

Background Note: Training on Climate Resilient Integrated Watershed Management

Introduction

Over 80% of India's population resides in districts prone to climate-induced disasters. Rising temperatures, shifting rainfall patterns, depleting groundwater levels, retreating glaciers, severe cyclones, and rising sea levels could lead to significant crises for livelihoods, food security, and the economy. Urban areas are not exempt from the effects of global warming. Densely populated cities, especially those with unplanned urbanization, are increasingly at risk from extended periods of extreme heat, flooding, and disease. The changing rainfall patterns and higher temperatures threaten the livelihoods of many rural Indians and the sustainability of the country's food production systems. These changes indicate a higher risk for water resources and highlight the need for adequate and responsive water resources planning and management with the increased susceptibility to flooding and drought events, which are expected to become more frequent and severe in the future.

The Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) 2.0, with its emphasis on watershed development, plays a pivotal role in strengthening rural livelihoods and ensuring water security across India. As we navigate the increasing challenges posed by climate change, it is imperative that stakeholders engaged in the watershed management are equipped with the latest knowledge and innovative approaches to effectively implement the program's objectives.

The escalating impacts of climate variability, including erratic rainfall patterns, increased frequency of droughts and floods, and rising temperatures, are directly affecting the productivity and sustainability of the watersheds. Furthermore, current agricultural practices are largely inefficient and often contribute to resource depletion and environmental degradation.

To counter these challenges, there is a need to adopt innovative solutions that promote climate-resilient infrastructure, foster sustainable agricultural practices, and optimize the use of natural resources. This proposed training program is designed to address the critical need for building capacity in key areas such as climate resilience, sustainable agriculture, and efficient water resources management. It aims to provide participants & stakeholders with a comprehensive understanding of cutting-edge technologies, best practices, and participatory approaches to climate resilient watershed management. By empowering participants with the knowledge and skills to implement innovative strategies, the training program aims to support the long-term success of PMKSY 2.0.

Objective

The main objective of the training program is to enhance the capacities and knowledge base of the participants & stakeholders with cutting-edge technologies & best practices, necessary to effectively implement climate-resilient and integrated watershed management practices, as mandated by PMKSY 2.0, through innovative solutions and community engagement.

Sessions

The thematic focus of the proposed training is ‘**Climate Resilient Integrated Watershed Management**’. Following topics are proposed to be covered in this one-day training session

1. **Technical Session I: Environment Conservation: Agroforestry as a Nature-Based Solution for Climate Change Mitigation**

Under this session, the participants will be equipped with knowledge on agroforestry's role in climate change mitigation, sustainable land and water management, and biodiversity enhancement. The training will cover practical agroforestry models, carbon sequestration potential, biomass estimation across five carbon pools, and relevant policies and financial incentives to support farmers. This will lead to the improved capacity of the participants to integrate agroforestry into land and water management for climate resilience. It will further aid in identification of nature-based adaptation and mitigation strategies to enhance carbon sequestration, biodiversity, and rural livelihoods. Enhanced understanding of agroforestry's economic benefits for farmers, including diversified income sources for doubling farmer's income.

2. **Technical Session II: Integrated watershed management: Climate-Smart Watershed Management: Integrating modern tools with participatory approach**

Participants will gain a comprehensive understanding of the principles and practices of integrated watershed management, including water resource assessment, land use planning, and ecosystem management. The session will cover topics such as participatory planning, community mobilization, and the use of geospatial technologies for watershed characterization (hydrological processes, land use patterns, and socio-economic dynamics) and monitoring. Emphasis will be placed on integrating climate-smart solutions, promoting sustainable livelihoods, and ensuring equitable access to water resources. Climate smart solutions including drought-tolerant crops, water-efficient irrigation (drip, sprinkler), soil health management as well as integrated farming systems such as agroforestry and livestock integration, to diversify income sources and enhance resilience to climate shocks will be introduced to the participants. Further, the need for enhancing water resources through rainwater harvesting (structures like check dams, farm ponds, and percolation), groundwater recharge, water-saving technologies and practices and water quality management will also be highlighted.

3. **Technical Session III: Innovative solutions for climate resilience: Smart Water Management: Integrating IWRM, NbS, and IoT for a Sustainable Future**

For a sustainable future, climate-resilient strategies are essential. Through this session, the participants will be exposed to a multi-faceted approach incorporating principles of Integrated Water Resources Management (IWRM), Nature-based Solutions (NbS), evidence-based decision making, advanced technologies, and the Internet of Things (IoT) to provide optimal solutions. Additionally, they shall also be briefed on the crucial role of demand management strategies, capacity building, and

stakeholder awareness. The need for establishing robust systems for the continuous monitoring of water resources and climate data using AI based approaches will also be highlighted. These will be useful for meteorological and hydrological stations and further utilizing advanced technologies such as remote sensing and GIS for better data accuracy which would be vital for resilient water infrastructure. Furthermore, the role of constructing new storage facilities, repairing existing ones, and implementing modern irrigation techniques to optimize water use will also be emphasized.

4. **Technical Session IV: Sustainable agriculture: *Climate-Resilient Agriculture: Micro-Irrigation and Water Conservation***

This session will discuss about the mechanisms to improve health and wealth of agriculture and farmers in the rainfed areas wherein the farming practices can be supported through enhanced irrigation efficiencies. Methods such as integrating small water harvesting structures with micro-irrigation systems, giving life-saving irrigation to crops, etc. will be highlighted during the session. The benefits of such mechanisms such as improved water use efficiency, increased crop yield, reduction in input costs, water conservation, enhanced soil health, and increased resilience to climate change will also be discussed.