The power of predictions and probabilities

Monsoon rainfall in India varies every year, and distribution is uncertain. This poses a production risk for farmers in the semi-arid India.

Farmers tend to ignore rainfall forecasts issued by the Indian Meteorological Department (IMD) while making crop decisions since they are made for the whole country, and could be unreliable regionally. Recent advances in forecasting techniques improve the usefulness of forecasting seasonal rainfall. Farmers in USA, Australia, Argentina and Brazil benefit from forecast-based cropping decision options to enhance agricultural productivity. ICRISAT, in collaboration with Acharya NG Ranga Agricultural University, worked on a pilot project funded by International START, USA, and provided seasonal rainfall forecast-based discussions aided by crop models to guide farmers' decision-making in the Kurnool and Anantapur districts in southern India.

Rainfall data (since 1937 for Nandyala in Kurnool, and since 1962 for Anantapur) was analyzed to assess the variability in length of crop growing season, and to estimate cropping systems productivity. We assessed statistical forecasting techniques and the El Niño/Southern Oscillation phase analyses to identify forecast signals. A model output statistical downscaling technique was employed on General Circulation Model precipitation fields provided by IRI, New York, to predict seasonal rainfall for Anantapur and Kurnool. Predicted rainfall totals were disaggregated to daily rainfall (useful for crop model APSIM) to simulate crop yield scenarios for different decision options.

Farmers discuss cropping decisions.

Probabilistic seasonal precipitation forecast was communicated to farmers at one-month lead-time. The value of forecast was assessed in the hindcast analysis using crop-modeling by (i) estimating crop yields with traditional practices of risk-averse farmers, (ii) crop production estimates from adoptive farmers' forecast based decisions. Twenty-one adoptive farmers, from a group of fifty selected farmers in two districts, assessed rainfall forecast based cropping decisions on their fields. In Anantapur, farmers had mixed experiences following forecast based decisions of the peanut/short duration pigeonpea intercrop system resulting in an average yield advantage of 300 kg ha^{-1} peanut, and a decision of peanut/medium duration pigeonpea resulted in an average yield loss of above 300 kg ha^{-1} peanut, compared to the risk-averse decision of sole peanut system, when our forecast failed. In Kurnool, rainfall forecast decisions of farmers on double cropping options of intercrops and sequential crops provided economic returns in the range of Rs 9329 ha^{-1} to Rs 22, 278 ha^{-1}($216 to $518).

In the March 2004 evaluation meeting, farmers expressed interest to assess rainfall forecasts for 3 seasons by implementing cropping decisions, to up-scale forecast applications further. Clearly, farmers now have a new awareness about forecast-based decisions.

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http://www.icrisat.org/what-we-do/satrends/june2006.htm#4