P-ISSN: 2618-0723
E-ISSN: 2618-0731

NAAS Rating: 5.04
www.extensionjournal.com

International Journal of Agriculture Extension and Social Development

Volume 8; Issue 7; July 2025; Page No. 499-504

Received: 11-05-2025
Accepted: 13-06-2025

Indexed Journal
Peer Reviewed Journal

Agricultural extension as a tool for empowering rural women

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DOI: https://www.doi.org/10.33545/26180723.2025.v8.i7g.2168

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Abstract

Rural women form the backbone of agricultural labor in India, yet remain marginalized in terms of access to training, technology, and decision-making platforms. This paper explores the transformative potential of agricultural extension as a tool for empowering rural women. Drawing upon extensive literature and empirical studies, it highlights how targeted training, gender-sensitive outreach, and participatory extension models can improve rural women's access to information, boost confidence, and enhance their decision-making in both household and farm operations. Despite contributing significantly to food security and agricultural productivity, women often face structural and cultural barriers that limit their empowerment. The review underscores that strengthening gender-inclusive extension systems can not only bridge these gaps but also lead to better farm productivity, improved family nutrition, and sustainable rural development. Emphasizing the need for institutional support, policy reform, and localized training models, the study advocates for the re-design of extension services to be more inclusive and impactful for rural women across India.

Keywords: Rural women, agricultural extension, empowerment, gender-sensitive training

Introduction

Empowerment of rural women through agricultural extension and training is a transformative approach to ensuring inclusive and sustainable agricultural development. Empowerment refers to enhancing women's ability to make strategic life choices, access productive resources, and actively participate in decision-making processes (Kabeer, 1999) [11].

Rural women, who are integral to food systems, engage in multiple roles, from seed selection and sowing to harvesting, livestock care, and household management, yet their contributions often go unrecognized (FAO, 2011) [8]. Agricultural extension services, defined as structured systems to transfer knowledge and innovations from research to farms, combined with training programs that build skills and self-reliance (Swanson & Rajalahti, 2010; Ponnusamy *et al*., 2017) [26, 18], can play a pivotal role in empowering these women. Globally, women represent 43% of the agricultural labor force, but face a consistent gender gap in access to land, credit, information, and extension services, which limits their productivity. Studies show that if women had equal access to these resources, agricultural output in developing countries could rise by 2.5-4%, potentially reducing hunger for over 100 million people (FAO, 2011) [8]. In India, despite forming 47% of the agricultural workforce, only 13% of women have access to extension services, and a meager 6% receive formal training (Planning Commission, 2012; GOI, 2019) [, 9]. This reflects deep-rooted socio-cultural and institutional barriers that marginalize women from knowledge systems. Punjab, a leading agrarian state, exhibits similar trends—rural women contribute 60-80% of manual labor in agriculture, particularly in paddy transplanting, weeding, and post-harvest work, yet only 8-12% of them participate in capacity-building or extension activities (Kaur & Sharma, 2020; PAU, 2022) [13, 19]. Addressing this gap is not just a matter of gender equity but a strategic imperative to improve productivity, household incomes, and community resilience. Therefore, strengthening gender-responsive extension systems and ensuring rural women's access to training and innovations is critical for achieving inclusive rural development and food security.

Despite their major role in agriculture, rural women are often excluded from agricultural extension services and policy decisions. Most agricultural programs are designed with men as the main beneficiaries, ignoring the specific roles, challenges, and contributions of women farmers (FAO, 2011) [8]. As a result, women have limited access to modern technologies, training opportunities, and government schemes that could help improve their productivity and income (World Bank, 2009) [27].

Empowering women in agriculture is not only a step toward gender equality, but also leads to greater economic and social benefits. Studies show that when women receive training and have access to knowledge, they are more likely to adopt sustainable practices, increase farm yields, and invest in their family's health and education (Meinzen-Dick *et al*., 2011) [15]. Training also helps rural women gain skills in improved crop production, agro-processing, organic farming, and income-generating activities, making them more self-reliant (Ponnusamy *et al*., 2017) [18].

Moreover, when extension systems become more gender-sensitive and inclusive, it reduces rural poverty and strengthens the role of women as key agents of agricultural

and rural development (Quisumbing *et al*., 2014) [20]. Therefore, there is an urgent need to re-design agricultural extension and training systems to specifically include women farmers and address the barriers they face in accessing information and support.

Hence, empowering rural women through agricultural extension and training is not only essential for achieving gender equality but also for driving sustainable growth in agriculture. By recognizing women as key contributors in farming and designing extension services that address their specific needs, we can build a more productive, fair, and resilient rural sector. This study is therefore timely and important, as it emphasizes the urgent need to make agricultural development more responsive to the roles and challenges of women.

Review of literature

Some important studies are written as follows

- Mishra *et al.* (2024) [16] analyzed how agricultural extension services contributed to the empowerment of rural women by improving their access to information, resources, and technical skills. The chapter emphasized that gender-sensitive approaches in extension systems promoted greater participation of women in agricultural planning and decision-making. It was found that women benefited from training sessions, demonstrations, and exposure visits, which enabled them to adopt improved farming practices. The authors noted that access to inputs, financial services, and markets through extension efforts enhanced women's economic independence. Community-based institutions and inclusive strategies were reported to strengthen women's confidence and leadership roles. Institutional support and consistent follow-up were also seen to sustain the long-term impact of such interventions. Overall, the chapter concluded that tailored extension services played a vital role in advancing women's social and economic empowerment in rural areas.
- Siaw *et al.* (2024) [24] examined how agricultural extension services contributed to the empowerment of women in agricultural development. The study revealed that these services enhanced women's knowledge, skills, and active involvement in farming activities. Training sessions, group meetings, and field demonstrations were reported to improve women's confidence and their ability to make informed decisions. The authors noted that access to agricultural inputs, technology, and financial support through extension programs increased women's productivity and income. Women who participated in these programs were also found to be more engaged in cooperatives and leadership positions. The research emphasized that continuous institutional support, inclusive policies, and active community participation were essential for sustaining women's empowerment. Overall, the study concluded that agricultural extension played a transformative role in reducing gender disparities and promoting women's socio-economic development in rural areas.
- Chowdhary *et al.* (2023) [5] studied the role of agricultural activities in empowering rural women in the Poonch district of Jammu and Kashmir. The chapter reported that nearly 68% of the women engaged in agriculture contributed significantly to household income. It was observed that 72% of the participants gained better access to farming knowledge and decision-making through their involvement in agricultural tasks. The authors found that extension exposure, training, and active participation improved the women's confidence and control over resources. About 60% of the women reported increased social status and participation in community-level discussions. The study also highlighted that access to credit, land, and cooperative societies further boosted women's roles in the local economy. Overall, the findings concluded that agriculture served as a key medium for social and economic empowerment, especially when supported by targeted extension and policy efforts.
- Singh *et al.* (2020) [25] investigated the influence of vocational training on the psychological and financial empowerment of rural women in Nainital district. The study reported that 75% of trained women showed high levels of empowerment, while only 15.6% of non-trained participants achieved similar outcomes. It was observed that women who received training demonstrated greater autonomy in household expenditure, increased participation in community activities, and improved access to resources. The researchers found that exposure to skill-based programs enhanced women's risk-taking ability and scientific orientation. Psychological empowerment indicators, such as confidence and motivation, improved significantly among the trained group. Moreover, women involved in these trainings reported better income generation and decision-making authority within families. The analysis highlighted that vocational interventions tailored to local needs could lead to substantial improvement in both economic status and self-perception of rural women.
- Gupta (2025) [10] conducted a systematic review of literature from 2000 to 2024 to examine how agricultural extension programs influenced women's empowerment, income, and nutrition outcomes. The study revealed that more than 68% of the reviewed research indicated positive effects on household income due to women's participation in agricultural training. Improved dietary diversity and better food security were also common outcomes among trained women. However, the review highlighted that nearly 40% of the studies reported negative consequences when these programs imposed additional labor burdens without considering women's time and physical constraints. Gupta emphasized the importance of designing gender-sensitive extension services that addressed the unique challenges faced by rural women. The review concluded that empowerment was most effective when extension activities included nutritional awareness, flexible training modules, and support systems that reduced women's workload. Thus, integrated approaches proved to be more successful in achieving both economic and health-related empowerment goals.
- Agarwal (1986) [2] examined how agricultural growth in India affected rural women and found that despite contributing over 60% of labor in subsistence farming,

women remained excluded from land rights, credit, and formal training. Her study revealed that only 13% of rural women owned land, and even fewer had independent access to agricultural inputs or decision-making. She argued that development policies had primarily focused on male farmers, which widened the gender gap and worsened women's poverty. Women, despite being key workers in weeding, transplanting, and harvesting, were paid **20-30%** less than men for the same tasks. Agarwal emphasized that poverty alleviation would remain incomplete unless women were economically empowered through land entitlements, equal wages, and gender-inclusive extension services. She concluded that recognizing and institutionalizing women's role in agriculture was vital for achieving sustainable rural development and reducing poverty.

- Yount *et al.* (2019) [28] evaluated the measurement properties of the project-level Women's Empowerment in Agriculture Index (pro-WEAI) across diverse rural settings. The study analyzed data from multiple agricultural projects and found that pro-WEAI effectively captured key empowerment domains such as decision-making in production, access to resources, income control, and time use. It revealed that in many project areas, only about 40-50% of women were empowered across all domains, showing significant gender gaps in agricultural involvement. The index also uncovered that women often lacked control over income and faced time poverty due to unpaid household labor. Yount and colleagues emphasized that measuring empowerment with sensitive and context-specific tools was critical for designing inclusive agricultural programs. Their study concluded that pro-WEAI could reliably guide policymakers and development practitioners in identifying disempowerment areas and promoting interventions that strengthened women's roles in agricultural systems.
- Shahbaz *et al.* (2022) [23] explored how women's empowerment and innovativeness influenced the adoption of Climate Smart Agricultural Practices (CSAPs) in rural communities. The study, based on structured interviews and statistical models, showed that women's participation in decision-making significantly boosted CSAP adoption, with empowered women being 1.7 times more likely to adopt sustainable practices than less empowered counterparts. The research highlighted that when women were given training and a voice in household agricultural choices, they were more open to experimenting with new climate-resilient technologies. It also found that innovativeness, measured through willingness to try new methods, strongly correlated with empowerment scores. Women with higher autonomy in financial and farm decisions adopted soil conservation, organic methods, and water-saving techniques at notably higher rates. The authors concluded that agricultural innovation systems should intentionally include gender empowerment components to enhance both sustainability and rural development outcomes.
- Ragasa *et al.* (2021) [21] conducted a comprehensive study across India, Bangladesh, Nepal, and Nigeria to assess the relationship between women's empowerment and their participation in agricultural value chains. The study revealed that although women played a central role in seed preservation, weeding, post-harvest processing, and informal trade, their contributions were often undervalued, with only 30-40% having a say in agricultural decisions or access to generated income. The findings emphasized that women's economic roles were frequently limited by social norms, lack of land ownership, and exclusion from value chain leadership. However, when women were empowered through access to inputs, credit, training, and collective groups (like cooperatives), their productivity, income, and self-confidence significantly improved. The study showed that empowered women were more likely to invest in family nutrition, children's education, and farm sustainability. It concluded that true empowerment required not just participation, but also control over resources and representation in decision-making bodies, making gender equity an essential pillar for sustainable agriculture.
- Ponnusamy *et al.* (2017) [18] evaluated how the Public-Private Partnership (PPP) model influenced women's empowerment in agriculture across selected regions in India. The study found that the PPP initiatives provided rural women with training in livestock management, crop production, and agribusiness skills, which directly enhanced their confidence and knowledge levels. It revealed that nearly 62% of the participating women gained decision-making power in farming-related activities, while 54% experienced improved access to financial services and markets. Women involved in the PPP programs reported greater mobility, increased leadership in self-help groups, and better control over income. The authors emphasized that empowerment was not limited to income generation but extended to enhanced self-worth, participation in household decisions, and visibility in village-level institutions. The study concluded that the PPP approach created a supportive ecosystem for women to move from laborers to active stakeholders in agriculture, contributing to both productivity and gender equity.
- Luqman *et al.* (2006) [14] studied the level of rural women's involvement in both agricultural and household work in Pakistan. The study revealed that women contributed heavily to farming tasks like sowing, weeding, harvesting, and post-harvest processing, especially in food and fiber crops. Over **70%** of women actively participated in field activities, yet their work was often seen as informal or unpaid. In addition, they were responsible for daily household chores, childcare, and managing livestock. The dual burden of farm and home responsibilities left them with little time for education or skill development. Despite their significant contributions, women had limited access to agricultural training, credit facilities, and decision-making roles. The authors highlighted the urgent need for policies that recognized women's roles and reduced gender inequality in rural areas. The study concluded that empowering women through education, access to resources, and institutional support would strengthen both agricultural productivity and family

well-being.

- Swanson, B. E and Rajalahti, R. (2010) [26] The authors studied how agricultural extension systems can be improved in developing countries. They explained that most extension services were not reaching women farmers effectively due to top-down approaches and lack of gender-sensitive planning. The report highlighted the need to redesign extension systems by using participatory methods, involving local communities, and training more female extension workers. They also shared step-by-step procedures to assess, reform, and evaluate extension services. The study supported the idea that training and farmer-led advisory services can help rural women gain access to useful information and new technologies. It also stressed the importance of government support and proper monitoring to make these services effective.
- Eslavath *et al* (2024) [7] The authors conducted a study in Telangana to measure the empowerment levels of farm women engaged in agricultural marketing. They surveyed 120 women across different districts and evaluated empowerment under four main categories: economic, technical, social, and psychological dimensions. The findings showed that about 60% of the respondents experienced a medium level of empowerment. Economically, women felt more secure as they started earning income from their marketing efforts and were able to contribute to family expenses. Socially, they gained more respect in their communities and started participating more in group discussions and local meetings. Psychologically, the women reported increased self-confidence and decision-making power in both family and farming matters. However, in the technical area, they faced challenges due to lack of training in digital marketing, packaging, and pricing strategies. The study emphasized that women's empowerment through marketing can be significantly enhanced by providing targeted capacity-building programs, improving access to market linkages, and ensuring institutional support for farm women entrepreneurs.
- Senapati, R., & Mukhopadhyay, S. D. (2024) [22] highlights the level of women's empowerment in agriculture in Odisha using a structured empowerment index. It covered areas like decision-making ability, access to agricultural resources, mobility, participation in extension activities, and control over income. The researchers found that most women had medium levels of empowerment, especially in areas like household decision-making and agricultural participation. However, their access to training, ownership of land and equipment, and involvement in technology-related decisions was limited. The study highlighted that educational background, landholding size, and exposure to extension services significantly influenced empowerment levels. It recommended the need for targeted capacity-building, improved information access, and inclusive extension policies to raise empowerment among farm women in Odisha. This research showed that while women contributed greatly to farming, their empowerment still needed policy and institutional support.
- Kaur, R. (1990) [12] focused on the role of farmers' wives in decision-making processes in rural households in Punjab. The research revealed that women actively participated in decisions related to household expenses, children's education, and food management. However, their involvement in important farm-related decisions—such as crop selection, input purchase, and financial planning—was limited. The study also showed that men dominated decisions involving large investments or land-related matters. Kaur observed that the level of women's participation in decision-making was influenced by factors like age, education, and landholding size. The research highlighted the need to recognize women's informal contributions and suggested that their role could be strengthened through education, awareness programs, and participatory extension strategies.
- Ali & Kumar (2024) [3] conducted a study to examine the role of women in developing agriculture by adopting specific empowerment strategies in India. The authors emphasized that rural women contributed over 60% of agricultural labor, including sowing, transplanting, weeding, and post-harvest work. However, they often lacked access to land, credit, technology, and training. The study found that the key barriers to empowerment included limited education, low awareness of rights, gender bias in extension services, and overburdening with household responsibilities. It also revealed that only 20-30% of women had access to formal agricultural training programs. The researchers suggested four main strategies to empower women: increasing access to agricultural education, improving outreach of extension services, encouraging women's self-help groups, and leveraging traditional social networks for knowledge sharing. The study concluded that strengthening women's capacities through targeted policies and training not only improved agricultural productivity but also contributed to rural socio-economic development.
- Bansal & Verma (2023) [4] studied the impact of agricultural training and extension services on rural women's empowerment in northern India. The study revealed that although women contributed nearly 65% of the total farm labor, only 18% had access to regular agricultural training. The researchers found that women lacked information, mobility, and support to participate effectively in farm decisions. The study emphasized that traditional extension approaches often failed to reach women due to male-dominated structures and inconvenient timing of programs. However, when women were trained through female-led groups and village-based participatory methods, their confidence, knowledge, and decision-making ability significantly improved. The paper also noted a rise in household income and better nutrition outcomes as a result of empowered women applying new techniques on their farms. The authors concluded that empowering rural women through tailored training is a crucial strategy for sustainable agricultural and rural development.
- Devi and Rani (2022) [6] conducted a detailed study on the role of rural women in sustainable agriculture in Andhra Pradesh. They observed that women actively

participated in environmentally friendly farming practices such as organic farming, composting, kitchen gardening, and traditional seed preservation. The study revealed that over 70% of the women surveyed managed home-based agricultural activities, while nearly 60% were involved in small-scale vegetable cultivation using organic methods. These activities significantly improved household nutrition and reduced dependency on market produce. However, women faced multiple challenges including lack of land ownership, limited access to institutional credit, and minimal exposure to technical training programs. Despite these barriers, the women demonstrated strong decision-making abilities, especially in selecting crops and managing farm inputs. The authors concluded that with targeted training, access to resources, and policy support, women could become key agents of sustainable agricultural transformation in rural India.

- Narayana and Reddy (2023) [17] examined how participation in Self Help Groups (SHGs) and agricultural activities empowered rural women in Karnataka. The study showed that around 68% of women involved in SHGs took part in agricultural decision-making, especially in crop selection, budgeting, and resource allocation. Participation in group farming activities enhanced their financial literacy, improved savings habits, and boosted self-confidence. Women also accessed credit more easily through SHGs, which helped them invest in seeds, tools, and livestock. The research found a 40% increase in women's income contribution to their households after joining SHGs. Despite facing obstacles such as gender biases and time constraints, women reported greater social mobility and recognition in their communities. The authors emphasized that integrating SHG models with agricultural extension services could effectively strengthen women's economic and social empowerment in rural India.

Conclusion

To sum up, empowering rural women through agricultural extension and training is not just about improving farming, it's about giving women the chance to grow, lead, and shape their own future. Rural women work tirelessly in the fields and at home, yet their efforts often go unnoticed, and their voices unheard in important decisions. Studies have shown that when women get access to proper training, support, and information, they gain not only skills but also confidence and respect in their communities. Simple changes, like bringing training closer to villages, involving more female trainers, and forming women's groups can make a big difference. An empowered woman not only improves her farm, but also lifts her family, educates her children, and becomes a change-maker in her village. True development in agriculture will happen only when rural women are fully included, supported, and recognized as equal partners in progress.

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