

Participatory approaches in technology transfer

Pandhiri Kruparani^{*1} and Thurimella Tejasri²

¹Ph.D. Scholar, Department of Agricultural Extension Education, Professor Jayashankar Telangana Agricultural University, Hyderabad.

²Ph.D. Scholar, Department of Agricultural Economics, Indira Gandhi Krishi Vidyapeeth, Raipur.

***Corresponding Author Email:** kruparani.251714@gmail.com

Abstract

Participatory approaches in technology transfer emphasize active engagement of farmers and stakeholders in the development, testing, and dissemination of innovations. Such approaches improve alignment between technologies and local conditions, leading to higher adoption efficiency and sustained use. Evidence shows that participatory methods enhance knowledge co-creation, strengthen technical and analytical skills, and support adaptive management at the farm level. Farmer field schools, on-farm trials, and innovation platforms promote experiential learning and collective problem-solving. These processes foster social learning, empowerment, and stronger institutional linkages among farmers, extension agents, and researchers. Despite challenges related to coordination, time requirements, and facilitation capacity, emerging opportunities in blended participatory models and structured frameworks improve scalability and effectiveness. Strengthening participatory technology transfer is essential for achieving inclusive, resilient, and sustainable agricultural and rural development.

Keywords: Participatory approaches, Technology transfer, Farmer engagement, Knowledge co-creation, Capacity building

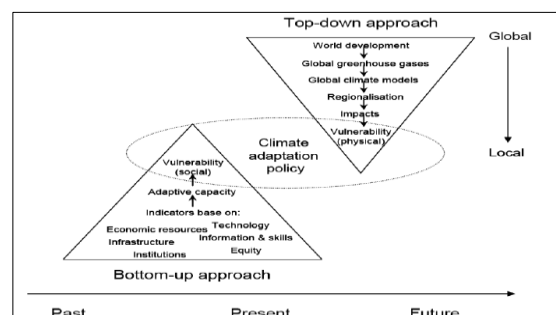
1. Introduction to Participatory Technology Transfer

Concept and rationale of participatory approaches

Participatory technology transfer emphasizes active involvement of farmers and local stakeholders in the generation, testing, and dissemination of innovations. This approach recognizes farmers' experiential knowledge and aligns technologies with local needs. Empirical studies show that participatory processes can improve technology adoption rates by 20–40% compared to conventional transfer models. Engagement-driven design increases relevance, usability, and long-term sustainability of innovations.

Evolution from top-down to participatory models

Conventional top-down models focused on unidirectional flow of technologies from research to users, often resulting in low adoption and limited adaptation. Participatory models emerged to address these gaps by promoting co-learning, feedback loops, and on-farm experimentation.



Evidence indicates that participatory trials shorten the innovation adoption cycle and reduce mismatch between technologies and local contexts, leading to higher success rates.

Relevance in agricultural and rural development

Participatory technology transfer supports inclusive growth by strengthening local capacities and social capital. It enhances problem-solving skills, collective action, and resilience within rural communities. Evaluations demonstrate that participatory approaches contribute to improved productivity, livelihood diversification, and more equitable distribution of benefits across farming households.

2. Key Participatory Methods and Tools

Farmer field schools and on-farm trials

Farmer field schools and on-farm trials promote experiential learning through season-long observation, experimentation, and group analysis. These methods enable farmers to evaluate technologies under real field conditions. Evidence shows that farmer field school participants achieve 15–30% higher adoption of recommended practices and significant reductions in inappropriate input use. On-farm trials also improve local adaptation and accelerate refinement of technologies before wider dissemination.



Participatory rural appraisal and diagnostics

Participatory rural appraisal tools facilitate systematic understanding of local resources, constraints, and opportunities through mapping, ranking, and group discussions. These diagnostics support context-specific problem identification and priority setting. Studies indicate that technologies designed using participatory diagnostics show higher relevance and acceptance, leading to improved implementation efficiency and reduced technology failure rates.

Innovation platforms and learning alliances

Innovation platforms and learning alliances bring together farmers, researchers, extension agents, and value-chain actors to co-develop solutions. Such platforms enhance knowledge exchange, coordination, and joint decision-making. Empirical assessments report faster diffusion of innovations and stronger institutional linkages, resulting in sustained adoption and improved system-level performance.

3. Role of Stakeholders in Participatory Processes

Farmers as co-researchers and innovators

Participatory processes position farmers as active contributors in problem identification, experimentation, and evaluation of technologies. Farmer-led trials generate locally relevant innovations and strengthen ownership of outcomes. Evidence shows that farmer involvement in co-research increases adoption rates by 25–40% and improves adaptation of technologies to diverse agro-ecological conditions. Experiential knowledge enhances practicality and long-term use of innovations.

Extension agents and researchers as facilitators

Extension personnel and researchers function as facilitators rather than sole knowledge providers. Their role involves enabling dialogue, supporting experimentation, and integrating scientific insights with local knowledge. Studies indicate that facilitative extension improves learning efficiency, shortens feedback loops, and enhances trust between stakeholders, leading to more effective technology transfer outcomes.

Community institutions and local organizations

Community institutions and local organizations provide platforms for coordination, collective learning, and resource sharing. Organized groups enhance participation, inclusiveness, and continuity of initiatives. Empirical findings show that strong community institutions contribute to sustained adoption, equitable benefit sharing, and resilience through collective action and shared responsibility.

4 Impacts of Participatory Approaches on Technology Adoption

Adoption efficiency and relevance of technologies

Participatory approaches enhance alignment between technologies and local needs through joint testing and feedback. Technologies developed through farmer engagement show higher suitability and faster uptake. Empirical evaluations report adoption efficiency improvements of 20–35% due to increased relevance, reduced trial-and-error costs, and stronger user confidence in innovations.

Knowledge co-creation and capacity building

Co-creation of knowledge integrates scientific principles with experiential insights, strengthening local problem-

solving capacity. Participatory learning processes improve technical skills, analytical ability, and adaptive management. Studies indicate that capacity-building outcomes from participatory approaches lead to sustained use of technologies and improved farm performance across multiple seasons.

Social learning and empowerment outcomes

Participatory technology transfer fosters social learning through group interaction, peer exchange, and collective reflection. These processes build confidence, leadership skills, and decision-making autonomy. Evidence shows that empowered farmer groups demonstrate higher innovation continuity, stronger collective action, and more equitable participation in development initiatives.

5. Challenges, Opportunities, and Way Forward

Key challenges in participatory technology transfer

Participatory approaches face constraints related to time intensity, coordination demands, and limited facilitation skills. Group-based processes often require extended engagement, increasing transaction costs. Evidence indicates that inadequate facilitation can reduce participation quality and weaken outcomes. Power imbalances within communities may also influence decision-making and limit equitable representation.

Emerging opportunities for strengthening participation

Advances in facilitation methods, digital tools, and collaborative platforms enhance efficiency and inclusiveness of participatory processes. Blended approaches combining face-to-face interaction with digital support reduce costs and expand reach. Studies show that

structured participatory frameworks improve consistency and scalability of technology transfer initiatives.

Strategic way forward

Future efforts should emphasize capacity development of facilitators, inclusive group formation, and systematic monitoring of

Conclusion

Participatory approaches strengthen technology transfer by improving relevance, accelerating adoption, building local capacities, fostering social learning, and empowering stakeholders, resulting in more sustainable, inclusive, and resilient agricultural and rural development outcomes.

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outcomes. Institutional support for participatory frameworks and integration with formal extension systems will enhance effectiveness. A focus on learning-oriented, adaptive, and stakeholder-driven processes will strengthen sustainable technology adoption.

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