

Government's first-of-its-kind AI-based weather forecasting program for agriculture, reaching 3.8 crore farmers

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Crores of farmers across India depend on rainfall for Kharif farming—their main source of income and livelihood. If farmers receive advance forecasts about the monsoon, it can help them make better decisions about what to plant, how much, and when. This is now possible, thanks to a revolution in weather forecasting driven by artificial intelligence (AI).

The Ministry of Agriculture and Farmers' Welfare (MoAFW) is harnessing the power of AI for farmers. In a novel public initiative, MoAFW sent AI-based monsoon forecasts via SMS (m-Kisan) to nearly 3.8 crore farmers across 13 states this year. This forecast was available earlier than ever before—up to four weeks ahead of the rain. AI-based models made it possible to design forecasts specifically for farmers' needs, giving farmers a critical tool for planning their Kharif agricultural decisions. This is the first-of-its-kind targeted dissemination of AI weather forecasts to date, marking MoAFW as a world-leader in applying AI weather forecasting to directly benefit farmers.

In a program review meeting held at Krishi Bhavan on September 8, the Additional Secretary Dr. Pramod Kumar Meherda, and Joint Secretary Shri Sanjay Kumar Agarwal met with Nobel Laureate and University of Chicago Professor Michael Kremer to discuss the groundbreaking initiative by the Ministry and the expansion of the program. Additional Secretary Dr. Meherda remarked, "This program harnesses the revolution in AI-based weather forecasting to predict the arrival of continuous rains, empowering farmers to plan agricultural activities with greater confidence and manage risks. We look forward to continuing to improve this effort in future years."

This year, the monsoon arrived early but there was a pause in the northward progression—stalling rains mid-season for 20 days. The AI-based forecasts distributed by the MoAFW correctly identified this pause in monsoon progression. The government sent updated information to farmers every week until continuous rains arrived in their area. "As climate change increases weather variability, forecasts are a useful tool to help farmers adapt", said Joint Secretary Shri Sanjay Kumar Agarwal.

AI Revolution in Weather Forecasting

Since 2022, an AI-driven revolution has transformed the science of weather forecasting, delivering more accurate predictions in many settings. These models can be tailored to meet user needs and are enhancing our ability to predict complex phenomena, such as the Indian monsoon, weeks in advance. MoAFW has taken a major step forward in applying this revolution to benefit crores of farmers.

The forecasts used by MoAFW were a blend of two open-access models—Google's Neural GCM and ECMWF's Artificial Intelligence Forecasting Systems (AIFS). In rigorous evaluations, these models were shown to clearly outperform other available forecasts at predicting the start of the monsoon locally for farmers.

Professor Ramesh Chand, Member of Niti Aayog stressed that focusing on the needs of farmers when providing weather information is essential. "This initiative is tremendously valuable because it centers specifically on the needs of farmers by providing tailored weather forecasts in easy to

understand language and helps them make informed farming decisions.”

Working with teams from Development Innovation Lab - India and Precision Development, the Ministry worked directly with farmers to ensure that the messages were understood and actionable.

“This is a huge achievement by the Ministry of Agriculture, benefiting millions of farmers and putting India at the cutting edge of addressing the needs of farmers,” said Nobel laureate Michael Kremer. “The Ministry’s program is a model for how to put people first in the age of AI.”

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