

Chapter 6

Role of Extension Services in Enhancing Women Access to New Knowledge

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Abstract

Women contribute 70 % of total agricultural labour in developing countries, particularly in India's smallholder farming systems. Yet, they remain systematically excluded from agricultural extension services, formal training, digital technologies, and institutional decision-making. Gender mainstreaming the systematic integration of gender perspectives into all development policies and programs has become an important approach to address this structural inequity. This paper discusses in detail of gender mainstreaming in Indian agriculture, with specific focus on the role of extension services, institutional mechanisms, and government schemes in enhancing women farmers' access to new knowledge and technologies.

However, drawing on evidence from national and international literature, government program evaluations, ICAR research reports, and NRLM implementation data, this study examines the conceptual foundations of gender mainstreaming, the limitations of traditional male-centric extension systems, the effectiveness of gender-sensitive extension approaches, and the transformative role of Self-Help Groups (SHGs), Krishi Vigyan Kendras (KVKs), and ICAR's CIWA institute. The paper also assesses six major Government of India schemes MKSP, NRLM, RKVY, PMFBY, PMKSY, and SMAM in advancing gender equity in agriculture.

The paper proposes a multi-pillar framework for gender-responsive extension and concludes that empowering women farmers is both a social justice imperative and a strategic necessity for achieving India's agricultural development goals.

Keywords: Gender mainstreaming, Agricultural extension, Women farmers, Digital extension, Gender-sensitive extension, Women empowerment.

1. Introduction

Agriculture is the foundation of rural livelihoods in most developing countries, particularly in India where a large section of the population depends directly or indirectly on farming. This shows that, women play an important but often overlooked role in agriculture. They are involved in many agricultural activities land preparation, sowing, transplanting, weeding, irrigation management, harvesting, post-harvest processing, seed storage, livestock rearing, poultry farming, kitchen gardening, and food preparation. It is estimated that women contribute nearly 70 % of total agricultural labour, especially in small and marginal farming systems (FAO, 2011).

However, despite this major contribution, women farmers remain economically, socially, and institutionally marginalized. They have limited ownership of land, poor access to irrigation, credit, farm machinery, quality inputs, extension services, market linkages, and digital technologies. Most agricultural policies, training programs, and extension models were historically designed with a male farmer in mind. As a result, women farmers are often excluded from scientific knowledge, modern technologies, and institutional decision-making processes.

To correct this imbalance, the concept of gender mainstreaming has emerged as a powerful strategy worldwide. Gender mainstreaming helps to that the concerns, experiences, and needs of both men and women are integrated into the design, implementation, monitoring, and evaluation of all agricultural policies and programs. It is observed that, agricultural extension services act as a crucial bridge between

research institutions and farmers and therefore play a decisive role in strengthening women's access to new agricultural knowledge, skills, technologies, and entrepreneurship opportunities.

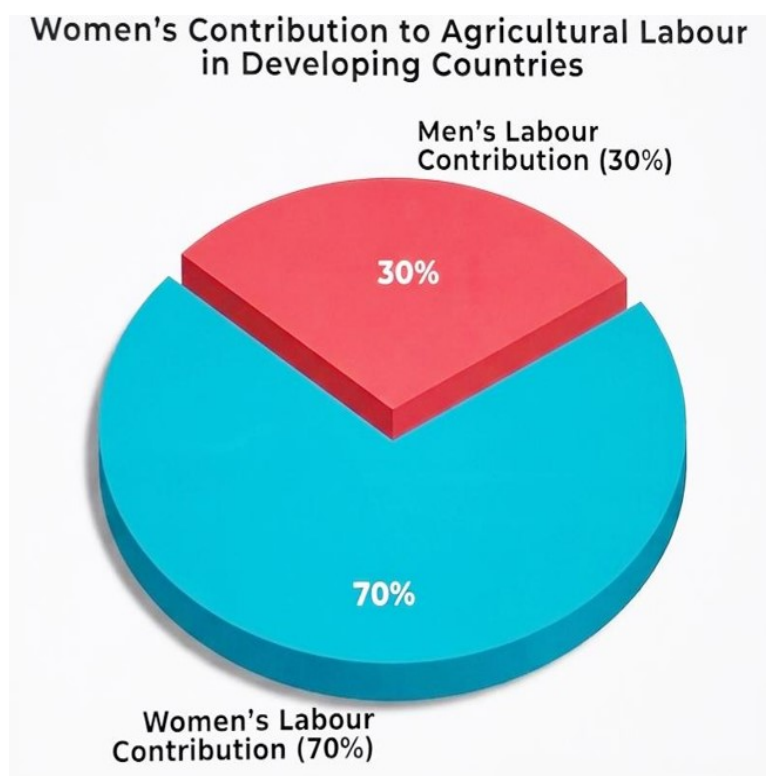


Figure 1: Women's Contribution to Agricultural Labour in Developing Countries (Updated using World Bank Open Data, 2024; and FAOSTAT, 2023)

2. Concept and Meaning of Gender Mainstreaming

Gender mainstreaming can be understood as including gender considerations into policy planning, implementation, and evaluation processes.” (Adapted from ECOSOC, 1997), gender mainstreaming is ‘the process of understanding the effects for women and men of any planned action, including legislation, policies, and programs, in all areas and at all levels.

“In many cases, this approach does not focus on isolated initiatives for women but aims to make all development efforts inclusive.” Instead, it helps both men and women benefit equally from existing development interventions. It focuses on removing structural barriers and creating an equitable system of access to resources, opportunities, and decision-making. In agriculture, gender mainstreaming means recognizing women as independent farmers and agri-entrepreneurs not merely as helpers or invisible contributors.

2.1. Objectives of Gender Mainstreaming

- To ensure equal access and benefits for men and women in all development programs
- To eliminate institutional and structural discrimination in agricultural extension
- To strengthen women's participation in agricultural decision-making at all levels
- To improve women's access to education, extension, credit, and markets
- To promote economic empowerment, agri-entrepreneurship, and social justice

2.2. Gender Inequality in Indian Agriculture: Key Statistics

Several inequalities persist within India's agricultural sector that underscore the urgency of gender mainstreaming:

Table 1: Gender Inequality Indicators in Indian Agriculture

Indicator	Data / Status
Women's share of agricultural labour	70 % in small and marginal farms
Women owning agricultural land	Only 10–13% in India
Women receiving formal extension training	Less than 20%
Female extension workers	Only 15% of total extension workforce (FAOSTAT, 2023)
Women with access to institutional credit	Below 30% in rural India
Women using mobile internet (global)	20% less likely than men (GSMA, 2023)

“Source: Compiled from IFPRI (2020), GSMA (2023)”

3. Limitations of Traditional Extension Systems for Women Farmers

Traditional agricultural extension systems have mostly focused on male farmers, focusing mainly on commercial agriculture and large landholders. Women farmers face multiple overlapping barriers within these systems that often limit their access to knowledge, technology, and institutional support.

The Trickle-Down Theory of Extension

Traditional extension assumed that technical knowledge given to male farmers would automatically reach women within the household. However, this idea has not worked well in many cases because men focus mainly on market-oriented crops while women handle subsistence crops, storage, seed preservation, and livestock. Information is rarely transferred properly within households, creating a serious and persistent knowledge gap among women farmers (Oakley & Garforth, 1997).

Bias Towards Landowners and Commercial Producers

In many cases, extension agents typically target farmers with legal land ownership, access to institutional credit, and involvement in commercial production. Since most rural women lack legal land titles and collateral, they are often excluded from farmer lists, training programs, subsidy schemes, and institutional support mechanisms. This structural exclusion reinforces poverty cycles and agricultural stagnation in women-managed farm enterprises.

Cash Crop Oriented Training

However, extension services predominantly promote hybrid seeds, chemical fertilizers, and high-input commercial crops. Women, on the other hand, manage millets, pulses, vegetables, poultry, dairy, and backyard farming activities that are crucial for household nutrition but receive comparatively little scientific and institutional support. This mismatch between extension content and women's actual farming responsibilities severely limits the relevance and uptake of extension advice among women farmers.

Time, Mobility, and Social Barriers

Women face a triple burden of farm work, household responsibilities, and community obligations. Due to these time constraints, women often cannot attend training programs organized far away or during peak household working hours. It is observed that cultural norms governing mobility further restrict participation, particularly in conservative communities. The absence of childcare facilities, sanitation, and transportation support at training venues creates additional access barriers.

4. Role of Gender-sensitive Extension in Enhancing Access to Knowledge

Meaning of Gender-Sensitive Extension

“A gender-responsive extension system recognizes differences in roles and constraints between men and women and adapts its strategies accordingly.” It helps to that women farmers receive equal opportunities to access agricultural knowledge, skills, technologies, financial resources, and markets. Traditional extension systems were mainly designed for male farmers, assuming men as the primary decision-makers. Gender-sensitive extension corrects this imbalance and supports inclusive and equitable agricultural development (Singh & Yadava, 2019).

Key Components of Gender-Sensitive Extension

Ensuring Equal Participation of Women

Gender-sensitive extension helps to the direct involvement of women in training programs, demonstrations, field days, exposure visits, and farmer-scientist interactions. Special efforts are made to invite women directly, organize women-only training batches, and conduct programs at the village level. This creates a safe learning environment and builds confidence among women farmers who are otherwise hesitant to participate in mixed-gender extension events.

Designing Training According to Women's Needs

Gender-sensitive extension focuses on agricultural activities mainly handled by women vegetable cultivation, pulse and millet production, seed preservation, livestock and poultry management, food processing, and kitchen gardening. However, training content is designed according to women's real farming responsibilities so that the knowledge provided is practical, applicable, and immediately useful to their livelihoods.

Flexible Timing and Convenient Locations

In many cases, training programs are organized according to women's free time and at easily accessible village locations. Peak household work hours are avoided. Facilities such as drinking water, sanitation, and childcare services are provided to encourage greater participation. Time-use surveys are employed to identify optimal scheduling, ensuring that program timing does not conflict with women's agricultural or domestic responsibilities.

Promotion of Women-Friendly Technologies

Gender-sensitive extension supports drudgery-reducing and women-friendly technologies such as manual weeders, paddy transplanters, maize shellers, dal-making machines, improved sickles, and small processing units. These tools reduce physical workload, save time and energy, improve operational efficiency, and enhance women's health and productivity. ICAR has developed over 35 such drudgery-reducing tools specifically designed for women farmers.

Strengthening Women-Oriented Communication Methods

Women prefer group learning, visual demonstrations, local language communication, and peer learning. Gender-sensitive extension uses participatory methods such as farmer-to-farmer extension, progressive women farmers as trainers, participatory rural appraisal (PRA) tools, audio-visual aids, and field demonstrations. Community radios, mobile advisory services, and WhatsApp farmer groups are increasingly used to bridge communication gaps and deliver real-time agricultural advice.

Recruitment and Support of Female Extension Workers

The presence of female extension workers plays a critical role in promoting women's access to agricultural knowledge. Women extension agents communicate more freely with rural women, reduce social barriers, encourage open discussion, and serve as professional role models. In areas with staff shortages, local women are trained as para-extension workers, village-level knowledge brokers, and community resource persons under programs like MKSP and NRLM.

Integration of Digital Technologies

Gender-sensitive extension supports women's access to digital tools including mobile advisory services, agricultural mobile applications, WhatsApp farmer groups, interactive voice response (IVR) systems, and online marketing platforms. Digital literacy training is provided specifically to women farmers, reducing the digital gender gap and ensuring real-time access to market prices, weather information, crop advisories, and government scheme updates.

Market and Credit-Oriented Knowledge

Gender-sensitive extension offers knowledge on market prices, value addition, food processing, packaging, branding, cooperative marketing, and digital commerce. Women are linked with Self-Help Group bank linkage programs, microfinance institutions, and government subsidy schemes. This enables women to transition from subsistence farming to viable agri-entrepreneurship, generating income and building financial independence.

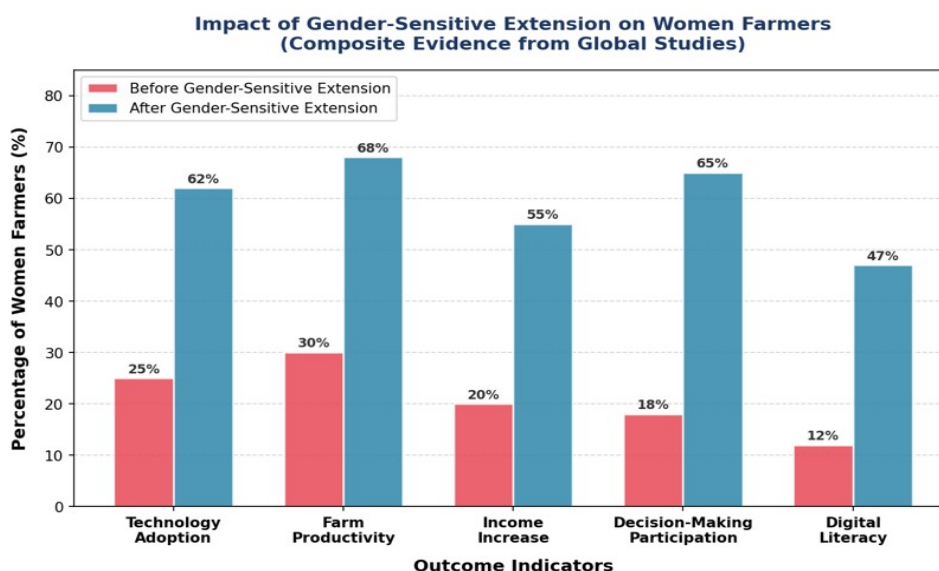


Figure 2: Impact of Gender-Sensitive Extension on Women Farmers — Before and After Comparison (%)
Source: Composite evidence from IFPRI, (2020); Malapit, H., et al. (2024); Malapit, H., et al. (2024)

5. Role of Self-help Groups (SHGs) in Gender Mainstreaming

Self-Help Groups (SHGs) are small, informal, and voluntary associations of people mostly rural women who come together for savings, credit, and collective livelihood activities. SHGs have become an important tool for women empowerment, poverty alleviation, social inclusion, and gender mainstreaming in rural India, especially in agriculture and allied sectors.

Under NRLM (Aajeevika), millions of women SHGs are transforming rural livelihoods and strengthening women's role in farming, agribusiness, and community decision-making.

SHGs as Instruments of Women Empowerment

“Self-Help Groups help improve women’s empowerment across economic, social, and decision-making dimensions.” Economically, SHGs inculcate regular savings habits, provide access to low-interest loans, reduce dependence on moneylenders, increase income from farm and non-farm activities, and promote micro-enterprises. Socially, they improve confidence and communication skills, enhance women’s mobility and public participation, reduce social discrimination, and build collective identity. Psychologically, SHGs enhance improve confidence, build confidence in decision-making, and develop leadership capabilities among rural women.

Role of SHGs in Agricultural Development

SHGs directly contribute to agricultural growth by facilitating group purchase of seeds, fertilizers, and pesticides; adoption of improved varieties, organic farming, and natural farming; collective cultivation and shared labour and promotion of dairy farming, poultry, goat rearing, fisheries, mushroom cultivation, and beekeeping. These allied activities provide women with regular, diversified income streams that enhance household food and economic security.

Role of SHGs in Financial Inclusion

SHGs serve as the backbone of rural financial inclusion in India. Through the SHG-Bank Linkage Programme, members access crop loans, enterprise loans, and emergency credit at subsidized interest rates. Financial literacy training, digital payment systems, and banking awareness programs equip women with skills to manage finances independently, reducing dependency and strengthening economic security for entire households.

Role of SHGs in Marketing and Value Addition

SHGs help women access better markets and fair prices through collective marketing, direct farm-to-market linkages, participation in haats and agri-fairs, formation of Women Farmer Producer Organizations (WFPOs), bulk selling, and contract farming. Value-added products including pickles, papad, flour, jam, jelly, handicrafts, and dairy products are produced and marketed collectively, improving profit margins and market competitiveness for women farmers.

Role of SHGs in Capacity Building

SHGs provide continuous training through KVKs, NGOs, Agriculture Departments, and NRLM Mission Units in scientific farming practices, food processing and value addition, organic farming, packaging and branding, livelihood diversification, and digital literacy. This systematic capacity building transforms women from agricultural Labourers into skilled agri-entrepreneurs capable of running viable farm businesses independently.

Role of SHGs in Leadership and Political Empowerment

SHGs actively prepare women for participation in Panchayat elections, village development committees, school management committees, and Water User Groups. Many women leaders active in local governance and agricultural committees today have emerged directly from the SHG movement. SHGs thus serve as democratic incubators that translate economic empowerment into political participation and social transformation.

6. Role of Government Schemes in Gender Mainstreaming

The Government of India has launched several flagship schemes specifically designed to empower women farmers and integrate them into the mainstream agricultural development process. These schemes collectively enhance women’s economic independence, productivity, leadership capacity, and social status across rural India.

Mahila Kisan Sashaktikaran Pariyojana (MKSP)

MKSP is a sub-scheme under NRLM, launched in 2011, specifically targeting women farmers to strengthen their role in agriculture and allied sectors. Its objectives include economically, socially, and technically empowering women farmers; enhancing agricultural productivity through sustainable practices; ensuring skill development and capacity building; and promoting drudgery-reducing technologies. MKSP recognizes women as independent farmers, enhances their decision-making power, and improves income stability and food security through women farmer collectives and market linkage support.

National Rural Livelihood Mission (NRLM – Aajeevika)

NRLM aims to reduce rural poverty through SHGs and community institutions with special emphasis on women. It organizes rural women into SHGs and federations, promotes financial inclusion, and strengthens livelihood generation activities including agri-enterprises, dairy, fisheries, poultry, and food processing. NRLM offers women with financial independence, enhances collective bargaining power, improves entrepreneurial skills, and help build leadership capacity through Women Farmer Producer Organizations (WFPOs).

Rashtriya Krishi Vikas Yojana (RKVY) – Women Component

RKVY mandates specific allocations for women-oriented activities within state agricultural development plans. Women-specific provisions include tailored training programs, support for women-led agri-processing units, and promotion of nutri-gardens and kitchen gardens. The scheme helps to budgetary inclusion of women, promotes skill development and entrepreneurship, and enhances income generation opportunities for women in agriculture.

Pradhan Mantri Fasal Bima Yojana (PMFBY)

PMFBY offers crop insurance coverage to farmers against natural calamities, pests, and diseases. Women farmers receive equal eligibility, low premium rates, and compensation for crop losses. The scheme promotes independent risk management, encourages women's economic confidence, reduces vulnerability of women farmers, and strengthens resilience to climate variability and extreme weather events.

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

PMKSY focuses on water to every field and improving water-use efficiency through micro-irrigation systems. Women-relevant interventions include promotion of drip and sprinkler irrigation, participation of women in Water User Associations, and training for women on efficient water management. The scheme reduces women's labour burden associated with water collection and manual irrigation, improves crop productivity, and enhances household food security.

Sub-Mission on Agricultural Mechanization (SMAM)

SMAM offers financial support for farm mechanization with special subsidies (50–80%) for women beneficiaries. Women-specific provisions include promotion of women custom hiring centers, distribution of lightweight tools, and training programs on machinery operation. The scheme reduces physical drudgery, enhances work efficiency, and promotes equal participation in mechanized agriculture a domain historically dominated by men.

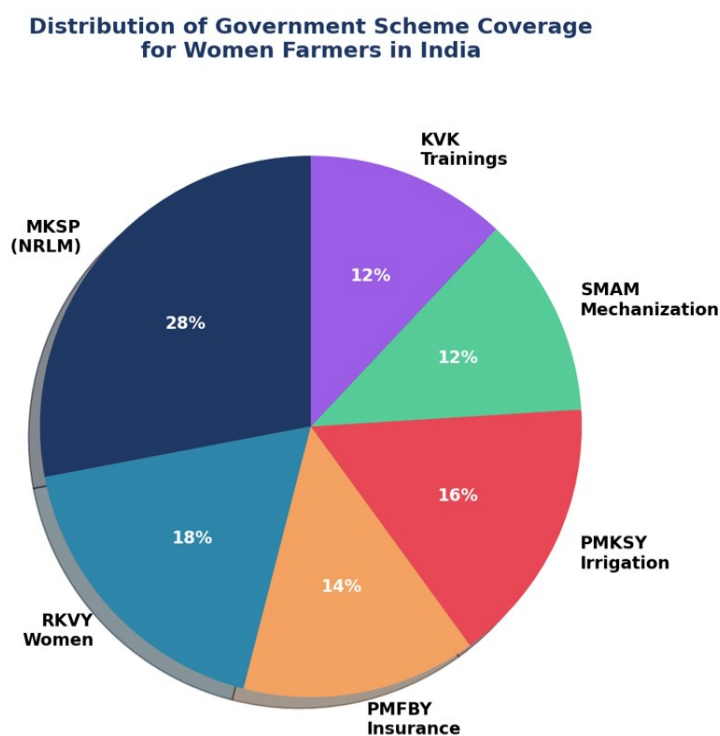


Figure 3: Distribution of Government Scheme Coverage for Women Farmers in India — Proportional Representation
(Source: Government of India Scheme Reports, 2020–2024)

7. Role of Krishi Vigyan Kendras (KVKs)

Krishi Vigyan Kendras (KVKs), established under ICAR across all districts of India, serve as knowledge and resource centers for doubling farmers' incomes through science-led development. KVKs play an important role in gender mainstreaming by conducting women-specific vocational training programs, frontline demonstrations on gender-relevant crops and enterprises, drudgery-reducing technology promotion, and digital agriculture training. Under ICAR guidelines, 30–40% of all KVK trainings are reserved for women farmers.

KVK programs encompassing improved farming practices, nutrition-sensitive agriculture, food processing and value addition, mushroom production, beekeeping, animal husbandry, organic farming, agri-entrepreneurship, and digital literacy have improved women's income,

skills, and entrepreneurship capacity. Farm Women Clubs at KVKs serve as structured platforms for continuous learning, networking, peer support, and collective marketing.

8. Role of Icar in Gender Mainstreaming

The Indian Council of Agricultural Research (ICAR) plays a major institutional role in promoting gender equality, women empowerment, and gender-responsive agricultural development in India. ICAR works through its 113 research institutes, 731 KVKs, and national research programs to ensure that women farmers gain equal access to resources, training, technologies, and decision-making opportunities.

ICAR–CIWA: India’s Nodal Institute for Women in Agriculture

ICAR-Central Institute for Women in Agriculture (CIWA), Bhubaneswar, is the only institution in India focusing entirely on research and extension for women in agriculture. Its key functions include conducting gender-disaggregated research on women’s role, workload, and drudgery; designing women-friendly tools and technologies; developing entrepreneurship models for women in dairy, poultry, mushroom, value addition, and nutrition gardens; and implementing Farm Women Knowledge Centres, Nutri-Smart Villages, and Drudgery Reduction Technology Demonstrations.

Gender Analysis in Research Projects

ICAR mandates that all research projects include gender-based analysis encompassing time-use surveys of women in agriculture, assessment of women’s access to land, credit, irrigation, and inputs, evaluation of gender division of labour, identification of priority needs of farm women, and gender-sensitive technology assessment. This systematic gender analysis helps to that agricultural technologies developed by ICAR are responsive to women’s specific constraints, capabilities, and preferences.

Development of Women-Friendly Tools and Technologies

ICAR has developed more than 35 drudgery-reducing tools specifically for women, including improved sickles, groundnut strippers, seed treatment drums, hand weeders, vegetable seedling tools, milking machines suitable for women, and protective gear. These ergonomically designed tools reduce fatigue, improve operational efficiency, and enhance the safety and health of women engaged in labour-intensive agricultural operations.

Nutrition-Smart and Climate-Smart Programs

ICAR integrates women into national programs including the Nutri-Sensitive Agriculture Mission and Climate Smart Agriculture initiatives. Women are trained to adopt nutrition gardens, bio-fortified crops, drought-resistant varieties, and climate-resilient technologies. Special campaigns such as Mahila Kisan Diwas, celebrated annually on 15th October, recognize women’s contributions to agriculture and showcase women-centric technological innovations developed by ICAR institutes and KVKs.

Entrepreneurship Development for Women

ICAR actively promotes women entrepreneurship in food processing, mushroom cultivation, dairy and goatery, poultry, floriculture, sericulture, medicinal and aromatic plants, and organic inputs production including vermicompost and biofertilizers. KVKs and ICAR institutes provide skill training, starter kits, business development models, packaging guidance, and market linkage support to help women establish and scale viable agri-based enterprises.

9. Transforming Extension Delivery Mechanisms for Women

Organizing Women into Groups

Self-Help Groups, Farmer Interest Groups (FIGs), and Mahila Kisan Samitis serve as powerful platforms for knowledge dissemination. Group-based extension encourages peer learning, builds leadership skills, enhances collective decision-making, and improves bargaining power. Women’s groups also facilitate bulk input procurement, collective marketing, and access to institutional credit that individual women farmers cannot easily access.

Farmer-to-Farmer Learning Approach

Women learn best from fellow women farmers through demonstration plots, progressive women farmers serving as trainers, and participatory learning methods. This approach builds strong trust, reduces social inhibitions, and accelerates technology adoption. The Lead Farmer Model and Community Knowledge Worker systems have proven particularly effective in reaching isolated women farmers in remote communities.

Use of Gender Analysis Tools

Scientific gender analysis tools including the Activity Profile — which identifies who performs what agricultural work — and the Access and Control Profile — which identifies who owns and controls agricultural resources — are essential for proper targeting of training programs and technology interventions. These tools ensure that extension programs are grounded in the realities of women’s agricultural responsibilities and resource access.

Institutional and Staffing Reforms

Achieving gender mainstreaming requires fundamental institutional reforms. These include increasing recruitment of female extension workers, providing mandatory gender sensitivity training for all extension personnel, establishing gender-responsive budgeting mechanisms, creating gender-disaggregated M & E systems with mandatory gender outcome indicators, and building accountability mechanisms at organizational leadership levels. Village-level women trained as para-extension workers can significantly enhance outreach in communities where male extension agents face social access barriers.

10. Impact of Gender Mainstreamed Extension on Women Farmers

The evidence reviewed in this paper consistently demonstrates that gender-mainstreamed extension produces significantly superior outcomes compared to gender-neutral approaches. The following impacts have been documented across studies and program evaluations:

Beyond quantitative gains, gender-mainstreamed extension produces transformational qualitative outcomes: enhanced self-confidence and self-esteem, strengthened leadership capabilities, improved household nutrition and food security, greater social recognition and status for women farmers, and expanded participation in community governance and agricultural institutions.

11. Conclusion

Gender mainstreaming in agriculture is important for achieving sustainable farming systems, food security, poverty reduction, and social justice in India and across the developing world. Agricultural extension services play an important role in ensuring that women farmers who contribute 70 % of agricultural labour yet remain systematically marginalized receive equal access to knowledge, technology, markets, and financial services.

This paper has demonstrated that gender-sensitive extension show improvement in women's agricultural productivity, technology adoption, income, decision-making power, and digital access. The transformative role of SHGs as financial, social, and entrepreneurial platforms; the institutional leadership of ICAR and CIWA in developing women-friendly research and technologies; the field outreach of KVKs; and the policy support of government schemes including MKSP, NRLM, RKVY, PMFBY, PMKSY, and SMAM collectively constitute a comprehensive ecosystem for advancing gender mainstreaming in Indian agriculture.

However, significant gaps persist. Women still constitute less than 20% of formal extension training recipients. Female extension workers remain scarce. Digital gender divides continue to exclude women from the benefits of precision agriculture and digital advisory services. Achieving genuine gender mainstreaming requires not only program delivery but fundamental institutional reform — in extension workforce composition, budget allocation, M & E systems, content relevance, and leadership accountability.

When supported by gender-transformative approaches that engage men as allies, address intra-household power dynamics, and build women's agency at multiple levels, gender-responsive extension transforms women farmers into confident producers, independent decision-makers, skilled agri-entrepreneurs, and empowered rural leaders. Investing in gender mainstreaming in agricultural extension is therefore not merely a social justice imperative but a strategic necessity for sustainable and inclusive agricultural development.

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