jayashankar Telangana State Agricultural University, Hyderabad, India. <https://krishikosh.egranth.ac.in/handle/1/80109>

Sharma, N., Singhvi, R., 2017. Effects of chemical fertilizers and pesticides on human health and environment: A review. *International Journal of Agriculture Environment and Biotechnology.* 10 (6): 675–679. <https://ndpublisher.in/admin/issues/IJAEBv10n6f.pdf>

Sujianto, Gunawan, E., Saptana, Syahyuti, Darwis, V., Ashari, Mat, S., Ariningsih, E., Saliem, H.P., Mardianto, S and Marhendro. 2022. Farmers’ perception, awareness and constraints of organic rice farming in Indonesia. *Open Agriculture*. 7(1): 284-299. <https://doi.org/10.1515/opag-2022-0090>

Willer, H., Jan, Travnicek J., C. Meier and B. Slatter. 2021. The World of Organic Agriculture, Statistics and Emerging Trends 2021, Research Institute of Organic Agriculture FiBL, Frick, and IFOAM – Organics International, Bonn, <https://www.fibl.org/fileadmin/documents/shop/1150-organic-world-2021.pdf>

Yanakittkul, P. and Aungvaravong, C. 2020. A model of farmers intentions towards organic farming: A case study on rice farming in Thailand. *Heliyon*. *6*(1): 1–9. <https://pubmed.ncbi.nlm.nih.gov/31909245/>