

Co-creating Resilient Landscapes: Transitioning to a Multifunctional Approach in India

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CGIAR Multifunctional Landscapes Program

Multifunctional Landscapes is a CGIAR Science Program that aims to enhance the resilience, productivity, and sustainability of agricultural landscapes by integrating diverse land uses, ecosystem services, and livelihood strategies. The initiative supports evidence-based policies and innovations that balance food production with climate adaptation, biodiversity conservation, and social inclusion. By working with local communities, governments, and partners, it promotes landscape-level approaches to managing natural resources for long-term ecological and economic benefits. To learn more about the CGIAR Research Portfolio, please visit www.cgiar.org/cgiar-research-portfolio-2025-2030/

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Multifunctional Landscapes Science Program

The Multifunctional Landscapes (MFL) Science Program originally builds on CGIAR Initiatives (Agroecology Initiative, Nature-Positive Solutions, Livestock and Climate), the Environmental Health and Biodiversity Impact Platform and their successful partnerships while pioneering new integrated approaches to landscape management. It employs a systems approach to synergistically link to achieve social, economic, and ecological benefits. The MFL program applies transdisciplinary approaches and will integrate agricultural, ecological, aquatic, and other ecosystems.

In alignment with this vision, landscapes under the MFL are to be developed and managed collaboratively by diverse stakeholders, who co-design innovations and participate in policy processes through inclusive governance and effective planning. MFL aims to operate across a diverse array of global geographies, collaborating closely with a

wide range of stakeholders and co-creators. These locations include Colombia, India, Kenya, Peru, Senegal, Tanzania, Tunisia, Vietnam, and Zimbabwe. There are seven interconnected Areas of Work (AoWs) within MFL, implemented simultaneously across key landscapes to foster resilient livelihoods, enhance food security, and improve ecosystem services. Each AoW (Fig 2) is designed to address the specific needs of local landscape users as well as their surrounding environments, all while promoting the sustainable management of natural resources.

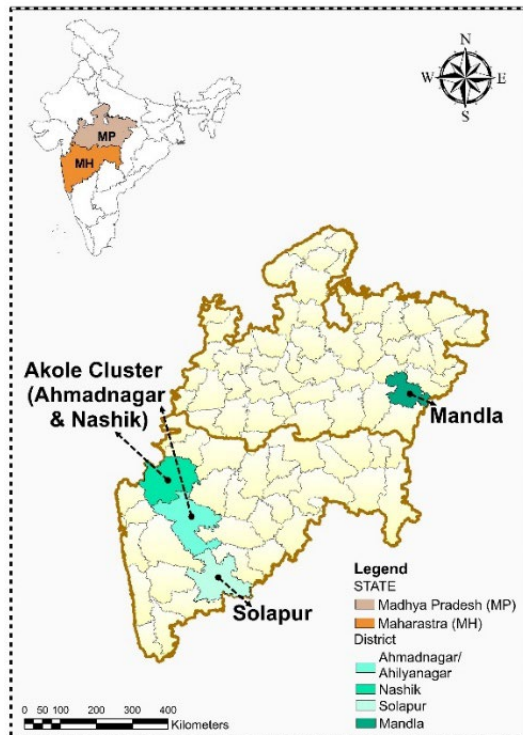


Figure 1. Map of Multifunctional Landscapes sites in India.

Multifunctional Landscapes (MFL) Science Program (SP) Areas of Work (AoW)

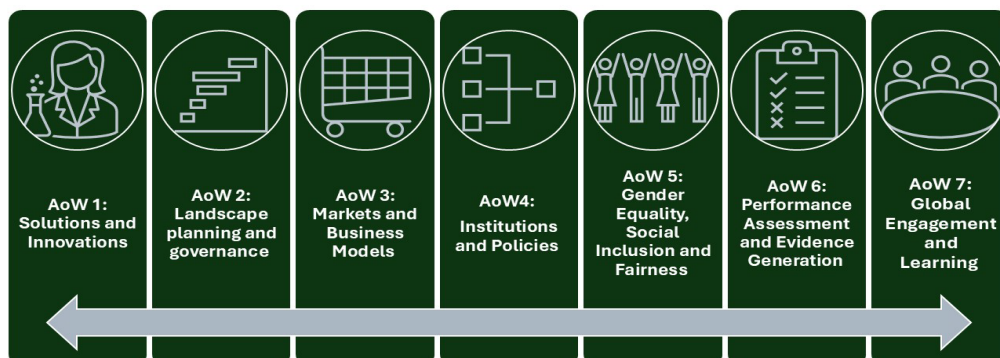


Figure 2. AoWs under CGIAR Multifunctional Landscapes Science Program.

MFL in India

Drawing from experiences during the Initiative phase (2021–2024), the current phase (from 2025 onward) adopts transdisciplinary approaches to collaboratively develop solutions that balance environmental health with human development, aiming for resilient, biodiverse, and low-emission landscapes. In India, the Multifunctional Landscapes Science Program concentrates on the Central Highlands, specifically in Mandla (Madhya Pradesh), the Akole cluster (Nashik and Ahmednagar, Maharashtra), and Solapur (Maharashtra).

The program brings together expertise from CGIAR centres including IWMI, Alliance of Bioversity-CIAT, ICRISAT, IFPRI, and World Fish. Strong partnerships with organizations such as BAIF, PRADAN, ICAR-NIASM, ICAR-IIFSR, and MPKV Rahuri have ensured a smooth and impactful transition from the initiative phase to the current Multifunctional Landscapes Science Program.

This year marked a pivotal transition as we moved towards implementing the MFL Science Program, building upon the strong foundation laid by previous CGIAR Initiatives on Nature Positive Solutions and Agroecology. With this aim, “Co-creating resilient landscapes: Transitioning to multifunctional approach” engagement was scheduled. The objectives were to:

1. Introduce the Multifunctional Landscapes Program (MFL) to our stakeholders during the consultation and show them how it is different from the previous initiative and highlight its relevance in promoting integrated, sustainable, and resilient landscape-level development.
2. Engage diverse stakeholders to co-design and exchange insights from research and field experiences from the previous phase, to shape actionable MFL pathways at the landscape level.
3. Strengthening partnerships to ensure sustained and scalable outcomes

This collaborative engagement aims to unite diverse expertise and perspectives, advancing CGIAR’s vision for global food security and sustainable landscapes. By exchanging insights from all three project sites, we can collectively shape our future approach, strengthen professional connections, and clarify stakeholder roles towards shared goals for the MFL program.

In this context, a consultation was convened on “Co-creating Resilient Landscapes: Transitioning to a Multifunctional Approach”, on 7th August 2025, in Pune, Maharashtra to serve as a critical milestone in initiating the program in selected geographies of India. Organized jointly by the International Water Management Institute (IWMI) and the Alliance of Bioversity International and CIAT, the event brought together representatives from research institutions, development organizations, financial agencies, and government bodies. Together, they charted pathways for embedding nature-positive, agroecological, and multifunctional landscape approaches into India’s rural development agenda.

Opening Session

Dr. Alok Sikka, Country Representative, IWMI India and Bangladesh/Senior Fellow and MFL Country Lead, welcomed participants and outlined MFL as a systems-based approach integrating agriculture, environment, nutrition, and policy, while fostering synergies across sectors. He emphasized the role of nature-positive (N+) and agroecology interventions in enhancing ecosystem services and rural livelihoods, highlighting the contributions of diverse partners engaged in MFL sites across India.

Setting a global context, **Dr. Carlo Fadda**, Lever Director (Principal Scientist), Biodiversity for Food & Agriculture, Alliance Bioversity-CIAT presented scientific evidence showing that six of the nine planetary boundaries have already been transgressed, suggesting that earth is now well outside of the safe operating space for humanity, with agriculture contributing significantly to deforestation, biodiversity loss, and ecosystem degradation. He underlined the importance of integrating multifunctional landscape principles into agricultural systems to achieve biodiversity and ecosystem gains, enhance nutrition and food security, and strengthen sectoral connectivity, while managing trade-offs inherent in land-use decisions. \

Dr. Jai Rana, Senior Scientist and Country Representative, Alliance Bioversity-CIAT, India added that the MFL framework is closely aligned with the Sustainable Development Goals (SDGs) and offers an opportunity to accelerate progress through coordinated, cross-sectoral interventions.

Technical Session

The technical sessions introduced Areas of work (AOWs) of MFL, which together provide a pathway from field-level solutions to global engagement. Dr. Gopal Kumar (IWMI) presented the overarching MFL approach and its seven AOWs, highlighting contributions to water use efficiency, greenhouse gas mitigation, governance reforms, and gender inclusivity. He elaborated on AOW1, which promotes nature-positive, agroecological, and nutrition-sensitive solutions through participatory approaches.

Dr. Smitha Krishnan (Alliance Bioversity-CIAT) described AOW2 on landscape planning and governance, featuring "living landscapes" and digital restoration tools such as diversity for restoration (D4R), MyFarmTrees (MFT) while Dr. Mansi Tripathi (IWMI) outlined AOW3 on markets and business models, including the establishment of a Circular Bioeconomy Hub in India and other countries. Subsequent presentations covered AOW4 on Institutions and policy engagement Prapti Barooah (IFPRI) described the policy of national and subnational frameworks for circular bioeconomy, agroecology, aquatic food systems, and nature-based solutions, identifying gaps and opportunities for integration. It emphasizes convergence between PM-KUSUM (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan) and SRLM (State Rural Livelihoods Mission) to scale solar irrigation and enhance rural livelihoods through coordinated, large-scale program implementation, AOW5 on gender equality and youth empowerment (IWMI), AOW6 on performance assessment and evidence generation (ABC), and AOW7 on global engagement and learning. Dr. Ayan Samaddar (WorldFish) provided insights on the nexus between aquatic ecosystems, food production, and environmental sustainability. Dr. Thomas Falk (IFPRI) concluded the session by presenting a vision-to-action approach and iterative management to co-create impact pathways with diverse stakeholders.

The site-specific sessions showcased on-the-ground field interventions for MFL implementation. In the Akole, Shahada, and Igatpuri sites in Maharashtra, Dr. Rajshree Joshi (BAIF) described integrated interventions encompassing agrobiodiversity conservation, soil and water conservation, circularity, waste management and ecosystem restoration, culminating in the launch of a Circular Bioeconomy Innovation Hub. These efforts placed strong emphasis on gender-inclusive agroforestry models and nutrition-sensitive farming systems. Dr. Sachin Nadgude (MPKV Rahuri) presented watershed-level strategies for carbon sequestration, soil erosion control, and climate resilience, stressing the need for long-term monitoring. Future plans include deploying AI-based modelling, geospatial analysis, and GHG hotspot mapping. Complementing these approaches, Dr. V Rajagopal and Dr. Sangram Chavan (ICAR-NIASM) discussed nutrient management in rice systems and the use of agroforestry to restore degraded land.

In Mandla, Madhya Pradesh, Dr. Md. Shamim (ICAR-IIFSR) outlined the adoption of integrated farming systems combining crops, dairy, fishery, horticulture, and poultry that improve biodiversity, sequester carbon, and enhance water use efficiency. Mr. Saurabh Singh (PRADAN) described agroecology homestead models implemented in four villages, focusing on women's self-help groups and tribal farmers. These multilayer farming systems have diversified household incomes, improved nutrition, and strengthened women's leadership roles.

The Sholapur site in Maharashtra, presented by Dr Kaushal Garg (ICRISAT), has adopted regenerative landscape approaches to augment groundwater, develop water budgets, characterise soils, and introduce climate-resilient

cropping systems. Innovations include a water-use calculator to guide irrigation decisions and a monitoring framework to support scaling across dryland regions.

Panel Discussion

The panel discussion on “Multifunctional Landscapes and Rural Development” brought together diverse expertise (Figure 3), with active participation from Dr. Arun Padiyar (WorldFish), Dr. Poonam Khatavkar (ATMA¹), Mr. Hemant Kumbhare (NABARD²), Prof. Gurudas Nulkar (Gokhale Institute of Policy and Economics), and Sh. Vasant Shripati Binawade (Adarsh Gao Sankalp aur Prakalp Samiti) and moderated by Dr. Rajshree Joshi (BAIF).

Dr. Rajshree Joshi opened with emphasizing landscapes are shaped not only by natural processes but also by behavioral aggression from human activities and herbivorous wildlife. Drawing on two decades of research in Maharashtra, she stressed integrating these behavioral aspects into restoration planning.

Dr. Padiyar highlighted the role of inland fisheries in improving dietary diversity, noting their value as a protein and micronutrient source. NFHS³ data shows fish consumption rising from 50% in NFHS-3 to 72% in NFHS-5, with per capita intake at 9 kg annually. Despite schemes like Pradhan Mantri Matsya Sampada Yojana and minor irrigation tanks, yields remain low. He advocated nutrient-sensitive fish farming and better integration into agricultural systems, especially in states like Uttar Pradesh, Bihar, Jharkhand, and Chhattisgarh.

Sh. Shripati Binawade outlined the Ideal Village (Adarsh Gao) model, which has developed 102 villages, targeting 45 more for transformation in the state. The model combines self-help groups, small businesses, infrastructure, and farm ponds, with three years of investment before government programme convergence.

Dr. Poonam underscored knowledge sharing via ATMA’s magazine, Farmer Field Schools, social media, and BAIF’s demystification model. The panel agreed that interventions must align with community aspirations, build natural capital, and encourage reverse migration through transdisciplinary collaboration.

Prof. Nulkar stressed stable land use and community-led governance like social fencing.

Hemanth Kumbhare cited Sikkim as a model blending ecology with high farmer incomes.

In conclusion, MFL’s defining traits include circularity, smallholder focus, nature-positive systems, balanced cropping, integrated water bodies, and modular, adaptable designs for resilient rural landscapes.

With a call to embed biodiversity and ecosystem service gains within agricultural landscapes, strengthen cross-sectoral policy integration, expand gender-responsive and youth-led initiatives, and mobilize resources that support long-term benefits, and landscape- resilience. Participants committed to co-developing and implementing MFL pathways that deliver on productivity, environmental sustainability, and improved rural livelihoods, reaffirming the potential of multifunctional landscapes to contribute to national and global development goals.

In moving forward, large-scale MFL implementation will require a unified agenda to address complex challenges, underpinned by strong bilateral and multilateral partnerships. Ensuring adequate and sustained funding, along with a strategic shift from short-term project-based efforts to long-term program-based approaches, will be essential for achieving lasting impact on landscapes and livelihoods.

“ It is important to consider the constantly changing prices of commodities. Our interventions should ensure that land use and landscape patterns remain stable, even when market values fluctuate. One way to achieve this is through community-based protection models like social fencing. For example, the sacred groves in Dewara are preserved because communities themselves protect them—showing how social fencing can safeguard natural resources against external pressures.”

- Prof. Gurudas Nulkar (Gokhale Institute of Policy and Economics)

¹ Agricultural Technology Management Agency

² National Bank for Agriculture and Rural Development

³ National Family and Health Survey



Figure 3. Experts speaking at panel discussion on Multifunctional Landscapes and Rural Development.

A Collective Journey Forward

The consultation concluded with a collective call to action:

- Co-develop actionable plans for resilient landscapes through participatory codesign workshops, interface meetings and interactions with stakeholders at multiple levels.
- Support resilient livelihoods, healthy diets, and sustainable eco-agrifood systems, all while respecting planetary boundaries.
- Embed biodiversity and ecosystem service gains into agricultural landscapes,
- Strengthen cross-sectoral policy integration, aligning agriculture, water, forestry, fishery, energy, and nutrition.
- Expand gender-responsive and youth-led initiatives, making resilience a shared responsibility across demographics.
- Attention to successful examples such as the Ideal Village (Adarsh Gaon) model, which combines self-help groups, local enterprise development, farm ponds, infrastructure improvements, and the convergence of government schemes to achieve holistic rural transformation.
- Knowledge-sharing emerged as a common priority, with suggestions ranging from farmer field schools and targeted extension services such as digital platforms and publications to make technical information more accessible to communities.

Looking ahead, panellists agreed that scaling MFL approaches requires a shared agenda, long-term funding, and a shift from project-based to programmatic implementation.

The consultation workshop demonstrated that India’s landscapes hold immense potential to become multifunctional engines of resilience, productivity, and sustainability. Achieving this vision will require continuous co-creation, where scientists, policymakers, financial institutions, and communities work side by side. As one participant remarked, “Multifunctional landscapes are not just about managing land—they are about reimagining rural futures.”

The workshop closed with a renewed commitment: to co-develop and implement MFL pathways that enhance productivity, environmental sustainability, and improved rural livelihoods, ensuring that India’s diverse landscapes, from tribal regions, semi-arid zones, or smallholder clusters remain vibrant, inclusive, and resilient for generations to come.

Annexure 1

Agenda

Time	Topic	Lead
09:30 - 10:00	Registration	IWMI team
Opening Session		
10:00 - 10:15	Opening remarks & Context setting	Dr. Alok Sikka, Country Coordinator – MFL India Country Representative-India & Bangladesh/Senior Fellow, IWMI
10:15 - 10:30	Brief remarks	Dr. Carlo Fadda, Lead AoW1 (MFL) Lever Director (Principal Scientist), Biodiversity for Food & Agriculture, Alliance Bioversity-CIAT
10:30 - 10:40	Remarks	Dr. Jai Rana Senior Scientist & Country Representative, Alliance Bioversity-CIAT, India
10:40- 11:00	Tea / Coffee break	
Technical Sessions I – Site Wise		
11:00 - 11:45	Perspective of Multifunctional Landscape in India (7 Areas of Work)	AoW Country Leads (Gopal Kumar, Smitha Krishnan, Muzna Alvi, Ayan Samaddar, Mansi Tripathi, Ramesh Singh)
11:45 -12:00	Co-develop a shared vision and action plan for landscape development	Dr. Thomas Falk Research Fellow - Natural Resources & Resilience, IFPRI
Technical Session (Akole Site)		
12:00 - 12:20	Outcomes of CGIAR Initiative on Nature Positive Solutions (N+) and transition to MFL	Dr. Rajashree Joshi / Mr. Viswadev V S BAIF Development Research Foundation
12:20 – 12:40	Outcomes of N+ initiative and transition to MFL	Dr. Sachin Nandgude Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri
12:40 - 01:00	Outcomes of N+ initiative and transition to MFL	Dr. V Rajagopal & Dr. Sangram Chavan ICAR-National Institute of Abiotic Stress Management (NIASM)
Group photograph		
01:00 – 02:00	Lunch break	
Technical Session (Mandla Site)		
02:00 – 02:20	Outcomes of CGIAR Initiative on Agroecology (AE) and transition to MFL	ICAR-Indian Institute of Farming Systems Research (IIFSR)
02:20 – 02:40	Outcomes of AE initiative and transition to MFL	Professional Assistance for Development Action (PRADAN)
Technical Session (Solapur Site)		
02:40 – 03:00	MFL perspective in Solapur site	ICRISAT Representative
Discussions		
03:00 - 04:00	Panel Discussion on Multifunctional Landscapes and Rural Development	Dr. Poonam Khatavkar (Editor- SHETKARI, Agriculture Technology Management Agency (ATMA), Dept. of Agriculture, Maharashtra) Mr. Hemant Kumbhare (DGM, NABARD, Maharashtra) Prof. Gurudas Nulkar (Director, Centre for Sustainable Development, Gokhale Institute of Policy and Economics) Shri Vasant Shripati Binawade (Deputy Director, Adarsh Gao Sankalp aur Prakalp Samiti, Govt. of Maharashtra). Dr. Rajashree Joshi, BAIF
04:00 – 04:15	MFL Monitoring plan and information collection	Ms. Gulshan Borah Project Coordinator, MFL India
16:15 - 16:30	Wrap up & Way forward	Dr. Alok Sikka Country Coordinator, MFL Program
16:30	High tea and networking	

Annexure 2

List of Participating Organisations

Sl. No.	Name of the Institute	No. Of participants
1	National Bank for Agriculture & Rural Development (NABARD)	1
2	Maharashtra State Biodiversity Board, Pune	1
3	Nanaji Deshmukh Krushi Sanjivani Prakalp, Department of Agriculture, Maharashtra	1
4	ITC Limited	1
5	Centre for Sustainable Development, Gokhale Institute of Politics and Economics	1
6	Agriculture Department, Adarsh Gaon	1
7	Agricultural Technology Management Agency (ATMA)	1
8	BAIF Development Research Foundation	11
9	Professional Assistance for Development Action (PRADAN)	1
10	ICAR-Indian Institute of Farming Systems Research (IIFSR)	1
11	Mahatma Phule Krishi Vidyapeeth (MPKV) Rahuri	6
12	ICAR-National Institute of Abiotic Stress Management (NIASM)	5
13	International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)	2
14	World Fish	2
15	Alliance Bioversity CIAT	4
16	International Food Policy Research Institute (IFPRI)	2
17	Ashoka Trust for Research in Ecology and the Environment (ATREE)	1
18	International Water Management Institute (IWMI)	8



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