



Location-specific weather forecast services for improved farm management and yield loss reduction

Case overview

During the 2017 and 2018 cropping seasons, location-specific weather forecasting services were provided to farmers and agricultural professionals in the sesame zone of Northwest Ethiopia. Weekly SMS messages informed more than 3,000 farmers about expected weather conditions, which helped them to plan and adjust their farm activities, increase yields and/or reduce losses. Practical and institutional lessons learned are shared in this note.

Background

Farmers in the sesame production zone have to deal with (increasingly) unpredictable weather conditions. Improved coping with these conditions can increase yields and reduce post-harvest losses. Most farmers nowadays have a mobile phone and can be reached by phone and SMS messages. Benefit-SBN established collaboration with the CommonSense project. Weather Impact, partner in this project, is specialized in weather forecasting services and related advisory services. The weather forecasting service, based on the European Centre for Medium range Weather Forecast (ECMWF) model, was implemented in collaboration with the National Meteorological Agency (NMA) and a local ICT company.

Objectives

The main objective was to support farmers' decision-making using weather information and agro-meteorology forecasts. Institutionally, the objectives were to evaluate the accuracy of the ECMWF model, to cross-fertilize the NMA and ECMWF models and to improve NMA services, both in terms of forecast reliability and reach to farmers.

Achievements

The weather forecast information helped more than 3,000 farmers to decide on the right time for land preparation, planting, weeding, harvesting and related labour needs, and to decide on post-harvest management activities to reduce yield losses. Weather forecasts were improved and fine-tuned, based on accuracy checking of forecasts and feedback from farmers.

What worked well?

- The delivery of the weather information through SMS was appropriate for literate farmers. Forecasts were sent throughout the entire cropping season (June-October) to farmers participating in the pilot and access to the weather forecast delivery number (8338).
- A total of 3,000 farmers was reached. These farmers were selected based on their ability to read. In case of limited literacy or understanding, family members (children and youth) helped out.
- Forecasts were compared with actually observed meteorological conditions in the field (rainfall, wind, temperature). The forecasts were found to be close to accurate. Based on continuous communication between Weather Impact and agricultural professionals in the sesame zone, the accuracy and specificity of the forecasts were further improved.

- Farmers' experiences and suggestions were systematically collected. Based on the results of the first-year user assessment, the contents and presentation of the forecast was adjusted.
- The regularity and accuracy of the forecasts created trust among farmers, who increasingly used the weather forecast to plan and adjust farm activities. The 2017 and 2018 surveys persistently confirmed that the rainfall forecast helped farmers to better plan farm activities and to mitigate risks. The weather forecast was used to decide upon the right time for planting, fertilizer top-dressing, weeding and harvesting and to plan and adjust the hiring labour accordingly. Weather forecasts were also used to protect cereals from rainfall damage and to use plastic sheets for sesame stacking and drying.
- The majority of respondents indicated to use wind forecasts to determine the appropriate time of harvesting. It also induced farmers to put harvested sesame together in larger stacks (hillas) and to fence these to reduce the risk of sesame falling on the ground or to be blown away. For cereals, farmers decided to put wood on top of sorghum and millet piles to protect them from the wind.

What didn't work well or had unintended consequences?

- Due to interruption of the network, SMS messages were sometimes not received on time. This was the reason to explicitly put the date and period of the weather forecast in the SMS message.
- Irrelevant advertisements (other SMS messages from the Telecom company) highly disturbed and confused farmers.
- According to the user assessment surveys, more than 30% of the interviewed farmers did not (fully) understand the meaning of the text message. Farmers were not well aware of the meaning of weather parameters such as millimetre and degree centigrade.
- Two thirds of the farmers did not make use of the temperature forecast. The wind forecast was not used by a significant number of farmers.
- In addition to the understanding of weather information, translating it into farm management decisions and adjustments is an important challenge.
- Although the NMA was involved in the pilot and institutional objectives were clearly formulated, NMA recently decided that weather forecasts in Ethiopia should be based on the NMA model, even though the ECMWF model proved to be able to deliver precise, location-specific forecasts. This created an impasse, causing the interruption of services to farmers in the current season (2019).

Practical recommendations

- It is important to deliver practical training to agricultural professionals and farmers to ensure that the weather information in the SMS message is clearly understood.
- Weather forecasts have to be in the local language. The date and period of the forecast, as well as the location for which it applies have to be clearly indicated.
- To reach illiterate farmers (40% in the sesame zone), involvement of family members enrolled in education is important. Collaboration with schools and teachers providing and explaining weather information during lessons could improve the reach and understanding of weather forecast services.
- Weather forecasting should start at the end of the dry season and continue until all crops are harvested and bagged, so that farmers benefit from weather information for all farming operations.
- The provision of weather information has to be accompanied by the training of farmers on how to use it for farm management decisions. Weather forecast messages could be followed by messages indicating options for adapted farm management. This would require collaboration of the meteorological agency with agricultural research and extension. A call service that farmers could use for extra explanations would make the activity even more relevant.

Institutional recommendations

The only way for achieving sustainable results is through collaboration with institutions mandated for weather forecasting services. Much attention has to be given to the testing of models with continuous feedback from the end users, and to modalities to reach out to (different categories) of farmers. Another point of attention is the financing of weather forecast systems. Although a pilot may be largely based on project funding, modalities for sustainable funding are of fundamental importance. In the sesame zone, farmers, who have experienced the service, are ready to pay for the weather information. In the case of commercial commodities, like sesame, a levy system could also be an option.