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SEVEN WAYS HOW EXTENSION CAN MAINSTREAM AGROBIODIVERSITY CONSERVATION

In this blog, Archana Bhatt and P Vipindas highlight the importance of agrobiodiversity conservation and list seven ways to mainstream it through extension efforts.

CONTEXT

The rapid decline in agricultural biodiversity globally poses a significant threat to the sustainability of food systems and the livelihoods of smallholder farmers. This, coupled with climate change and its impacts, exacerbates the vulnerability of the food systems, especially for smallholder farmers. Several studies have pointed out that enhancing agrobiodiversity at the farm level contributes to biodiversity conservation, climate change adaptation and mitigation, availability of nutritious diets, sustainable land use, and resilient livelihoods.

Biodiversity Conservation (Adapted from CBD 1992)

Across the globe, numerous organizations and consortiums are working to conserve agrobiodiversity, including CGIAR, The Crop Trust, Conservation International, Bioversity International, International Union for Conservation of Nature (IUCN), Global Environment Facility (GEF), International Partnership for the Satoyama Initiative (IPSI), Local Initiatives for Biodiversity, Research and Development (LI-BIRD), and Wetlands International, to name a few. In India, many such organizations and grassroots institutions are actively engaged in agrobiodiversity conservation. Some of the key players include the National Biodiversity Authority, State Biodiversity Boards, National Bureau of Plant Genetic Resources (NBPGR) and its regional centers, agricultural universities, ICAR institutes, Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA), non-governmental organizations like M S Swaminathan Research Foundation (MSSRF), Ashoka Trust for Research in Ecology and Environment (ATREE) and independent conservators. To learn more about these mechanisms in India, you may refer to the AESA Blog 225.

The conservation of agrobiodiversity can only be successful when the efforts include the community who hold indigenous knowledge. Additionally, ensuring an equitable access and benefit-sharing mechanism is vital. In this light, on-farm conservation or community biodiversity management should take centre stage, with Indigenous Peoples and local communities (IP and LC) as key stakeholders. However, there are certain challenges that limits on-farm biodiversity conservation, some of them are discussed below:

CHALLENGES IN AGROBIODIVERSITY CONSERVATION

- **Monoculture:** Intensive cultivation of a single crop or variety reduces diversity, making agricultural systems vulnerable to pests, diseases, and climate shocks.
- **Loss of Traditional Knowledge:** Rapid modernization has led to the erosion of traditional knowledge, which is essential for conserving and sustainably using agrobiodiversity.
- **Land Degradation:** Soil erosion, deforestation, and improper land management practices contribute to habitat loss and degradation, affecting the survival of genetic resources.
- **Changing Market Preferences:** Commercial farming often favours high-yielding, genetically uniform varieties over traditional and local crops, leading to the neglect of native species. Unique traits of traditional varieties are often overlooked due to lower productivity and reduced market demand.
- **Climate Variability:** Natural disasters and extreme weather events can undermine efforts to manage agrobiodiversity effectively.
- **Knowledge & Awareness Gap:** Often, farmers and local communities are unaware of the importance of agrobiodiversity, making it challenging to engage them in conservation activities.
- **Policy Gaps:** A lack of robust incentive mechanisms to support conservation efforts hinders the mainstreaming of agrobiodiversity conservation. Additionally, many government policies do not prioritize agrobiodiversity as a critical component.
- **Human-Wildlife Conflict:** The encroachment of wildlife into farmland poses significant challenges to agrobiodiversity conservation efforts.
- **Insufficient Technical Support:** A lack of technical assistance and support systems to manage diverse farming systems and adapt to technological innovations hampers agrobiodiversity conservation.
- **Invasive Species:** The spread of invasive species in non-native areas threatens existing agrobiodiversity.

SEVEN WAYS OF MAINSTREAMING AGROBIODIVERSITY CONSERVATION

While the above mentioned challenges hinder the advancement of agrobiodiversity conservation, many agricultural research and extension organizations in India do not directly address agrobiodiversity, whether in educational curricula or through research and development interventions. Nevertheless, agricultural extension plays a crucial role in integrating agrobiodiversity conservation into research and development efforts. Below are key roles, with some notable examples from MSSRF extension work, that extension professionals can undertake in this context:

1. Education and Awareness:

Extension professionals act as a bridge between researchers, farmers, local communities, and policymakers by facilitating the dissemination of best practices and innovations in agrobiodiversity and promoting knowledge exchange.

Wayanad Community Seed Fest

Notable Examples:

- Community Seed Fests or Diversity Fairs to foster conversations around conservation and sustainable use of agrobiodiversity, sensitizing the community and stakeholders about the value of local genetic resources.
- Food Fests & Nutrition Gardens to raise awareness about dietary diversity, promoting traditional and nutritious food varieties and local crops.
- Short courses and vacation programs, such as the “Every Child a Scientist" program of MSSRF for school students.
- Organizing seminars and conferences to enable direct farmer-scientist interactions.
- Developing educational materials like guides, brochures, manuals, and digital content on agrobiodiversity management practices in local languages. Digitizing and integrating artificial intelligence (AI) can add more value in awareness generation and knowledge dissemination on good practices in agrobiodiversity conservation.

2. Field Demonstration:

Extension professionals facilitate the demonstration of on-farm conservation and sustainable utilization of agrobiodiversity at the farmer's field using various tools and techniques.

Notable Examples:

- Facilitating on-farm conservation by establishing community conservation plots or diversity blocks in farmers' fields, showcasing sustainable agriculture and biodiversity-friendly practices.
- Establishing community seed banks or seed villages to encourage participatory seed exchanges among farmers, strengthening local seed networks and promoting market linkages for traditional crop varieties.
- Creating home or school nutrition gardens to enhance knowledge of nutrition and dietary diversity, addressing malnutrition and promoting positive behavioural changes in health and nutrition.

Children harvesting vegetables from an Anganwadi Nutrition Garden

- Conducting Diversity Field Schools (DFS), which are community-centred learning platforms where farmers participate to understand the value of agrobiodiversity and manage plant genetic resources (PGR).

3. Participatory Research Programs

Participatory research programs involve collaboration between farmers, researchers, and extension professionals to identify traditional varieties with unique traits, manage crop diseases, and prioritize the conservation of endangered varieties.

Notable Examples:

- Participatory Varietal Preference Ranking: This method involves farmers evaluating on-farm trials to identify cultivars they prefer. Participatory varietal selection (PVS) provides a quicker and more cost-effective approach to identifying farmer-preferred cultivars.
- Participatory Plant Disease Identification and Management: This method brings together plant pathologists, farmers, and extension professionals to diagnose plant diseases accurately. It offers suitable management options and involves farmers in assessing the effectiveness of these practices over time. This approach seeks to gain insights from grassroots perspectives on managing plant health challenges.
- Red Zoning/Red Listing of Varieties: This process helps prioritize conservation areas and agricultural genetic resources by red-listing endangered varieties. Methodologies like Five-Cell Analysis and Trait Distribution Analysis are employed to identify and classify high-priority conservation targets.
- Facilitating the exchange of germplasm from in-situ conservatories at national and regional levels, creating broader conservation outreach and enabling participatory research at the community level.

4. Documentation & Validation of Indigenous Technical Knowledge (ITK)

Extension professionals play a key role in documenting and validating indigenous knowledge to ensure its conservation and effective application in modern agriculture, particularly for climate adaptation and value chain development, while respecting the critical role of Indigenous Peoples and local communities.

Notable Examples:

- Engaging in multi-disciplinary research with research institutions to study and develop catalogues on landraces, crop wild relatives, and local crops, alongside documenting associated indigenous knowledge and their role in climate adaptation. This can be achieved using various tools such as in-depth interviews, oral history, focus group discussions, participatory diversity mapping, and ethnobotanical surveys, always ensuring Free, Prior & Informed Consent (FPIC) from the community before documentation.
- Facilitating the development and regular updating of People's Biodiversity Registers (PBR) in collaboration with local communities and Biodiversity Management Committees (BMCs) under State Biodiversity Boards.

Documentation of traditional knowledge on agrobiodiversity

5. Training & Capacity Building

Extension professionals play a primary role in coordinating training programs aimed at skill development and capacity building. They can also contribute toward establishing strong linkages between localized farmer networks, multi-stakeholders, and rural and urban communities to facilitate collaborative partnerships.

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Notable Examples:

- Coordinating training programs on good practices in agrobiodiversity management, focusing on sustainable conservation, cultivation, consumption, and commercialization of agrobiodiversity (e.g., MSSRF's C4 approach).
- Facilitating the formation of farmer cooperatives focused on resource-sharing, knowledge exchange, and marketing initiatives that promote the sustainable use of agrobiodiversity. Strengthening local seed networks and creating market linkages for niche traditional varieties.
- Providing training on community-based resource management using a participatory approach, where local communities are involved in managing natural resources and conserving biodiversity. This could include the restoration of agro-ecosystems and Sacred Groves.

- Facilitating the recognition of conservator farmers or custodian farmers by linking them with programs such as the Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA) for the registration of farmer varieties and Geographical Indication (GI) tags. MSSRF, for example, has facilitated the registration of over 20 farmer varieties in Wayanad with the support of PPVFRA.

Recognition of Custodian farmers with the support of PPVFRA

- Building the capacity of economically and socially marginalized communities by developing micro-enterprises focused on sustainable practices such as mushroom cultivation, bio-inputs, medicinal plants, nurseries, and herbal products derived from agrobiodiversity. Ensuring sustainable utilization of agrobiodiversity in enterprise development, particularly targeting Neglected & Underutilized Crops (NUCs) and Non-Timber Forest Products (NTFPs), offering both subsistence and commercial opportunities for communities.
- Promoting social mobilization and leadership development by creating platforms for women's participation in decision-making processes.

6. Payment for Agrobiodiversity Conservation Services (PACS) / Payment for Ecosystem Services (PES)

Extension professionals can act as a bridge, connecting communities to resources necessary to access the benefits of PACS or PES schemes.

Notable Examples:

- Assisting farmers in implementing conservation practices that qualify for payments or awards, such as maintaining diverse crop varieties or adopting conservation practices (e.g., carbon credits, green credits, and biodiversity credits).

Tribal community conferred with Genome Savior Awards by WDTDAC

- Empowering communities engaged in agrobiodiversity conservation by facilitating awards, incentives, and recognition through PACS or PES programs. For instance, MSSRF facilitated Wayanad District Tribal Development Action Council (WDTDAC), which won the Plant Genome Saviour (Community) Award in 2012. WDTDAC now awards tribal community members involved in agrobiodiversity conservation during the Wayanad Community Seed Fest.
- Identifying and connecting communities with potential funding sources, both governmental and non-governmental, that support PACS programs.
- Conducting research to value ecosystem services, which helps create databases to support PACS and PES initiatives in the future.

7. Policy Advocacy & Governance

Policy advocacy is crucial to ensuring that the voices and rights of marginalized communities are heard and sincerely considered in decision-making processes related to agrobiodiversity conservation.

Notable Examples:

- Analyzing the effectiveness of policies and governance frameworks in promoting agrobiodiversity conservation.
- Supporting local and national policies that encourage agrobiodiversity conservation through awareness campaigns and community mobilization. Creating a policy-enabling environment that ensures fairness and equity in sharing the benefits of agrobiodiversity conservation.
- Identifying key stakeholders, from local to global levels, to understand their influence or control over the management of agrobiodiversity; augmenting knowledge exchange on agrobiodiversity management across borders and fostering cross-learning from successful case studies.
- Strengthening linkages between like-minded networks and alliances worldwide, with an emphasis on policy advocacy.
- Ensuring participation in national and international forums, such as the 9th Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), to make sure farmers' voices are heard.
- Collaborating with NGOs and government agencies to align conservation efforts with broader agricultural policies, ensuring that the concerns of farmers and communities are considered in decision-making processes.

DTDAC participated at the 9th Session of the Governing Body of International Treaty on Plant Genetic Resource for Food and Agriculture (ITPGRFA)

WAY FORWARD

Mainstreaming agrobiodiversity conservation is key to reconfiguring food systems and livelihoods towards sustainability. But to do this, multi-lateral support from governments is essential, integrating agrobiodiversity conservation as a cross-cutting theme across major agricultural, environmental, and rural development programs. Providing technical and financial support, particularly at the ground level, along with extension systems through training, capacity building, and technology adaptation will help ensure the long-term success of agrobiodiversity conservation.

Furthermore, including agrobiodiversity conservation in the curriculum of the Indian education system would be a significant step forward. At present, agrobiodiversity is rarely covered in undergraduate agricultural courses, being limited to the study of plant genetic resources. By fostering a stronger connection between agricultural practices, biodiversity conservation, and environmental stewardship, we can empower future generations to become responsible custodians of India's agrobiodiversity.

Additionally, making agrobiodiversity conservation a crucial part of the National Agricultural Research, Education, and Extension System (NAREES) will help address several concerns in this area. With these efforts, we can create a future where conservation and sustainable management of agrobiodiversity form the pillars of resilient agro-ecosystems.

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