International Training on

Systems Approach and Tools to Support Investment Decisions for Scaling Climate Resilient and Sustainable Farm and Food Systems

Organized by
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

under the aegis of
**Indian Technical and Economic Cooperation (IETS)
program of Government of India**

20 to 31 January 2025
ICRISAT, Patancheru, Telangana, India

Background

Promoting food security, climate resilience and sustainable livelihood systems within resource-constrained smallholder farming systems is a major priority for governments, development partners, and the Research and Development institutions globally.

Data-driven decision making considering the local resources, context, and markets enables policymakers and stakeholders to promote context-specific innovations and technologies that support the development of resilient and inclusive farming systems and value chains. Despite the efforts to introduce climate-resilient innovations and technologies, ensuring their widespread adoption and integration remains a significant challenge for various stakeholders.

Numerous improved technologies and practices are being suggested to enhance the performance of complex multi-objective smallholder farming systems. However, these systems are highly heterogeneous and need differentiated interventions and strategies. To achieve transformation towards resilient, profitable, inclusive and environmentally sustainable farm and food systems, it is essential to consider the economic, social, environmental sustainability, as well as human wellbeing dimensions of the smallholder farming systems. Additionally, the inability of the farmers, extension actors, and policymakers to fully visualize the potential impact of different agricultural development strategies on these heterogenous farming systems hinders decisions on investments. This in turn limits progress towards increasing food production, farm profitability and other related objectives over both the short and long-time horizon. An innovations systems approach can help create the necessary conditions to drive demand for technologies, innovations, while also facilitating the use of knowledge to bring about such changes.

An important component of innovation systems thinking is that innovations most often emerge from systems of actors collaborating and communicating. Key to facilitating this dialogue is the use of systems analysis using computer-based simulation tools. In the context of smallholder resource poor agriculture, common and widely applied tools include climate based- crop risk management tools, household bio-economic models' approach (e.g. optimization, cash-flow budgeting), coupled farm-region-national system dynamic models (e.g. value chain model), whole farm dynamic models, multi-dimensional sustainability assessment tool and integrated assessments to develop climate resilient farm and food systems. These tools can be instrumental in promoting climate-resilient farm and food systems.

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The focus of this two-week hands-on training program is on how these tools and approaches are being applied in research for development, particularly in identifying market-led opportunities and developing climate-resilient action plans. Participants will receive practical training on Systems modelling and integrated assessment tools supporting decision making on investments, and technology and enterprise choices across agricultural value chains and food system by various stakeholders including policy makers.

Who should attend?

Participants can be from the National Agricultural Research and Extension System, Government departments such as the department of agriculture, rural development, and animal husbandry, NGOs engaged in agriculture, people from industries related to agriculture, and government policy makers.

Objectives of the course

- To provide skills and hands-on experience on tools and methods to assess climate risk and multidimensional sustainability of farming and livelihood systems
- Design sustainable farming and rural livelihood systems in complex settings and vulnerable regions
- Skills in dynamic modelling and participatory approach to identify leverage points and investment options to improve the performance of agricultural value chains
- To design and scale climate resilient and profitable farming systems and value chains

Outlines of the course
(Topics covered during the course)

- Assessment of climate risk to agriculture and food security at different scales
- Unified approach to design climate resilient farm and food systems (action plans)
- Investment planning for upscaling climate smart agriculture
- Framework and tool for assessing and tracking multi-dimensional (economic, social, environmental) sustainability of farming and livelihoods systems to support transitions to sustainable livelihoods
- Why systems modelling- examples of its application in the real world
- Modelling adaptation strategies for crop-livestock systems in Sub Saharan Africa and Asia
- Tradeoffs and implications for sustainable intensification in dryland agriculture
- Transitioning smallholder farm systems in the semi-arid to cope with climate variability and more frequent extreme events
- Value chain modelling- System dynamics approaches in analyzing and developing inclusive and resilient agricultural value chains in agriculture.

Approach and methodology of training: Experiential learning and two field visits

Number of participants: 30- 35

Application: Prospective applicants from any country except India can be able to apply for the course on the website of ITEC, Govt of India.

ITEC: Indian Technical and Economic Cooperation

Note: The potential candidate after filling the form online, may need to submit copy of the filled application to Indian Embassy/consulate in their country for funding approval.

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International Training on

Landscape Resource Conservation for Achieving Land Degradation and Carbon Neutrality and Sustainability of Smallholder Farming Systems

Organized by
International Crops Research Institute for the Semi-Arid Tropics

under the aggies of
**Indian Technical and Economic Cooperation (ITEC)
program of Government of India**

03 to 23 February 2025
ICRISAT, Patancheru, Telangana, India

Background

Land degradation is one of the major global challenges which is a major cause for water scarcity, poor productivity and low cropping intensity. With increasing global population, technological advancement and changing food habits, there is a significant change in land use. A large part of the forest cover has been converted into grazing and agriculture lands in search of various provisioning services and facilitating urbanization. These changes have been accompanied by negative externalities such as climate change, loss of biodiversity, poor retention ability of the landscape and heavy land degradation. These alterations have influenced the number of planetary boundary conditions which are negatively influencing available natural resources, sustainability and productivity of the landscape at local, regional and global scale. These challenges are catastrophic, especially in uplands, those were historically covered with forest, however, converted into desolated landscapes over the period. In addition, these landscapes largely belong to marginal and small landholders which coincided with high poverty and malnutrition. In the absence of resource availability, inhabitants residing in these areas are compelled to migrate to urban centres in search of their livelihoods leaving behind their valuables and families.

This situation often results in precarious socio-economic conditions including large scale unemployment and delinquency in society.

The landscape resource conservation approach is a promising solution for regenerating desolated landscapes into productive areas which can address the interlinked challenges of food insecurity, malnutrition, poverty along with climate change. This approach supports building groundwater resilience, moisture retention ability, improving baseflow and cropping intensification with carbon neutrality. Once the moisture is made available, farmers develop their interest in agriculture and start adopting a range of climate resilient agricultural technologies to make agriculture a profitable venture. In addition, regenerative landscapes with increased resource availability hold huge opportunity for crop intensification and system productivity. Scaling such good practices will also generate employment opportunities locally catering the need of landless, marginal and vulnerable farming families. This not only enhances the household income but also controls out migration, reduces drudgery and improves the overall quality of living. Scaling regenerative landscapes with climate smart agriculture technologies is the way forward to addressing United Nations Sustainable Development Goals (UN-SDGs) including social equality, peace and harmony.

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Who should attend?

Participants can be from the National Agricultural Research and Extension System, Government departments such as the department of agriculture, horticulture, forestry, rural development, and animal husbandry, NGOs engaged in agriculture, people from industries related to agriculture, and government policy makers.

Objectives of the course

- To reorient a wide range of stakeholders on the landscape resource conservation approach for achieving land degradation neutrality and sustainable crop intensification
- To introduce the concept of land resource inventory along with hydrology in designing and developing landscape-based resource conservation measures along with exposure visits
- To discuss science-policy gap in natural resource management and developing strategies for scaling up

Approach and methodology of training:

This training program will be a mix of classroom teaching, interactive discussions, case study discussion about current challenges and possible solutions. Participants will be taken to the existing project sites to witness the science-led approaches and methods used for addressing various challenges of water scarcity, land degradation and poor agricultural and livestock productivity. Participants will be experiencing the outcome of various good practices of land-water-crop-tree-livestock management those holds huge potential for scaling up. Participants will be facilitated to share their experiences in dealing with such challenges. The program will also cover how complex science outcomes to be used in decision making process in solving various challenges.

Outlines of the course
(Topics covered during the course)

- Landscape Resource Conservation approach for intensification and diversification
- Concept of Land Resource Inventory (LRI) and landscape hydrology
- Integration of Land Resource Inventory and hydrology for addressing demand-supply gap
- Concept of water budgeting (field, watershed, catchment and river basin scale) and its interconnectivity
- Concept of nature-based solution and ecosystem services
- Quantification of ecosystem services and its trade-offs
- Analysing water-energy-carbon nexus
- Study tour to the pilot sites (Lalitpur, Jhansi in Bundelkhand region, Central India) to witness landscape-based resource conservation measures and its impact on building system level resilience
- Traditional rainwater harvesting system of central India (haveli cultivation) for groundwater recharge and transforming agriculture
- Visit to World Heritage Irrigation Structure (Sukwa-Dukwan Dam) at Lalitpur
- Strategies of rainfed and irrigated ecosystems for enhancing resource use efficiency
- Discussion on science-policy gap in natural resource management
- Developing scaling up strategies considering different states (low, medium and high rainfall regions) and different land use and cropping systems

Application:

Prospective applicants from any country except India can be able to apply for the course on the website of ITEC, Govt of India, using the link below:

[ITEC :Indian Technical and Economic Cooperation](#)

Note: The potential candidate after filling the form online, may need to submit a copy of the filled application to the Indian Embassy/consulate in their country for funding approval.

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International Training on
Detection and Integrated Management of Aflatoxin Contamination in Crops for Safe Food and Fair Trade

Organized by
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

Under the aegis of
**Indian Technical and Economic Cooperation (ITEC)
program of Government of India**

24 February 2025 to 07 March 2025
ICRISAT, Patancheru, Telangana, India

Background

Many agricultural commodities are vulnerable to attack by a group of fungi that can produce toxic metabolites called mycotoxins. Among various mycotoxins, aflatoxin contamination of agricultural products has gained global significance because of their deleterious effects on human as well as animal health and its importance to international trade. Aflatoxins are potent carcinogenic, mutagenic and immuno-suppressive agents, produced as secondary metabolites by the fungus *Aspergillus flavus* and *A. parasiticus*. Many food commodities are contaminated by aflatoxins, including cereals (maize, sorghum, pearl millet, rice etc.), oil seeds (groundnut, soybean, sunflower) spices (chillies, black pepper, turmeric, ginger, coriander), tree nuts (almonds, pistachio). Health hazards from the ingestion of aflatoxin contaminated food are much greater in the developing countries than in the developed world. Most developing countries lie in the tropics, where temperature and relative humidity often favor mold growth, and where no or only limited facilities exist for monitoring groundnut and groundnut products for aflatoxin contamination. Developed countries, which import groundnuts, have set aflatoxin contamination limits for foodstuffs ranging from zero to 20 µg/kg and this has resulted in import restrictions on aflatoxin-contaminated produce. As a result, many developing countries have been unable to export their groundnuts and groundnut products.

For exporting countries to satisfy the regulations, they must produce groundnuts with no or extremely low aflatoxin contents. This can only be achieved by following suitable management practices and by storing produce under conditions that minimize the growth of aflatoxin-producing fungi. The research, development and monitoring needed to ensure this is dependent upon having simple, specific and cost-effective methods for the detection and estimation of aflatoxins in various agricultural commodities.

The two-week training program on "**Detection and Integrated Management of Aflatoxin Contamination in Crops for Safe Food and Fair Trade**" can have a multifaceted impact, touching on economic, nutritional, and social aspects. By equipping participants with the necessary skills and knowledge, it has the potential to improve food safety, trade and thus public health across the globe.

Who should attend?

Research workers actively involved in food safety and/or crop improvement programs in the universities and industries of Global South representing sub-Saharan Africa, Latin America and the Caribbean, South and South-east Asian countries. Participants from Departments of Agriculture and Veterinary Science, NGOs engaged in agriculture, personnel from food and feed industries, agricultural

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commodity exporters, traders and government policy makers will also be ideal for this training program.

Objectives of the course

- To provide hands-on training to the participants using laboratory assays on quantifying aflatoxins in agricultural commodities
- To provide necessary technical know-how on setting up of laboratories, monitoring aflatoxin contamination along the crop value chains and possible management approaches

Outlines of the course (Topics covered during the course)

- Hands-on training on quantification of aflatoxins using immunoassays like competitive ELISA
- Sampling strategies
- Screening groundnut seed for resistance to *Aspergillus flavus* infection and subsequent aflatoxin contamination
- Host plant resistance to *A. flavus* infection and aflatoxin contamination
- Knowledge of the health-related problems associated with chronic exposure to aflatoxin contaminated food
- Good Agricultural Practices (GAPs) that include pre-harvest and post-harvest measures to reduce aflatoxin contamination in crops.
- Transfer of technology: case studies

Approach and methodology of the course: Hands-on training in the laboratory and classroom lectures

Number of participants: up to 35

Application:

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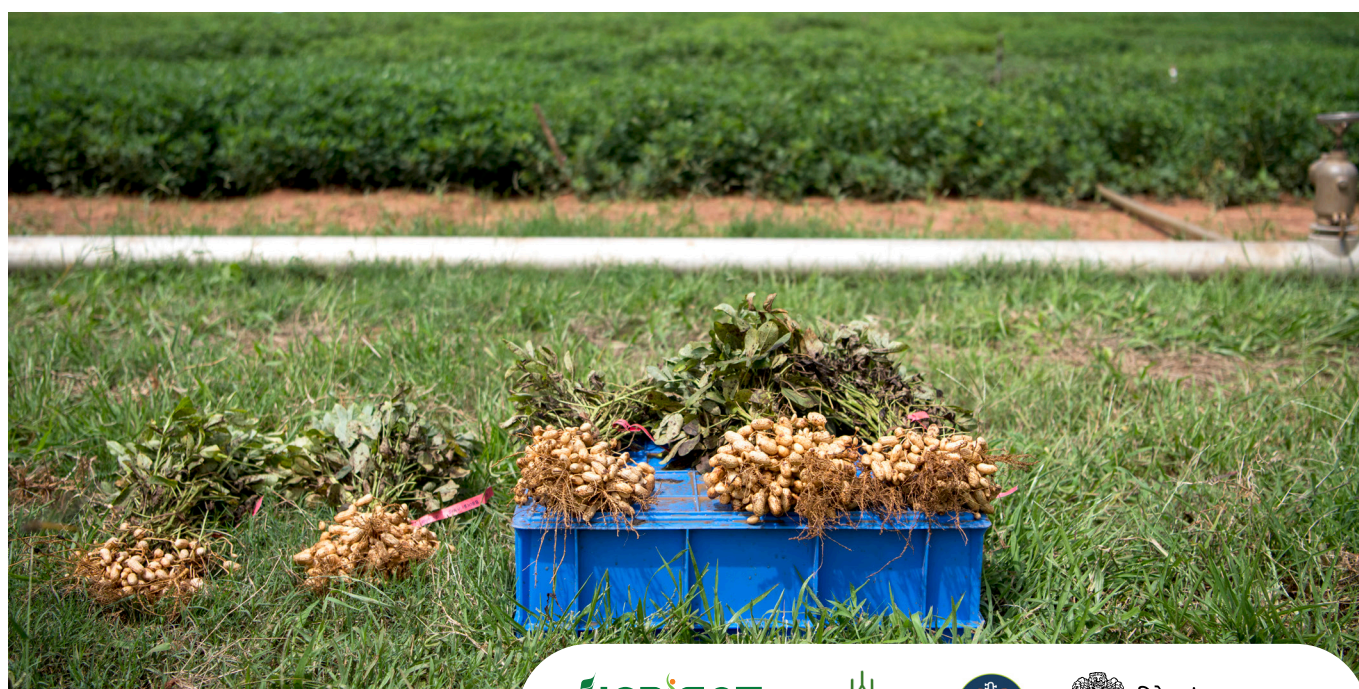
International Training on Gender Equality and Social Inclusion Principles in Research for Development

Organized by
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

Under the aegis of
Indian Technical and Economic Cooperation (ITEC)
program of Government of India

10-21 March 2025
ICRISAT, Patancheru, Telangana, India

Background

Nurturing gender and social inclusion is paramount for addressing the triple challenge within food systems: ensuring food security and nutrition for a growing population, supporting the livelihoods of millions in the food supply chain, and promoting environmental sustainability. However, achieving gender equality and social inclusion (GESI) remains a persistent challenge across various domains.

To tackle these challenges, we are organizing a comprehensive training course aimed at sensitizing all stakeholders on GESI principles within the context of research for development. The primary objectives of this training are to promote awareness and understanding of gender equality and social inclusion principles and to integrate these principles into different components of projects, programs, and policies. The training course is designed to provide a safe and inclusive space for participants to explore and discuss the concepts of gender equality and social inclusion. Through raising awareness and fostering dialogue, our goal is to empower individuals to challenge gender norms, stereotypes, and discriminatory practices, while also understanding privilege and power dynamics inherent in research for development activities.

The rationale behind this course is to identify and bridge evidence gaps regarding gender aspects within research for development, with the ultimate aim of advancing women and marginalised groups'

contributions to food systems. By equipping participants with the tools and knowledge to integrate GESI principles into their research endeavors and development practices, we aim to foster more inclusive and equitable outcomes within food systems, nutrition, environmental sustainability and beyond.

Who should attend?

The training program is designed for a diverse range of stakeholders involved in agriculture and related sectors. Ideal participants include representatives from farmer organisations, government departments such as Agriculture and Veterinary Science, as well as NGOs actively engaged in agricultural development. Additionally, farmers, individuals from food, feed, doctoral and post graduate students, and agricultural commodity exporting and trading sectors, and government policymakers are encouraged to attend. Research workers who are actively involved in agriculture and food systems, both within universities and industry settings, will also find this training beneficial.

Geographically, the training program targets participants primarily from low and middle-income countries (LMICs) in Asia and sub-Saharan Africa. By focusing on regions where gender equality and social inclusion challenges are particularly pronounced, we aim to provide targeted support and capacity-building opportunities to enhance research for development practices and outcomes in these areas.

Objectives of the course

- Increased awareness and understanding of gender equality and social inclusion
- Enhanced ability to recognize and address gender biases and stereotypes
- Empowered individuals who actively promote gender equality and social inclusion in their communities and workplaces.

Outline of the course

- Introduction to Gender Equality and Social Inclusion
- Language as a tool for inclusivity
- Recognizing privilege and its influence on social structures
- Creating inclusive spaces in workplaces and communities
- Developing action plans for personal and collective change.

Approach and methodology of training

The training course will utilize a combination of visual aids, case studies, videos, and interactive exercises to engage participants and facilitate their learning experience.

Learning Outcomes

Participants will gain a deeper understanding of the importance of gender equality and social inclusion. They will also develop practical skills to promote gender equality and inclusivity, and challenge gender-based biases and thereby contribute to evidence-based decision-making for transforming the perceptions of their workplaces and communities regarding gender equality, power relationships, and inclusivity.

Number of participants: 35

Application: Prospective applicants from any country except India can be able to apply for the course on the website of ITEC, Government of India.

Link: ITEC :Indian Technical and Economic Cooperation

Note: The potential candidate after filling the form online, may need to submit a copy of the filled application to the Indian Embassy/consulate in their country for funding approval.

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