



**Climate Adaptation and Resilience
(CARE) for South Asia Project**

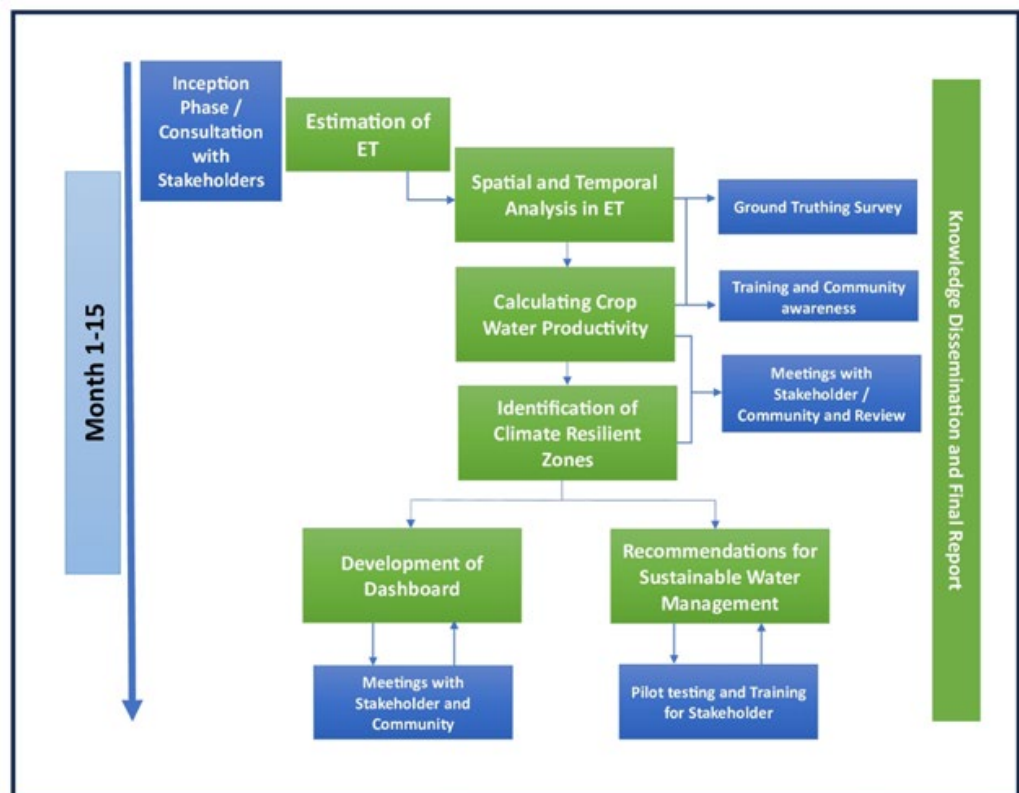
Innovations in Climate Adaptation and Resilience (iCARE)

**Calculating Evapotranspiration using GIS and Remote
Sensing Techniques for Calculating Crop Water
Productivity in Sindh Province, Pakistan**

Project Name	Calculating Evapotranspiration using GIS and Remote Sensing Techniques for Calculating Crop Water Productivity in Sindh Province, Pakistan
Lead Organization Name	Asian Institute of Technology, AdaptX
Country of Implementation	Pakistan
Summary Description	<p>This study assumes paramount importance in addressing the role of water in sustaining agriculture and livelihoods within Sindh Province. The region faces intensified challenges due to irregular rainfall patterns and excessive groundwater extraction, exacerbating water scarcity and posing a substantial threat to food production, economies, and overall well-being. The vulnerabilities intensify the risk of communities falling into poverty and hunger.</p> <p>The core objective of this project is to tackle the pressing water challenges in Sindh Province, with a primary focus on agricultural and Integrated Water Resource Management. Using advanced remote sensing, GIS, and nature-based solutions (NbS), our holistic approach aims to accurately estimate evapotranspiration (ET) – a crucial metric for understanding plant water needs. This initiative holds promise for promoting efficient irrigation management, optimizing water usage, reducing waste, and fostering sustainable agricultural practices.</p> <p>The project encompasses several key components, including the estimation of ET, analysis of spatial and temporal variations in ET across diverse crops, assessment of crop water productivity (CWP) and efficiency, identification of climate-resilient water use zones, and the provision of actionable recommendations for sustainable water management practices. By integrating these elements, our project seeks to enhance the understanding of water dynamics, encourage efficient water use, and contribute to climate resilience.</p> <p>Anticipated outcomes of the project include the development of spatially explicit maps, delineation of efficient water use zones, and the creation of a user-friendly IT-based dashboard. These tools will facilitate informed decision-making for stakeholders, particularly benefiting the concerned department. The project aims to improve the understanding of crop water productivity for major crops in the region, enabling the application of</p>

informed irrigation water management in the region. Farmers will benefit from increased awareness of the crop-water relationship, leading to higher yields and improved food production, specifically in rice and wheat cultivation.

This project aligns with key Sustainable Development Goals (SDGs) and endeavors to create an enabling environment for climate adaptation and resilience in policies, planning, and investments. Through widespread knowledge dissemination and collaborative learning, our initiative seeks to inform future research endeavors and contribute to the continuous improvement of water-efficient agriculture within Sindh Province.



Expected Outcome

The expected outcomes of the project includes:

- Improved water management in Sindh Province through remote sensing and GIS-based comprehensive evapotranspiration (ET) estimation, facilitating sustainable agriculture in the province.
- Stakeholders empowered with insights on spatial and temporal ET variations, guiding strategic water allocation, crop planning, and climate-resilient agriculture in Sindh.

	<ul style="list-style-type: none"> ● Evaluation of crop water productivity informs decision-making, aligning water management with sustainable agriculture and climate goals in Sindh Province. ● Strategic delineation of climate-resilient water use zones offers insights for enhancing water efficiency in Sindh's agriculture, particularly water management in the identified zones. ● An IT-based dashboard disseminates research outcomes, aiding farmers, policymakers, and researchers in informed decision-making for sustainable water management and nature-based solutions. ● Knowledge dissemination and training on integrated water resource management and climate strategies empower stakeholders, contributing to informed decision-making and the advancement of water-efficient agriculture in Sindh. <p>This initiative aligns with key Sustainable Development Goals (SDGs), including Goal 1 (No Poverty), Goal 2 (Zero Hunger), Goal 6 (Clean Water and Sanitation), and Goal 13 (Climate Action).</p>
Partner Government Agency(ies)	<ul style="list-style-type: none"> ➤ Irrigation Department, Government of Sindh The irrigation department will play an important role in the project water management initiative in the province through data collection support, collaboration in farmers awareness trainings and surveys, sharing of data and knowledge about the regulation of water to the crops according to their requirements, water allocation in climate resilient zones, Incorporation of ET in water resource management, infrastructure development. ➤ Sindh Province, Pakistan ➤ District Jamshoro ➤ District Dadu ➤ District Larkana ➤ District Shikarpur District Jacobabad
Project duration	15 Months

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