Adaptation Insights

KENYA

Addressing Climate Change Adaptation in Africa through Participatory Action Research

November 2010 • N° 4

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Improving Farmer Adaptive Capacity by Integrating Local and Indigenous Knowledge in Climate Forecasting and Adaptive Response

Enhancing Local Adaptive Capacity: The Role of Localised Climate Forecasts

Recent developments in weather and seasonal rainfall predictions have increased the accuracy and reliability of the seasonal forecasts issued by the Kenya Meteorological Department (KMD). Despite these advances, location-specific forecasts to assist farmers in taking proper decisions at the farm level remain unavailable. Historically, farmers in Kenya have used various local indicators for rainfall prediction. However, due to recent climate changes which have led to significant changes in seasonal rainfall patterns, these indicators have become increasingly unreliable. Despite the availability of relatively more reliable forecasts from the meteorological service, farmers seldom use these for farm level decision-making because they are not adapted to the locality and it is difficult for farmers to access the information on time and in a format they can easily understand. This gap is mainly due to lack of capacity for interpretation and use of the forecasts. Providing location-specific and easily understood climate forecasts can therefore enhance farmers' capacity to use climate forecasts to manage risk. The project 'Managing risk, reducing vulnerability and enhancing agricultural productivity under a changing climate' has applied a participatory research approach with smallholder farmers in Kitui, Mwingi and Mutomo Districts of Kenya to develop location-specific, simplified climate information for their use.

Linking Local and Exogenous Knowledge in Constructing Climate Forecasts

The first step of engagement with farmers was to analyze climatic variability using rainfall data from 1957 to 2004 for 38 stations in Kitui, Mwingi and Mutomo Districts together with agricultural extension agents and scientists from the meteorological service. Farmers used the exogenous knowledge of climate variability to assess the capability of seasonal forecasts to capture local-level climate variability. Next, for 3 years starting with the short rains of 2007, a team of farmers, extension agents, agricultural researchers and the meteorological service together developed downscaled (locally adapted) climate forecasts from the seasonal climate forecasts issued by KMD. Inputs from local leaders, farmers and extension agents were used in the downscaling process. These inputs included consideration of farmers' own indicators for climate forecasting and determination of how local topographical features differentiate rainfall and thus shape local climate variability. This helped to correct the forecasts and thus enhance their local accuracy. The downscaling process is summarized in Box 1.

Farmers learn conventional methods of measuring and recording rainfall (Photo : W. Ndegwa)

Developing Appropriate Agricultural Response Strategies

After generating the downscaled climate information for each season, a team of farmers, extension agents and researchers identified a basket of technological options suitable for the predicted rainfall conditions and publicized these in agro-advisory bulletins to bridge gaps in information availability and usability. The bulletin was made available to farmers participating in the research team and distributed widely in the districts. Thereafter, each farmer made his or her own decision on the appropriate practices for that season to be carried out in his or her farm. Each participating farmer kept a record of decisions made for the season. A control farm, whose location was chosen by farmers, was prepared with the recommended management options found in the agro-advisory bulletin. At the end of each season, rainfall data for the season and farm outputs relative to pre-season decisions and the control farm were analyzed in a participatory manner with all stakeholders: farmers, extension agents, agricultural researchers and meteorologists.

The provision of downscaled climate information to smallholder farmers has led to improved adoption of agricultural technologies with the potential to improve productivity and local adaptive capacity. During a monitoring and evaluation session, farmers indicated that the downscaled climate outlook has helped them to make more appropriate on-farm decisions. Figure 2 illustrates the effects of seasonal forecasts on the decisions farmers made in regards to the type/variety of seeds to plant. During the March, April, May (MAM) 2008 season, when the forecast indicated below normal rainfall conditions, a larger proportion of farmers chose to plant local varieties rather than hybrid seeds whose higher yields are obtained under optimal conditions such as adequate rainfall. During the October, November, December 2009 season, when the forecast indicated extreme wet conditions, a higher proportion of farmers opted for hybrid seeds. In addition to assisting in adapting varieties to the conditions under which they are likely to perform well, farmers were particularly enthusiastic about the accuracy of the onset date as indicated in the forecast – which enabled them to take advantage of the first rainfall of the season.

Developing location-specific climate forecasts can enhance the adaptive capacity of small-scale farmers.

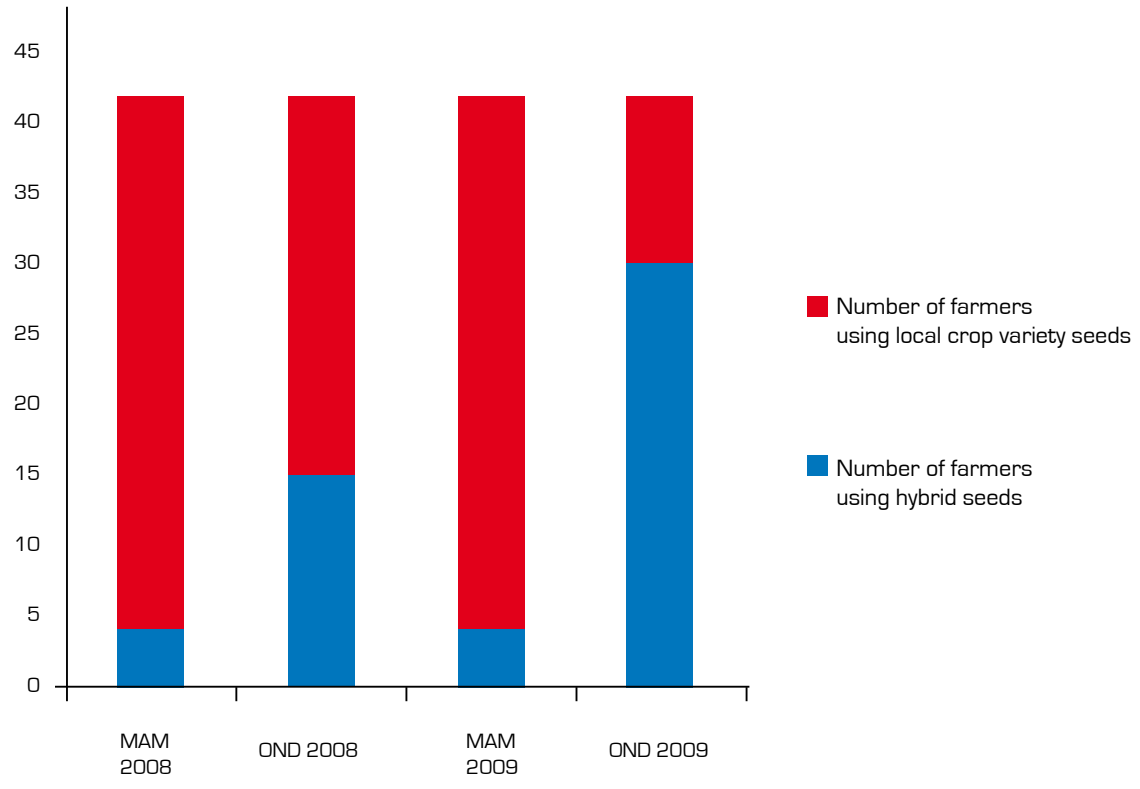

Figure 2 : Number of farmers using hybrid seeds and local varieties as a function of rainfall forecasts, Mutomo District, Kenya

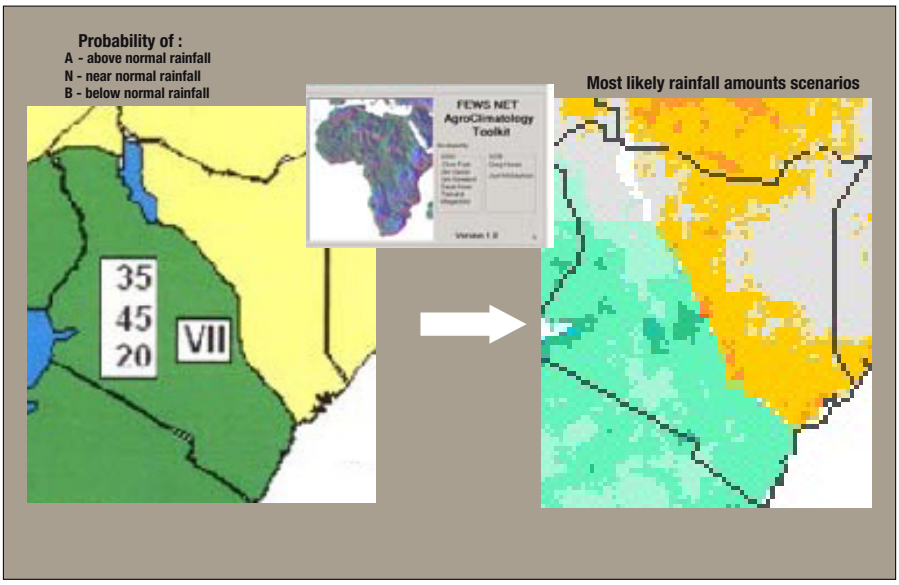

Figure 1. Local rainfall forecasting before and after applying a climate analysis tool

Lessons Learned

This research has demonstrated the usefulness of integrating seasonal climate forecasting with farm management activities for on-farm decision-making by smallholder farmers. Knowledge sharing among scientists and farmers and capacity building are necessary for improving the quality of climate forecasts and enabling farmers and extension agents to interpret the probabilistic climate information and use them to generate agronomic recommendations and 'best bet' on-farm practices for the season.

Acknowledgement :
The project «Managing Risk, Reducing Vulnerability and Enhancing Agricultural Productivity under a Changing Climate" is supported by the Climate Change Adaptation in Africa (CCAA) program, a joint initiative of Canada's International Development Research Centre (IDRC) and the United Kingdom's Department for International Development (DFID). The views expressed are those of the authors and do not necessarily represent those of DFID or IDRC.