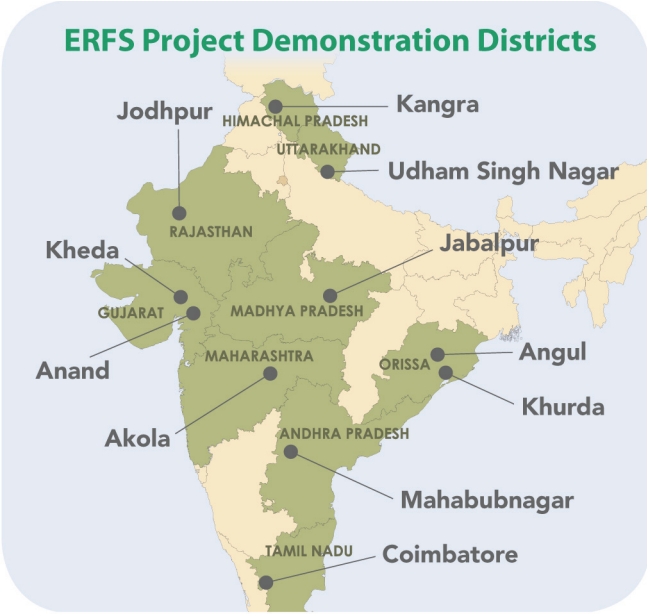
CLIMATE RISK MANAGEMENT AND AGRICULTURE IN INDIA: LIVING WITH AN UNCERTAIN MONSOON

In India, where over 60% of agricultural land is rainfed, a failed monsoon causes crippling impacts in rural communities. Farmers often face a complete loss of crops, threatening livelihoods and food security, and pushing already-stressed areas into further poverty. Nationally, GDP drops and the government spends massive sums on drought relief for farmers. The magnitude of these human and economic costs – particularly as concern grows over the potential for climate change to increase extreme weather patterns – has highlighted the need to better manage climate risks and find ways to plan ahead.

The majority of India's over 100 million farming households depend upon the summer monsoon to water their crops from June through September. Advance information about the likely character of the upcoming monsoon season could be very helpful to both farmers and policy makers. They need information relevant to their specific region, and about specific climate variables that affect crop management and agriculture policy decisions. In addition to seasonal and sub-seasonal rainfall forecasts, analysis of past climate patterns, like timing of monsoon onset and dry or wet spells, at appropriate scales can help decision-makers better understand the climate risks they face.



The International Research Institute for Climate and Society (IRI) is partnering in an innovative new research effort led by the Government of India, aimed at addressing these challenges. The Extended Range Forecast System for Climate Risk Management in Agriculture, or "ERFS," supported by the Department of Agriculture Cooperation, Ministry of Agriculture, seeks to improve monsoon forecasts and demonstrate approaches to using tailored climate information to benefit agriculture and rural livelihoods. The project includes demonstration districts in nine states (see map) affected by the monsoon.

Leading partners in India include the Indian Institute of Technology (IIT) Delhi, which serves as project secretariat, the India Meteorological Department (IMD); the National Centre for Medium Range Weather Forecasting, the Indian Council of Agricultural Research, and state agriculture universities. IRI is the lead international agency working on the project, contributing climate and agricultural expertise as well as coordinating inputs from other leading international research centers such as the European Centre for Medium-Range Weather Forecasts (ECMWF), the Japan Agency for

CONTACT

Erica Allis
Coordinator, Asia and Pacific Regional Program
eallis@iri.columbia.edu

International Research Institute for Climate and Society
Earth Institute,
Columbia University
61 Route 9W
Palisades, NY 10964-8000 USA

Ph: +1.845.860.4465
Fx: +1.845.680.4866
www.iri.columbia.edu

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

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Project work aims to benefit farmers by reducing the impacts of droughts, floods, and an uncertain monsoon; Surendranagar district, Gujarat. (Esther Conrad/IRI)

"Forecasting the monsoon is quite complex, especially at 1-to-2-month lead times or sub-national scales. And climate information alone isn't enough. It needs to be connected with decision opportunities, enabled by local institutions and sufficient resources for action by farmers."

Dr. L. S. Rathore
Director, IMD's Agro-Meteorology Division

Marine Earth Science and Technology (JAMSTEC), Wageningen University, and others.

In the area of climate science, the project will test new approaches to forecasting the Indian monsoon, which is notoriously challenging to predict. A new experimental "ensemble" forecast is being developed, combining outputs from multiple models from globally-recognized climate research centers. IRI and scientists from the India Meteorological Department and Indian Institute of Technology Delhi are also developing methodologies to create forecasts at a smaller scale and investigating the potential for information such as the likelihood of dry or wet spells and monsoon breaks, information that is crucial for farmers.

In the demonstration districts, researchers at state agriculture universities are identifying specific climate-related agricultural risks, and the decision options of farmers and local officials, such as adjusting crop timing, seed type, and fertilizer use. IRI scientists are working with researchers at Anand Agriculture University in Gujarat and the Acharya N. G. Ranga Agriculture University in Andhra Pradesh to analyze the impacts of climate variability on maize, cotton, groundnut and other key crops, and map out climate risk management opportunities. Work at these two sites will help demonstrate an approach for all nine districts. IRI is also working closely with partners in India to organize project-wide trainings and workshops in both climate science and agriculture risk management.

Through this project, the India Meteorological Department and state agriculture universities hope to expand the kinds of climate information they offer to farmers through the National Agro-Meteorological Advisory System. IRI and its partners are also identifying ways to integrate climate information into specific agricultural planning and drought-relief preparation policies. With 60% percent of India's population dependent on agriculture

ABOUT THE IRI

The IRI works on the development and implementation of strategies to manage climate related risks and opportunities. Building on a multidisciplinary core of expertise, IRI partners with research institutions and local stakeholders to best understand needs, risks and possibilities. The IRI supports sustainable development by bringing the best science to bear on managing climate risks in sectors such as agriculture, food security, water resources, and health. By providing practical advancements that enable better management of climate related risks and opportunities in the present, we are creating solutions that will increase adaptability to long term climate change. IRI is a member of the Earth Institute at Columbia University.