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Women Empowerment through Agricultural Extension

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Women are vital to agrifood systems, but their effort is often accompanied by worse access to land, knowledge, financing, technology, markets, leadership roles and income management. Agricultural extension may help bridge these gaps by connecting rural people with information, institutions and crucial services. Extension empowers women only if it recognises them as farmers and decision-makers in their own right, rather than as simple assistants of male family leaders. Evidence from Asia and Africa demonstrates that when women are directly targeted with agricultural information this may enhance their knowledge, involvement in farm choices, technology usage and production. Women's self-help organisations may enhance access to knowledge, collective agency and livelihood possibilities, and integrated initiatives linking agriculture, nutrition and gender interventions can promote both empowerment and family welfare. But training alone is not enough. Social norms, uneven land rights, unpaid care labour, limited mobility, digital exclusion and poor market power might limit women's ability to use what they learn. The essay discusses how gender-responsive extension might improve women's agency via inclusive advisory approaches, collective institutions, access to resources, market involvement, climate services and responsible monitoring. It also suggests an agenda for India's implementation based on convergence among extension agencies, self-help groups, farmer producer associations, local institutions and research systems. The idea is simple: extension is empowering when knowledge is combined with voice, assets, choice, time, income and institutional recognition.

Introduction

In almost every agricultural economy women support farming, livestock raising, seed selection, post-harvest handling, food processing, household nutrition and the management of natural resources. And their contribution is not little. The Food and Agriculture Organization estimates that 36 percent of working women throughout the world labour in agrifood systems. Women in agricultural wage jobs earn on average only 82 cents for every dollar earned by males. FAO also forecasts that addressing the gender inequalities in farm production and agricultural incomes may contribute close to USD 1 trillion to global gross domestic product and lower the number of food-insecure people by around 45 million. These data illustrate that women empowerment is not only a welfare issue, but crucial to productivity, food security and inclusive rural change. Agricultural extension is well placed for this shift. Extension is the structured process by which farmers obtain technical knowledge, issue solving help, demonstrations, climatic information, input and market links, collective groups and public initiatives. A well-designed extension system may assist a woman identify a crop illness, choose an appropriate variety, enhance animal health, utilise water effectively, estimate market pricing, secure finance, join a producer group and bargain within her family. Yet a poorly designed extension system may reproduce existing inequalities, for example, by only inviting the "head of household", scheduling meetings at times when women are busy with domestic and care work, using male spaces in the public domain, or sending digital advisories to phones held by men. The issue is not thus whether women are involved in extension

efforts. The most essential issues are: does extension impact what women know, what they can determine, what resources they control, how much income they keep and whether institutions accept them as farmers? This essay explores the research on these routes and discusses how agricultural extension might progress beyond nominal inclusion towards substantive empowerment.

Understanding Empowerment in Agriculture

Empowerment is frequently informally used to include participation in a training course, membership in a group or receipt of an agricultural input. These may be necessary measures but they are not empowering in themselves. Kabeer's (1999) widely utilised theory views empowerment as a process of interplay of resources, agency and accomplishments. Resources are not only land, money, and equipment but also knowledge, social networks and institutional backing. Agency is the ability to set objectives, to make decisions, to negotiate and to act. Outcomes are valued results such as enhanced livelihood stability, increased ability to influence choices, freedom from violence, improved nutrition or less physical hardship In agriculture, this multidimensional knowledge has been translated into the operationalisation of the Women's Empowerment in Agriculture Index and the project-level version, pro-WEAI. These instruments include aspects such as involvement in production choices, ownership and management of assets, access to credit, control over income, membership in groups, leadership, workload and intra-household relationships. They warn extension planners that technology adoption or yield alone cannot tell if a project has empowered women. A technology may boost the family production with a concomitant increase in the women's work load or a rise in revenue accruing to another household member. An empowering extension project should thus bring about a number of inter-related improvements. Women should have access to meaningful information, comprehend and trust that knowledge, have the power to utilise it, acquire the required land, labour, inputs or cash, be involved in decisions and control a fair portion of the profits. Progress in one dimension may be readily halted by deprivation in another.

Why Conventional Extension Often Misses Women

Traditional extension schemes usually saw the male landowner as the main farmer and women as unpaid household work. This assumption ignores women managing plots, cattle, household gardens, seed systems, processing firms or paid agricultural activities. It also makes land ownership an invisible entrance point for extension services.

A large survey of rural landowning families in India indicated that women made up just around 14% of landowners and held about 11% of agricultural land. Women's weak ownership might exclude them from official records, beneficiary lists, loans and programme eligibility, even when they do a large amount of the agricultural labour.

Institutional prejudice is compounded by practical constraints. Women may have less time available due to cooking, child care, water and fuel collection, animal care and seasonal agricultural chores. They may not be allowed to go to remote training sites, stay overnight, converse freely with male extension staff or talk freely in mixed meetings. Poor literacy levels, little access to smartphones, lack of control in the usage of mobile data and unfamiliarity with formal banking may restrict the efficacy of printed and digital advice. Women from landless, Scheduled Caste, Scheduled Tribe, minority, migratory, widowed or very poor homes may be disadvantaged in several ways.

Ethiopian research showed large gender inequalities in access to extension services and agricultural output, illustrating how service gaps combine with uneven access to assets and other production restrictions. Evidence from the COVID-19 disruption in Gujarat, India and Dang, Nepal also revealed how unstable women's agricultural information networks may be. Many respondents relied on conventional knowledge, group gatherings or input stores, while a significant number lost their principal source of information during the lockdown. These findings are not to be mechanically generalised outside their populations. But they

indicate a bigger lesson: an extension system is not inclusive only because information exists, the information must dependably reach women in formats they can comprehend and utilise.<

How Agricultural Extension Can Empower Women

1. Delivering Information Directly to Women

Information is a productive asset. Agricultural signals that are passed down solely via spouses, landowners or community leaders may be delayed, censored or not transmitted at all. Direct communication identifies women as valid customers of the agriculture sector and gives them the opportunity to ask questions about the crops, animals and businesses they are really managing. Evidence from experiments in Uganda is especially revealing. Targeting extension information directly to female co-heads enhanced women's agricultural knowledge, their involvement in family choices, input usage and technology uptake on farms they managed, and yields. The intervention also led to a reduction in men's unilateral decision making. The research shows that by altering who is given information, the distribution of both knowledge and agency in a family may be changed. Direct targeting can take many forms: registering women's phone numbers separately, inviting women by name, setting up women-managed demonstration plots, making home visits that involve both spouses, broadcasting community-radio programmes at convenient times, delivering voice messages in the local language, and creating channels through which women can ask questions. Extension curriculum must also be responsive to women's roles in agriculture. Advice confined to main commercial crops may ignore vegetables, small animals, poultry, fodder, seed conservation, food processing, nutrition gardens and local businesses where women often have key involvement in decision-making and management.

2. Making Learning Participatory and Confidence-Building

One way lectures may impart knowledge, but seldom build confidence or autonomous problem solving abilities. Participatory extension such as farmer field schools, demonstrations, exposure visits, farmer-to-farmer learning, diagnostic exercises and seasonal experimentation enable women to see, practice, compare and modify technology. For those people with less formal education, repeated engagement is especially vital. Women extension agents and local female facilitators may make services more accessible, but altering the sex of the teacher is not a perfect fix. Experimental study in Mozambique demonstrated that female teachers did not immediately eradicate gender bias in the transmission of sustainable land-management methods. Programme design, community norms, the selection of contact farmers and chances for women to engage were still important. Thus, female staffing must be paired with explicit targeting, inclusive facilitation, and responsibility for results for women. Extension may also foster what is often called "power within"—the confidence to talk, explore, make decisions and identify oneself as a farmer. The public's acknowledgement of women as lead farmers, community resource people, para-extension workers, animal-health professionals, seed producers or business mentors might change local attitudes of knowledge. But women in these jobs need to be paid appropriately. An empowerment scheme may become an extra burden, if it depends on their unpaid efforts perpetually.

3. Linking Knowledge with Land, Finance, Inputs and Technology

Training is of limited value when participants cannot access the resources needed to implement it. A woman may learn about drip irrigation but have no power over the plot; learn about balanced cattle feeding but have no control over family income; or obtain market knowledge but have no transportation. Agricultural extension must consequently act as a gateway to additional services, rather than as an isolated information department. Secure land rights important because they determine investment incentives, bargaining leverage and access to loans and governmental initiatives. But tenure security is more than a woman's name on a title. It involves legal and social recognition, protection against dispossession, duration of rights, involvement in decision-making and capacity to profit from the land. EXTENSION workers cannot modify inheritance systems by themselves but may assist women understand their rights, record cultivation, access legal-aid channels and finish applications and guarantee that extension databases do not associate "farmer" only with a

male titleholder. Extension should similarly link women with savings, appropriate finance, agricultural insurance, quality inputs, custom-hire centers, renewable-energy technology, labour-saving equipment and maintenance services. Technology choices should take into account ergonomics, safety, cost, maintenance and the jobs women really do. Mechanisation may be liberating when it lowers drudgery and frees time for education, entrepreneurship or relaxation. Women may lose their jobs or control of an activity when mechanisation makes an industry more financially attractive, and this can be disempowering.

4. Building Collective Agency through Women's Groups

Groups can combat the isolation women farmers face as individuals. They establish regular venues for learning, saving, mutual aid and communal bargaining. Groups may pool their demand for inputs, arrange demonstrations, hire equipment, cultivate seed, prepare food, sell goods together and represent their members to banks and government institutions. Evidence from India suggests that women's self-help organisations may facilitate access to agricultural knowledge, involvement in farm choices and adoption of agricultural techniques . Another big research indicated that membership in self-help groups increased women's empowerment via the power of collective organization. Further research in Uttar Pradesh shown how the social capital of women's self-help organisations may be used to boost local seed systems. All these studies taken together imply that extension is more successful when it works via organisations women already trust, rather than through short-lived committees for specific projects. But group participation should not be seen as inevitable indication of empowerment. Leaders may be dominant members socially or economically and may get tangible rewards. Meeting commitments may add to women's burden, and groups may have difficulty without continued technical or market assistance. Extension agencies should consequently encourage open processes for membership, rotation of leadership, disclosure of financial data, representation of marginalised women and accessible grievance mechanisms. Evaluation should include not just how many women are registered, but who talks, who decides and who benefits.

5. Supporting Enterprise Development and Market Power

Women are generally concentrated in low-return occupations or in the least remunerative phases of agricultural value chains. Even when they create a product, male family members may control the transportation, marketing, pricing negotiations and revenue. Therefore, a market-oriented extension has to educate more than industrial techniques. Enterprise planning, cost calculation, quality standards, grading, packing, food safety, storage, negotiation, digital payments, contractual literacy and market intelligence should be part of it. Lessons from agricultural value chains in Asia and Africa warn that market participation is not always liberating. Training and extension are generally favourably connected with empowerment, but commercialisation may reinforce inequities if males seize leadership of an activity when it becomes lucrative, or if women's unpaid work rises without a commensurate claim on income. Evidence from the Philippines using mixed methods further emphasises the significance of considering both quantifiable findings and the household processes that underlie them. So extension professionals should ask certain practical questions: Who runs the company? Who signs the supply contracts? Who is paid? Who has control of the bank account? Who bears the added workload? Joint household planning might be useful but women need autonomous membership and voting rights in cooperatives and farmer producer organization too. Collective marketing, women-led firms and direct buyer links may strengthen negotiating power provided they are backed by predictable production quantities, quality assurance, storage, transportation and transparent payment methods.

6. Connecting Agriculture with Nutrition and Household Well-Being

Beyond agricultural revenue, women's empowerment has implications. Research in Bangladesh finds that women's empowerment in agriculture is associated to household food security, but the intensity and paths of those links are context-dependent on the aspects of empowerment. In Bangladesh, the Agriculture, Nutrition and Gender Linkages project demonstrated that integrated interventions combining agricultural training, nutrition

behaviour-change communication and gender-sensitive household engagement could improve the empowerment of women and men, gender parity and some gender-related attitudes. Technical interventions are more likely to generate wide welfare improvements when, in discussions of resource allocation, families talk about diets and care obligations as well as agricultural productivity. Nutrition-sensitive extension may promote diverse production, safe food processing, small livestock management, domestic gardens and informed use of agricultural revenue. But such schemes should not make women the main responsibility for family nutrition. Men and other family members should share the care of children, food preparation and health duties. Otherwise, interventions may be just adding nutrition-related responsibilities to women's current agricultural and home tasks.

7. Strengthening Climate Resilience and Digital Inclusion

Climate change raises the significance of providing timely information regarding rainfall, excessive heat, pests, crop choices, water management, fodder supply and agricultural risk. Yet climate services may replicate gender disparities when projections are distributed via communication channels inaccessible to women, or when suggestions overlook their land, labour and financial restrictions. Review of gender-responsive rural climate services showed persisting inequalities in access, usage and benefits, emphasising the need for inclusive design and different communication channels. Digital extension may remove distance and provide speedy, customised counsel, but a smartphone app is not by default inclusive. Gender responsive digital extension may need local language audio, interactive voice-response systems, offline material, community videos, shared digital kiosks, call-back services, and support from qualified field staff. Women should be enrolled as individual users, not getting information via their husband's phone. Privacy protections are also essential if access to phones by households is regulated or restricted. Digital distribution should be a supplement to trusted field agents, demos and group-based learning.

Designing a Gender-Responsive Extension System

- Diagnosis is the first step in a gender sensitive extension system. Extension plans should be based on sex disaggregated and intersectional data: who is doing what agricultural work, who controls various resources, who gets information, who goes to meetings, who talks, who takes up a technology and who benefits. Women are not a homogenous group. Individual demands and limits are shaped by age, caste, tribe, marital status, handicap, landholding, business and home structure.
- Secondly, it needs to be acknowledged that women are key extension customers. Even without official land rights, registration systems should include women cultivators, livestock keepers, tenant farmers, agricultural labourers and businesses. They should contact them personally with invitations, messages and follow-up assistance. Targets shouldn't just look at the number of women participating but also the quality, relevance and continuity of engagement.
- Third, delivery arrangements must be compatible with women's daily lives. Meetings should take place in secure, accessible venues and at times decided in cooperation with participants. Shorter sessions, repeated training batches, childcare assistance, travel allowances and local facilitators may help. Educational materials should be designed, assuming low literacy and use of demonstrations, visuals, audio and practical activities.
- Fourth, expansion must include males and community institutions without taking away autonomous areas for women. Household discourse may help to address opposition, encourage shared duties and avoid backlash, while women-only meetings allow participants to explore their problems and speak more freely. Panchayats, community leaders and producer organisations should be engaged in altering the norms that limit women's mobility, leadership and rights over resources.
- Fifth, services should be packaged. Technical expertise is complemented by inputs, capital, mechanisation, market access, social protection and legal help. Convergence is

especially crucial for impoverished women, since if even one resource is lacking, they can't take it up.

- Finally, empowerment requires systematic measurement. WEAI and pro-WEAI give verified quantitative methods and qualitative interviews to help explain why change happened or didn't happen. In addition to adoption and yield, extension programs should also assess women's knowledge, decision-making, control over assets and income, leadership, time burden and independence from compulsion. Monitoring should also catch unintended impacts such as home strife, elite capture and increased unpaid employment.

An Implementation Agenda for India

India has a large agricultural extension and rural-development infrastructure which may be the basis for gender-responsive extension. It has Krishi Vigyan Kendras, state agriculture and related departments, rural livelihood institutions, self-help organisations, cooperatives, farmer producer organisations, panchayats, agricultural universities and civil-society organisations on board. The ICAR classifies KVKs as district level front-line extension organisations, responsible for technology evaluation, demonstrations, capacity building and farm advice. India's FPO structure offers an institutional mechanism for collective production and commercialisation. The critical need is for intentional convergence on women farmers and not rival schemes with unconnected beneficiary lists. At village level, extension agencies should identify women's agricultural businesses, workloads, information needs and service gaps prior to drafting yearly extension plans. Federations of self-help groups may discover women farmers, conduct demonstrations and choose qualified community resource personnel. Krishi Vigyan Kendras and agricultural institutions may give technical help and validation of locally adapted approaches. Government agencies may link participants with inputs, insurance, soil-testing and animal-health services while farmer producer associations can assist in aggregation, processing and selling. Panchayats may offer secure settings for meetings and help legitimise women as leaders in agriculture. There should be dedicated funding for mobility, childcare, practical demonstrations, internet access and follow-up and not just one-time awareness events. There should be a clear route from learning to application in every major training activity: what resource is needed, who will offer it, how money will be provided, when follow-up will take place and where the product will be sold. Women need to be participants of planning monitoring and evaluation committees not only members of beneficiary groups Performance indicators also need to be reformed. Counting the number of trainees or kits provided promotes tokenism. More meaningful indicators include the proportion of women who receive direct advice, complete an agricultural cycle of production, gain access to credit or machinery, and assume leadership positions, control enterprise income, experience less physical drudgery and report greater influence over farm decisions. Results should also be disaggregated by caste, tribe, landholding, age and economic position so that development among the relatively more affluent women does not hide the persistent exclusion of more disadvantaged groups.

Risks That Extension Programmes Must Avoid

Empowerment projects may do damage when they neglect power relations. Breaking domestic norms in public could result in opposition or violence. Women's working day may be extended by a new business. Men may seize control of valuable activities. When you register digitally, you can be giving out personal information. Group loans may be stressful when production or markets fail. Community volunteers may be required to provide services without remuneration forever. Confidential reporting channels, protection protocols, informed consent, workload evaluations, and referral paths for severe issues are required for a "do no harm" strategy. Facilitators should promote change in a gradual way, while engaging supporting home and community actors, and ensuring women's autonomy. Economic interventions should incorporate realistic market evaluations, risk-management clauses and clear funding arrangements. Most significantly, women should be involved in determining

what empowerment means in their particular social and economic context rather than being measured just against a standard external paradigm.

Conclusion

Agricultural extension might be one of the most practical tools for women's empowerment, since it sits at the intersection of information, technology, institutions and daily farm choices. But participation at a training course is not the ultimate objective. Women are empowered when they can access and utilise knowledge, influence production decisions, access land and financing, minimise drudgery, engage in organisations, bargain in markets and control a fair portion of the advantages accruing. The best data we have suggests a move from gender-neutral extension to intentional gender-responsive design. Information should be directed to women. Learning should be practical and interactive. Groups should develop collective voice. Extension should link knowledge with assets, services and markets. Engagement of males and community institutions is needed to decrease restrictive norms, while women preserve autonomous spaces, identities and rights. Measurement should include agency, time usage, control over income and leadership – not just technology adoption and agricultural productivity. When these concepts are used, agricultural extension becomes more than the diffusion of technical advice. It acknowledges women as farmers, inventors, entrepreneurs and leaders. Such recognition, backed by resources and real decision-making authority, may help increase agricultural performance and also promote family food security, climate adaptation and social justice.

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