

MANAGE Agricultural Extension "Evening4Learning (E4L)" Webinar Series

Topic: "Innovative Agricultural Extension Approaches for Climate-Resilient Agriculture"

Schedule:
22-11-2022, 19:00-19:45 PM

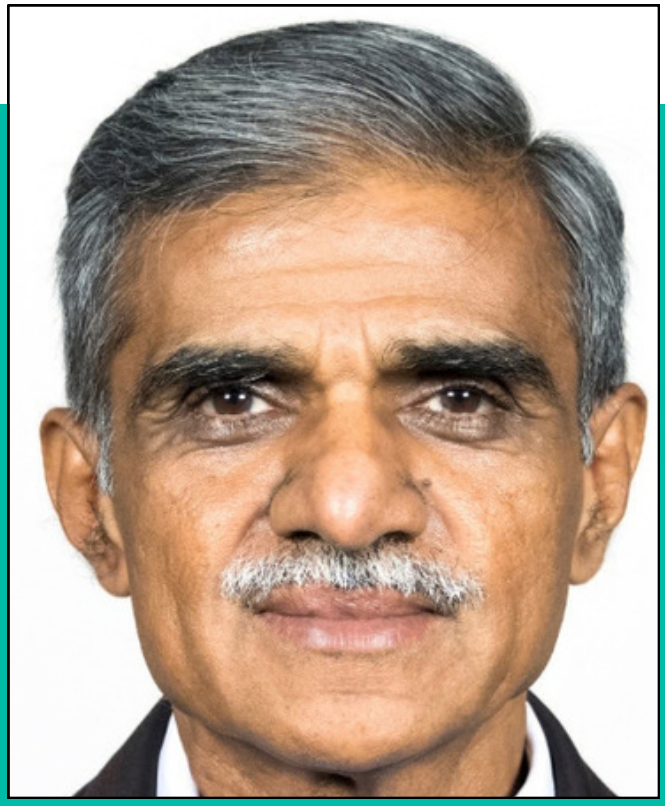
MANAGE - Center for Agricultural Extension Innovations, Reforms and Agripreneurship (MANAGE- CAEIRA)
National Institute of Agricultural Extension Management (MANAGE)
Rajendranagar, Hyderabad- 500 030, INDIA



About the Program

The MANAGE Agricultural Extension "Evening4Learning" Webinar Series is aimed at enhancing knowledge and professional engagement in the field of agricultural extension. The twelve-day series is structured with each day focusing on a distinct topic under a common theme, allowing participants to gain comprehensive insights into key areas of extension. The program is intended for a diverse audience, including postgraduate and doctoral students, agricultural faculty, and industry professionals. It covers broad themes ranging from entrepreneurship and sustainability to emerging technologies in agriculture.





Speaker

Dr. Sreenath Dixit
Principal Scientist
ICRISAT
D.Sreenath@cgiar.org

Sreenath Dixit

About the Speaker

Dr. Sreenath Dixit, Principal Scientist, ICRISAT Development Center (IDC), Hyderabad is an experienced agricultural extension and development professional with over three decades of expertise in agricultural research, extension, natural resource management, climate-resilient agriculture and rural development. He holds a Ph.D. in Agricultural Extension from the University of Agricultural Sciences, Bengaluru, and has served in various capacities within ICAR, including at CRIDA, Hyderabad, and as Director of ATARI, Bengaluru. His professional interests include participatory natural resource management, sustainable livelihoods, climate-change adaptation, ICT-enabled extension and farmer-centric technology dissemination. Through his research and development initiatives, he has contributed to strengthening climate-resilient, partnership-based and impact-oriented agricultural extension systems.

Introduction

Climate change is increasingly influencing agricultural production systems through changes in rainfall patterns, temperature regimes, drought frequency, extreme rainfall events and the length of the crop-growing period. These changes have significant implications for agricultural livelihoods, natural resource management and the delivery of effective agricultural extension and advisory services.

There is a growing need for agricultural extension professionals to move beyond conventional production-oriented approaches and develop a deeper understanding of climate processes, weather data, natural resource management and livelihood systems. Extension professionals have an important role in interpreting technical knowledge and translating climate-related information into simple, practical and locally relevant messages for farmers and communities. The effective climate change extension requires technical understanding, data interpretation skills, systems thinking, stakeholder engagement and the ability to facilitate locally appropriate solutions.

Changing Climate and Implications for Agriculture

Several changes in rainfall behaviour have been observed over recent decades. These included delayed onset of the monsoon, weakening and sporadic distribution of rainfall after its onset, increasing frequency and duration of intermittent dry spells, increasing incidence of high-intensity rainfall events and earlier cessation of the monsoon. Together, these changes can result in a shorter effective crop-growing period and increase risks to agricultural production.

The changes differ with the climatic characteristics of different landscapes. Areas previously considered semi-arid or sub-humid may experience shifts in rainfall conditions, while extreme rainfall events can cause damage to crops, property and livelihoods. These changes demonstrate the importance of understanding local climate variability rather than relying only on broad averages.

Strengthening Climate Knowledge among Extension Professionals

Extension professionals working on climate change need a strong understanding of the technical dimensions of climate and weather. Examining long-term weather data, particularly rainfall behaviour, is essential for understanding emerging trends and communicate their implications effectively to farmers.

Extension professionals therefore need to develop the ability to:

- Understand local weather and climate patterns.
- Analyse and interpret historical weather data.
- Translate technical climate information into simple farmer-oriented messages.
- Link climate information with crop, livestock and natural resource management decisions.
- Identify locally relevant adaptation opportunities.
- Facilitate coordination among technical experts, institutions and farming communities.

The extension professionals should be able to connect technical knowledge from different disciplines and translate it into practical action at the field level.

Opportunities Emerging from Climate Variability

Climate variability, while creating significant risks, may generate opportunities in certain contexts. For example, increased high-intensity rainfall can create opportunities for rainwater harvesting and storage so that surplus water can be made available during subsequent dry spells.

The importance of managing the imbalance between water surplus and deficit should be recognised. This requires strengthening the capacity of landscapes, communities and extension professionals to plan, conserve, harvest and efficiently utilise available water resources. Farmers can also be encouraged to adopt water recycling and improved water-management practices. However, the observed changes should not automatically be treated as permanent shifts without sufficient evidence. Continuous observation and analysis of reliable data are necessary before drawing conclusions regarding long-term climatic patterns.

Case Study: Climate-Resilient Agricultural Development in Bundelkhand, Uttar Pradesh

The intervention was undertaken in response to the challenge of improving farmers' incomes in a climate-vulnerable and resource-constrained landscape.

Bundelkhand was described as a semi-arid region characterised by water scarcity, high levels of soil and land degradation, poor water and land-use efficiency, low soil organic carbon, low productivity, inadequate mechanisation, low livestock productivity and limited awareness regarding improved crop, livestock and resource-management practices.

The case study also highlighted changes in rainfall patterns, including a decline in average annual rainfall and an increase in the frequency and duration of dry spells. These climatic conditions were considered alongside existing constraints related to soil, water, land and agricultural productivity.

Landscape-Based Approach

The intervention adopted a landscape and hydrological-unit approach rather than addressing individual farm-level problems in isolation. A degraded landscape was identified as a hydrological unit, and the intervention focused on understanding existing water bodies, traditional water-harvesting practices and opportunities for improving them.

Villages were selected across several districts and blocks, with emphasis on contiguous villages within the identified landscape. The approach began with natural resource management interventions, particularly restoration and improvement of traditional rainwater-harvesting systems.

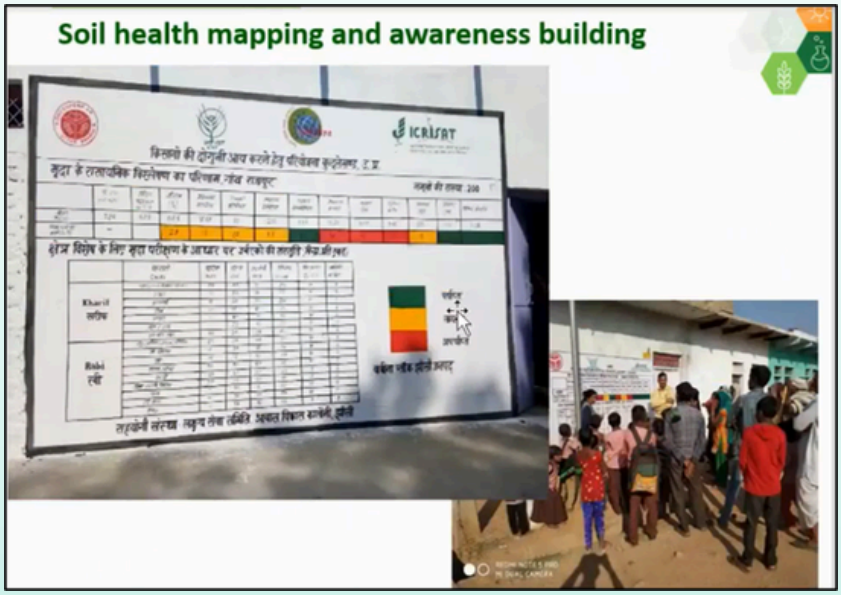


Soil Health and Crop-Based Interventions

Science-based interventions were used as entry points for engaging farmers. Soil samples were collected and analysed to identify deficiencies in primary, secondary and micronutrients. The results were communicated to farmers and followed by crop demonstrations so that farmers could observe the benefits of soil-test-based recommendations.

Soil health information was communicated through local-language materials, wall writings and soil health cards. These approaches helped create awareness about nutrient deficiencies and supported farmers in making informed crop and nutrient-management decisions.

Crop demonstrations were undertaken as integrated packages rather than as isolated technology demonstrations. These included land treatment, slope correction, nutrient management and improved crop varieties. Experiential approaches such as crop-cutting exercises were also used to enable farmers to observe crop performance throughout the production cycle.



Water Conservation and Natural Resource Management

Water conservation was identified as a central component of climate-resilient agriculture in the region. Initial interventions included relatively simple measures such as laser land levelling and zero tillage to improve water-use efficiency. As farmers gained confidence, larger investments in rainwater harvesting and landscape-level water management were introduced.

The approach also involved the restoration and improvement of traditional water-harvesting structures and clearing of drainage systems. Technical knowledge related to catchment characteristics, hydrology, stream networks and drainage systems was incorporated into landscape-level planning.



Role of Extension in Scaling Climate-Smart Technologies

Technology alone does not ensure successful climate adaptation. Extension plays an important role in creating the institutional, social and human conditions required for technologies to be adopted and sustained.

A key strategy was the identification and development of local human resources. Local masons and youth were trained and engaged in implementing natural resource management interventions. Their involvement enabled skills and technologies to move from one village to another and created local capacities for continued action.

The intervention also involved women, youth and schoolchildren to strengthen community awareness, ownership and visibility of the initiative. The importance of effective logistics, stakeholder coordination and community participation in implementing landscape-level interventions needs to be emphasized.

Both physical and biological measures were promoted for soil and water conservation. The approach also encouraged farmers to make long-term investments in natural resources by linking present conservation efforts with future livelihood and household needs.

Implications for Agricultural Extension

The important implications for the changing role of extension professionals in the context of climate change.

1. Evidence-Based Extension

Extension professionals need to develop a strong orientation towards weather and climate data. Historical and current data should be used to understand local climate variability and guide appropriate interventions.

2. Systems and Landscape Approach

Climate change cannot be addressed through isolated crop-level interventions. Extension professionals need to understand the interactions among soil, water, crops, livestock, livelihoods, institutions and the broader landscape.

3. Linking Climate Change with Livelihoods

Climate adaptation should be closely connected with livelihood resilience. Extension interventions should consider not only productivity but also farmers' capacity to withstand and recover from climatic shocks.

4. Shift from Yield Maximisation to Loss Minimisation

There should be a shift in extension thinking from an exclusive focus on maximising yield towards reducing losses and strengthening resilience under uncertain climatic conditions.

5. Promotion of Diversification

Diversification was identified as an important strategy for coping with climate variability. Combining short-term adaptive measures with long-term investments can help communities manage climate-related risks more effectively.

6. Resource-Use Efficiency

Extension professionals need to focus increasingly on efficient use of natural resources, including soil, moisture, irrigation water and nutrients. Recycling of farm waste and wastewater can also contribute to resource conservation and resilience.

Emerging Competencies for Climate-Responsive Extension

Future extension professionals need competencies that extend beyond conventional technology transfer. Important competencies include:

- Climate and weather literacy.
- Data interpretation and evidence-based decision-making.
- Natural resource management.
- Hydrological and landscape-level understanding.
- Climate-resilient crop and livestock management.
- Community mobilisation and facilitation.
- Stakeholder coordination and partnership building.
- Local capacity development.

- Risk management and resilience planning.
- Resource-use efficiency and circular approaches.
- Communication of complex climate information in simple language.
- Systems thinking and interdisciplinary problem-solving.

These competencies can help extension professionals to position themselves as specialised climate-change extension practitioners capable of facilitating adaptation and resilience-building processes.

Key Highlights

- Climate change is altering rainfall patterns and increasing agricultural risks, including delayed monsoons, prolonged dry spells, high-intensity rainfall events, and shorter crop-growing periods, requiring extension professionals to develop climate-responsive advisory approaches.
- Extension professionals need stronger climate and weather competencies, including the ability to analyse long-term weather data, interpret climate information, and translate technical knowledge into practical and locally relevant advisories for farmers.
- The Bundelkhand case study demonstrated the effectiveness of a landscape-based approach that integrated natural resource management, rainwater harvesting, soil health improvement, and community participation to enhance climate resilience and agricultural productivity
- Technology alone cannot ensure climate adaptation; effective extension is essential for mobilising communities, developing local capacities, coordinating stakeholders, and creating the institutional conditions necessary for sustainable adoption of climate-smart practices.
- The role of agricultural extension is shifting from technology transfer to climate resilience facilitation, emphasizing evidence-based decision-making, systems thinking, livelihood resilience, diversification, resource-use efficiency, and landscape-level planning.
- Future climate-responsive extension professionals require interdisciplinary competencies, including climate literacy, natural resource management, stakeholder coordination, risk management, community mobilisation, and the ability to communicate complex climate information in simple language.

YouTube Link: https://youtu.be/AC2LFWHNosk?t=2

E4L Report Prepared by:
Dr. Vavilala Priyanka
MANAGE Fellow