

Empowering Rural Women through Natural Farming: An Assessment of Training-Based Interventions and Socio-Economic Outcomes in Andhra Pradesh

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ABSTRACT

Natural farming is widely practiced in Andhra Pradesh as it addresses problems associated with dependence on costly agricultural inputs, while also reducing health and environmental concerns arising from the excessive use of chemical fertilizers and pesticides. The present study was undertaken to assess the effectiveness of training programmes on natural farming conducted among rural women in Andhra Pradesh. A total of 165 women participants were trained across six locations in Tirupati district, and follow-up data were collected after three months to evaluate adoption behaviour and initial outcomes.

The findings revealed that 71 per cent of the participants exhibited behavioural change towards the adoption of natural farming practices. About 64 per cent established kitchen gardens and adopted eco-friendly household cultivation practices, which contributed to reduced household expenditure on vegetables. Further, 78 per cent of respondents perceived improvements in family health and well-being due to the consumption of chemical-free food products. High levels of satisfaction were observed among the participants, with 46 per cent reporting that they were highly satisfied and 42 per cent satisfied with cultivating their own food using natural methods. Motivation and confidence among women participants increased substantially after the intervention, particularly among those involved in entrepreneurial activities. About 34 per cent of respondents engaged in income-generating activities through the sale of vegetables and value-added organic products, whereas only 17 per cent extended natural farming practices to their main agricultural fields.

The study concludes that training programmes are effective in promoting awareness, behavioural change, sustainable agriculture, and women-led entrepreneurship among rural households. However, continued technical support, market linkages, and follow-up interventions are required for large-scale adoption in main agricultural fields. The study contributes empirical evidence on the role of training-based interventions in promoting sustainable agriculture and rural women's empowerment, with important implications for scaling natural farming among smallholder farmers.

KEYWORDS

Organic/ Natural farming; women empowerment; technology adoption; extension intervention; entrepreneurship; sustainable agriculture; impact assessment

INTRODUCTION

In recent years, agriculture has been undergoing a gradual transition from input-intensive, chemical-based practices to more sustainable and ecologically sound farming systems. Continuous use of synthetic fertilizers and pesticides has led to concerns such as declining soil fertility, environmental degradation, rising cost of cultivation, and health risks due to chemical residues in food (NITI Aayog, 2018; Ministry of Agriculture & Farmers Welfare, 2024) . These challenges have created an urgent need to promote alternative farming approaches that are both environmentally sustainable and economically viable.

Need for Promoting Natural Farming

The limitations of conventional agriculture have highlighted the importance of adopting practices that ensure long-term sustainability. Natural farming offers multiple benefits, including improved soil health, conservation of biodiversity, and production of safe and nutritious food (ICAR-NAARM, 2020; Mariappan et al., 2025). Despite these advantages, the adoption of natural farming practices remains limited due to factors such as lack of awareness, perceived risk, and farmers' preference for quick and visible returns from conventional methods (Leo Saldhana, 2018) .

Despite increasing policy emphasis and field-level initiatives, there is limited empirical evidence on the effectiveness of training-based interventions in facilitating behavioural change and entrepreneurship among rural women (Fertő & Bojnec, 2024). Most existing studies focus on agronomic outcomes, with relatively less attention to gendered adoption pathways and livelihood transitions. This study attempts to bridge this gap by providing field-based evidence on post-training adoption and economic outcomes."

The promotion of natural farming has received significant attention at both national and state levels. The Government of Andhra Pradesh has been actively promoting natural farming through large-scale programmes implemented by Rythu Sadhikara Samstha (RySS) under the Andhra Pradesh Community Natural Farming (APCNF) initiative. These programmes focus on awareness creation, capacity building, and field-level demonstrations to encourage farmers to adopt sustainable agricultural practices. Efforts such as the establishment of Bio Input Resource Centers (BRCs), farmer training programmes, and community-based extension approaches have been instrumental in expanding the reach of natural farming. However, despite these initiatives, many farmers remain hesitant to shift due to their dependence on conventional practices that offer immediate and visible results.

Role of Women in Natural Farming

Women play a critical role in agriculture, particularly in household-level food production and resource management (Fertő & Bojnec, 2024). Promoting natural farming among women not only contributes to sustainable agriculture but also enhances household nutrition, reduces input costs, and creates opportunities for income generation. Training programmes targeting women can serve as an effective strategy for fostering both adoption and entrepreneurship at the grassroots level.

Purpose of the Study

According to the Andhra Pradesh Community-Managed Natural Farming (APCNF) initiative implemented by the Rythu Sadhikara Samstha (RySS), over 6 million farmers across 13 districts have adopted natural farming, with significant improvements in soil fertility, women's income, and ecological resilience (APCNF, 2024–26). However, awareness remains uneven, particularly among rural women who often play a decisive role in household-level farm management but face limited access to training.

Keeping this background in view, a series of training programmes were conducted to create awareness and promote adoption of natural farming practices among rural women, with an emphasis on developing entrepreneurial skills. The present study attempts to assess the effectiveness of these interventions in terms of behavioural change, adoption of practices, and income generation. This study investigates how training-based extension interventions influence women's behavioural and economic outcomes, with specific attention to adoption intensity, entrepreneurship initiation, and scaling potential.

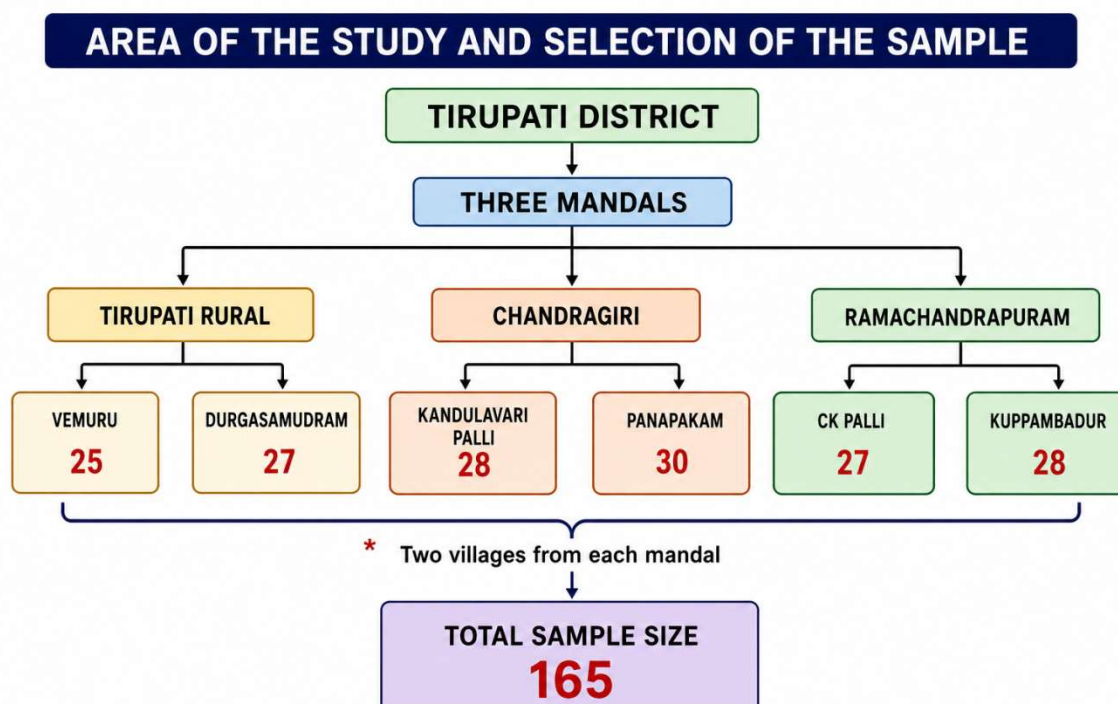
OBJECTIVES

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1. To assess the impact of training programmes on adoption of natural farming practices among rural women
2. To evaluate the extent of household-level adoption through kitchen gardening
3. To examine the emergence of entrepreneurship among participants
4. To analyse the extent of scaling from household to field-level adoption
5. To assess the effectiveness of training interventions in facilitating behavioural change

METHODOLOGY

The study was conducted in Three mandals of Tirupati district, Andhra Pradesh, namely Tirupati Rural, Chandragiri, and Ramachandrapuram mandals. Two villages from each mandal were selected as training venues, resulting in a total of six selected villages across the study area



The intervention consisted of six training programmes, each conducted for duration of three days. The training programmes focused on organic/ natural farming practices, preparation of bio-inputs, and entrepreneurship development related to organic and sustainable agriculture.

Women participants from the selected villages as well as nearby villages were invited to participate in the programmes to ensure wider outreach and participation within each mandal. Altogether, 165 rural women participated in the training programmes conducted across the three mandals.

The training programmes aimed to enhance participants' knowledge and skills related to eco-friendly agricultural practices, household nutritional security, and income-generating opportunities through natural and organic farming approaches.

Follow-up survey was conducted after three months using a structured interview schedule to assess the level of adoption and impact. The interview schedule was pre-tested among 15 non-sample respondents to ensure clarity, reliability, and suitability of the questions. Necessary modifications were made based on expert suggestions and field observations. The data were analysed using frequency, percentage, mean scores, and descriptive statistical methods to interpret adoption behaviour and impact of the intervention to evaluate changes in awareness, adoption, and income-generating activities.

The study follows an ex-post facto research design. The sample was selected using purposive sampling, focusing on women who participated in the training programmes. The effectiveness of the intervention was assessed through outcome indicators such as adoption rate, practice intensity, and income-generating activities. Descriptive statistics were used to interpret the data

RESULTS AND DISCUSSION

The demographic profile of the 165 women who underwent training in natural/organic farming reveals that the programme largely reached middle-aged participants, with the majority belonging to the 31–50 years age group. This indicates that women in their economically productive and family-responsible stages are more inclined to participate in skill development programmes related to natural farming and entrepreneurship.

Table 1: Demographic Data of the Beneficiaries

Details	Frequency = 165	Percentage (100)
Age in Years		
21-30	9	5.45
31-40	51	30.91
41-50	59	35.76
51-60	37	22.42
61-70	9	5.45
Education		
Illiterate	27	16.36
1st-10th	96	58.18
Inter	24	14.55
Degree	18	10.91
Marital status		
Married	147	89.09
Separated	2	1.21
Widow	16	9.70
Experience in Traditional Farming		
Nil	18	10.91
1-10 years	44	26.67
11-20 years	32	19.39
21-30 years	17	10.30
31-40 years	6	3.64
41-50 years	2	1.21
51-60 years	3	1.82

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In terms of educational status, most trainees had primary to secondary level education, and a notable proportion were illiterate, while only a small percentage possessed higher education. This demonstrates that the training programme was inclusive and accessible to women with low educational backgrounds, making natural/organic farming a viable livelihood option even for those with limited formal education. However, it also suggests the need for simplified and practical training approaches to enhance understanding and adoption.

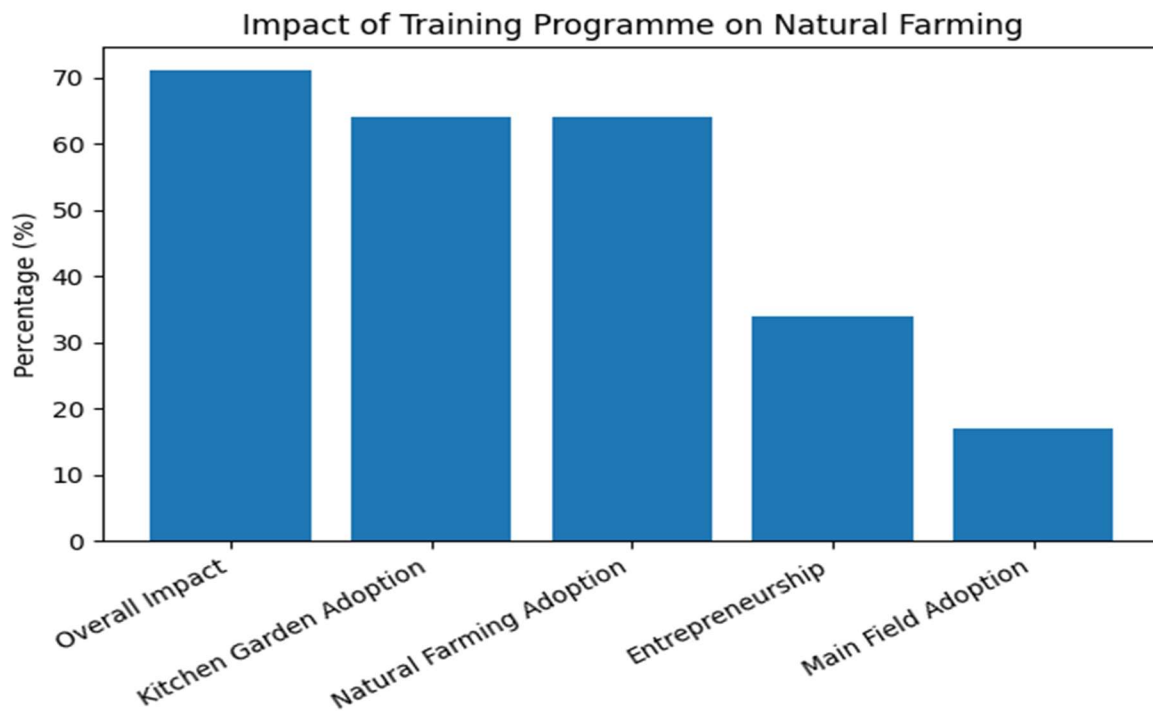
The marital status distribution shows that a vast majority of the trainees were married, with some representation of widows and very few separated women. This implies that the programme predominantly engaged women with family responsibilities, while also providing opportunities for economically vulnerable groups, particularly widows, to improve their livelihoods.

With respect to farming experience, a considerable proportion of trainees had moderate experience including some with no prior experience. This reflects that the training programme successfully attracted both new entrants and relatively less experienced women, indicating growing interest in natural/organic farming practices.

Overall, the demographic characteristics suggest that the training programme effectively targeted diverse and inclusive groups of women, particularly those who are middle aged, less formally educated, and with varying levels of farming experience. The findings highlight the potential of such programmes in promoting entrepreneurial skill development and livelihood enhancement among women. At the same time, they emphasize the need for continuous capacity building, practical-oriented training methods, and support services to maximize the impact of natural/organic farming initiatives.

Table 2: Overall Impact of the Training Programme

Particulars	Number (N=165)	Percentage	Inference
Beneficiaries showing adoption/impact	117	71	High effectiveness of intervention
Adopted kitchen gardens	106	64	Strong household-level adoption
Adoption of natural farming practices	106	64	Shift towards eco-friendly practices
Turned as an Entrepreneur	56	34	Moderate entrepreneurship development
Adoption in main agricultural fields	28	17	Limited but emerging large-scale adoption

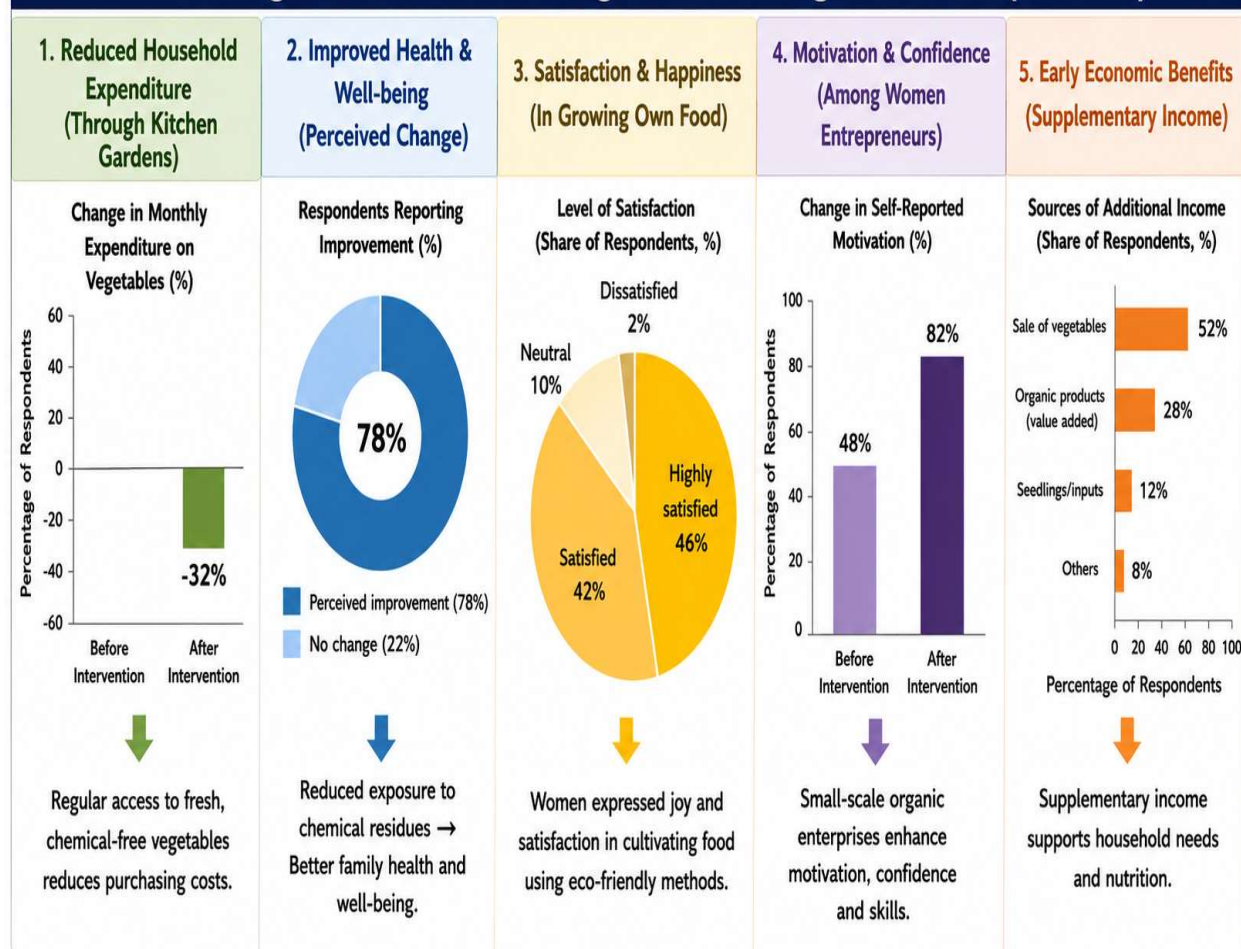


Since the post-intervention data were collected only three months after the completion of the training programmes, substantial changes in income levels were not immediately evident among the respondents. However, participants reported certain positive initial outcomes following the adoption of natural and organic farming practices.

Many respondents observed a reduction in household expenditure through the establishment of kitchen gardens, which enabled regular access to fresh and chemical-free vegetables for household consumption. Participants also perceived improvements in family health and well-being due to reduced exposure to chemical residues in food products.

In addition to economic and health-related benefits, several women expressed a sense of satisfaction and happiness in cultivating and producing their own food using eco-friendly practices. Respondents who initiated small-scale entrepreneurial activities related to organic products reported higher levels of motivation and confidence, as these activities provided supplementary income while also meeting household nutritional needs.

Chart 1. Short-Term Outcomes (3 Months Post-Intervention) of Training on Natural and Organic Farming Practices ($n = 165$)



Although the intervention period was short to capture long-term economic impacts, the training programmes succeeded in creating awareness and motivating participants towards a gradual shift from chemical-intensive farming to environmentally sustainable agricultural practices. Such behavioural changes are important for the conservation of soil health, environmental sustainability, climate resilience, and the well-being of future generations

The findings of the present study indicate that the training programmes on natural and organic farming practices produced several positive short-term outcomes among the 165 women participants. Although the post-intervention assessment was conducted only three months after the training programmes, the respondents demonstrated encouraging behavioural, economic, and health-related changes.

A noticeable reduction in household expenditure was observed through the establishment of kitchen gardens and the cultivation of home-grown vegetables. The chart indicates a 32 per cent reduction in monthly expenditure on vegetables after the intervention. This finding suggests that the adoption of kitchen gardening practices contributed to household savings and improved access to fresh and chemical-free vegetables for family consumption. Similar observations have been reported in studies on nutrition-sensitive agriculture and household food security (ICAR-NAARM, 2020)

Health and well-being improvements were also reported by a large proportion of respondents (Mariappan et al., 2025). About 78 per cent of participants perceived improvements in family health after adopting natural and organic farming practices. The respondents associated these improvements with reduced exposure to chemical residues and increased consumption of naturally grown food products. This finding highlights the perceived health advantages of chemical-free farming systems in rural households.

The study further revealed high levels of satisfaction and happiness among women participants involved in natural farming activities. Nearly 46 per cent of respondents reported being “highly satisfied,” while 42 per cent were “satisfied” with cultivating their own food using eco-friendly methods. Only a small proportion reported neutral responses (10 per cent) or dissatisfaction (2 per cent). These findings indicate strong acceptance of natural farming practices and reflect the emotional and psychological benefits associated with self-production of healthy food.

An increase in motivation and confidence was also evident among the participants, particularly among women engaged in entrepreneurial activities related to organic products. Self-reported motivation increased from 48 per cent before the intervention to 82 per cent after the intervention. This improvement suggests that the training programmes enhanced women’s confidence, skills, and willingness to participate in sustainable livelihood activities.

The intervention also generated early economic opportunities through supplementary income activities. Among the respondents, 52 per cent reported earning additional income through the sale of vegetables, followed by value-added organic products (28 per cent), seedling and input preparation (12 per cent), and other related activities (8 per cent). Although these income gains were modest during the short intervention period, they demonstrate the potential of natural farming-based enterprises in supporting household nutrition and supplementary earnings.

Table 3: Constraints Faced by Respondents in Adoption of Natural Farming

Constraints	Frequency (N=165)	Percentage
Fear of reduction in crop yield	102	61.82
Lack of technical guidance after training	96	58.18
Difficulty in marketing organic produce	88	53.33
Lack of awareness among family members	74	44.85
Labour-intensive practices	69	41.82
Delay in visible economic returns	117	70.91
Limited availability of bio-inputs	63	38.18
Hesitation to shift from conventional farming	110	66.67

The findings reveal that respondents faced several constraints in adopting natural farming practices at a larger scale. The major constraint reported was delay in obtaining visible economic returns (70.91%), followed by hesitation to shift from conventional farming practices (66.67%) and fear of reduction in crop yield (61.82%). Many participants expressed concerns regarding uncertainty in productivity during the transition period from chemical-based to natural farming systems.

More than half of the respondents also reported lack of continuous technical guidance and difficulties in marketing organic produce. Limited availability of bio-inputs and labour-intensive practices were additional constraints affecting adoption. Family-level resistance and lack of awareness among household members further influenced decision-making related to adoption.

These findings indicate that although training programmes created awareness and motivation, long-term adoption requires continuous extension support, demonstration-based learning, institutional backing, and

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market facilitation mechanisms. Similar constraints in adoption of sustainable agricultural practices were also reported by Sharma and Singh (2022) and Reddy et al. (2021).

Overall, the findings indicate that the training programmes were effective in creating awareness and encouraging a gradual transition from chemical-intensive farming to environmentally sustainable agricultural practices. While substantial economic impacts may require longer periods of adoption and market integration, the observed improvements in expenditure reduction, health perception, motivation, satisfaction, and supplementary income reflect the positive initial outcomes of the intervention. These behavioural changes are important for promoting sustainable agriculture, soil health conservation, environmental sustainability, climate resilience, and the well-being of future generations.

LIMITATIONS OF THE STUDY

The study is limited to a specific geographical region and a relatively small sample size, which may affect the generalizability of the findings. Future studies may incorporate longitudinal designs and control groups for more robust impact evaluation. And the absence of a control group limits causal interpretation of the findings

CONCLUSION

The present study demonstrates that training-based interventions on natural farming had a positive influence on rural women in terms of awareness creation, adoption behaviour, household nutritional security, and entrepreneurial motivation. The findings revealed that a considerable proportion of the participants adopted natural farming practices, particularly through kitchen gardening, which contributed to reduced household expenditure on vegetables and improved access to fresh and chemical-free food.

The intervention also resulted in perceived improvements in family health and well-being, along with enhanced levels of satisfaction, confidence, and motivation among women participants. A section of the respondents initiated small-scale entrepreneurial activities related to the sale of vegetables and value-added organic products, indicating the potential of natural farming as a supplementary livelihood opportunity for rural women.

However, the study also identified several constraints affecting large-scale adoption, including delayed economic returns, hesitation to shift from conventional farming systems, fear of yield reduction, lack of technical guidance, and marketing difficulties. These challenges suggest that awareness alone may not be sufficient to ensure sustained adoption unless supported by continuous extension services, demonstration-based learning, institutional support, and market linkages.

Overall, the study highlights the effectiveness of training programmes in promoting sustainable agricultural practices and women's empowerment at the grassroots level. Strengthening follow-up support, improving access to bio-inputs, facilitating market opportunities, and integrating behavioural change strategies with technical interventions can further enhance adoption and scaling of natural farming practices among rural households. The study provides useful insights for policymakers, extension agencies, and development organizations working towards sustainable agriculture, rural livelihoods, and women-led agricultural transformation.

POLICY IMPLICATIONS

The findings suggest that strengthening convergence between training institutions and state-led programmes such as natural farming initiatives can accelerate adoption. Policy focus should be directed towards scaling demonstration models, enhancing market access, and addressing behavioural barriers to transition from conventional to sustainable farming systems. Integrating behavioural change communication with technical training can further accelerate the transition towards sustainable farming systems.

RECOMMENDATIONS

1. **Strengthening Follow-up Support**

Continuous handholding, field visits, and mentoring should be provided to reinforce learning and build confidence among participants.

2. **Promotion through Demonstration Units**

Establishing more field-level demonstrations and success models can help reduce farmers' hesitation and improve trust in natural farming practices.

3. **Market Linkages and Value Addition**

Support should be extended for marketing, branding, and value addition of organic produce to enhance income generation opportunities.

4. **Capacity Building on Advanced Practices**

Advanced training programmes focusing on scaling up from kitchen gardens to field-level farming should be conducted.

5. **Convergence with Government Initiatives**

Greater integration with initiatives of the Government of Andhra Pradesh through the Andhra Pradesh Community Natural Farming (APCNF) implemented by Rythu Sadhikara Samstha (RySS) should be strengthened. The establishment of **BRCs (Block Resource Centres)** and ongoing awareness campaigns can be effectively utilized to scale up adoption.

6. **Addressing Farmers' Reluctance**

Since many farmers are accustomed to conventional methods that provide immediate results, awareness programmes should emphasize the **long-term economic and ecological benefits** of natural farming. Demonstrating gradual yield stability and cost reduction can help in changing perceptions.

7. **Encouraging Collective Action**

Formation of women farmer groups or producer collectives can improve knowledge sharing, reduce risks, and enhance bargaining power in markets.

The training intervention has demonstrated considerable potential in promoting sustainable agriculture and women's empowerment; however, continued institutional support and behavioural change strategies are essential to achieve large-scale transformation.

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