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Research Report

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Options for Improving the Communication of Seasonal Rainfall Forecasts to Smallholder Farmers – The Case of Kenya

Africa is on the move! African countries and societies are advancing along various development paths. For some, Africa is the “booming continent” of our times. For others, it is home to the majority of the “bottom billion”. In the DIE’s Briefing Paper series on African Developments, researchers from Europe and Africa regularly examine the African agenda and analyse African trends with a view to taking stock and identifying the challenges that will face the continent in the years to come.

Summary

This „Briefing Paper“ discusses options for improving the communication of seasonal rainfall forecasts to smallholder farmers, taking Kenya as its example. Smallholder farmers depend on rain-fed agriculture in most of sub-Saharan Africa. Over time, they have adjusted their planting patterns and farming calendar to the onset, duration and end of the rainy seasons. However, with changing rainfall due to climate change, their planting patterns and farming calendar no longer match seasonal rainfall distributions, which often leads to crop losses. Seasonal rainfall forecasts are thus crucial for the provision of early warning information and, if used by farmers, can enable them to adjust their planting seasons and farming calendar.

Yet farmers are often undecided whether to follow the recommendations of weather forecasts. As studies in Kenya show, this is due to uncertainty about their reliability, the limited ability of many farmers to comprehend the technical language used by meteorologists and the lack of access to detailed forecast information. Key actors in the communication of seasonal weather forecasts to farmers include the Kenya Meteorological Department (KMD), the Ministry of Agriculture (MoA), the Ministry of Livestock Development (MLD), the Ministry of Information and Communication and the media. These actors are beginning to address some of the challenges, but they should step up their efforts:

- The KMD needs to further downscale seasonal forecasts spatially to locally homogeneous rainfall zones or to

weather-station level so that small-scale local variations in rainfall patterns can be taken into account. This would provide farmers with better information on their local rainfall patterns.

- The MoA and MLD should institutionalise their role in guiding the KMD in the communication of forecasts to farmers and pastoralists. As the climate information needs of smallholders are not adequately addressed by the KMD, this demand-driven approach recently adopted by the ministries as a pilot scheme may increase the influence of the agricultural sector on the design and content of forecasts and should therefore be continued.
- In collaboration with the KMD and the Ministry of Information and Communication, the MoA and MLD should explore the use of telephone short message services to complement existing radio services for the communication of ready-to-use forecasts.
- The MoA and MLD should hold pre-season forecast workshops at which county agricultural extension officers and officials of local meteorological stations can discuss downscaled seasonal forecasts and the implications for local agricultural production with farmers. Such local-level partnerships and facilitated farmer-group interactions can influence the strategies pursued by farmers in response to forecasts.

Through these interventions, smallholder farmers are likely to regain confidence in seasonal forecasts and use them in agricultural production.

Introduction

Climate change in Kenya and other East African countries is expected to manifest itself in shifts in seasons and increased frequencies of extreme weather events, such as droughts, heavy rainfall and associated flooding. As climate continues to change, seasonal forecasts will become even more crucial as one way of informing farmers of short-term weather dynamics, impending seasons of below- or above-normal rainfall and extreme rainfall events. A seasonal forecast is a form of early-warning system and should therefore be early and warn the targeted public of impending climatic circumstances in such a way that they are enabled to take appropriate action to reduce adverse impacts. If seasonal forecasts appear in good time and are interpreted correctly, farmers will be able to decide which crops to grow and how to cope with the situation. Currently, smallholder farmers' limited use of seasonal forecasts provided by the Kenya Meteorological Department (KMD) increases their sensitivity to drought and flood impacts, which might otherwise be avoided (Ifejika Speranza 2006, Opondo 2012).

This „Briefing Paper“ discusses this limited use and examines how seasonal forecasts might be better communicated to smallholder farmers to enable them to use the information received to reduce adverse climatic impacts on their farm production. It is based on the authors' studies in the Embu, Makueni and Laikipia districts of Kenya and on a review of the literature.

Seasonal rainfall forecasts in Kenya

In Kenya, the KMD is responsible for the provision of meteorological and climatological services. It issues several types of forecast, including daily, 4-day, 7-day, monthly and seasonal forecasts. Seasonal forecasts are probabilistic – that is, they indicate the probabilities of wet, average and dry conditions occurring in a season. There are two main seasonal rainfall forecasts a year for most of Kenya, relating to the country's two main rainy seasons, March to May and October to December. The KMD downscales the seasonal forecasts to cover the large spatial areas of north and south Kenya and issues them to stakeholders in August and February, a lead-time of at least one month before the onset of the October-December and March-May seasons, respectively. To enhance the usefulness of seasonal forecasts, KMD encourages users also to consult the four-day, weekly and monthly forecasts and the regular updates it issues.

The KMD also has specialised forecasts for several sectors, including agriculture. It forwards its seasonal forecasts to the MoA. Through its District Agricultural Officers, the MoA advises farmers how to make the best use of the forecast rains in their production planning.

The KMD disseminates forecast information through the print media, radio and television. The broadcasts include a

review of weather performance in the past season and its impacts on various sectors and a climate outlook for the coming season and its potential impacts. The KMD has also launched a radio and internet project to facilitate the dissemination of seasonal forecasts with a view to improving its early-warning system and so reducing the risk of disasters. In the following, past communication failures, recent technological innovations and open issues are discussed.

Past failures in the communication of seasonal forecasts to smallholder farmers

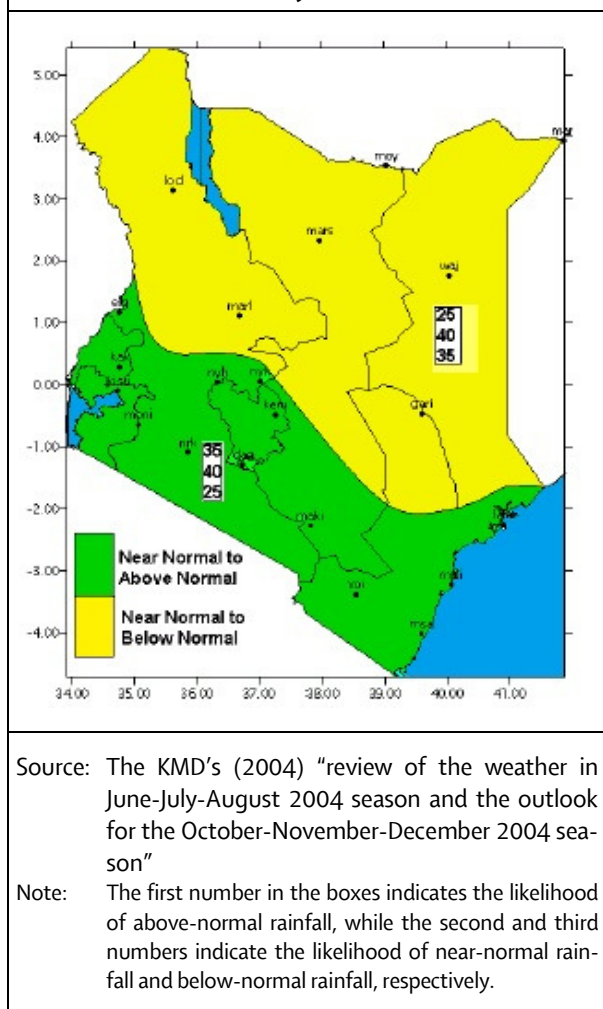
In the past, farmers in Kenya used various local indicators to predict rainfall. However, changing climatic conditions have made these indicators increasingly unreliable. Although recent technological developments have increased the accuracy and reliability of the seasonal forecasts issued by the KMD, early warnings continue to be largely ignored in farm production strategies, resulting in avoidable farm losses. Despite the availability of the forecasts from the KMD, farmers seldom use them in their decision-making owing to such factors as the coarse scale of forecasts, the technical terms used, the distorted interpretation of forecasts by the media, “incorrect” forecasts, their own lack of confidence in seasonal forecasts, and the poor timing of broadcasts.

While the KMD is to be commended for releasing its forecasts with a one-month lead-time, the **seasonal forecasts are generalised and coarse**, providing little or no detail on the local characteristics of a season. Figure 1 shows a KMD forecast of rainfall amount that divided Kenya into two segments in September 2004 (even now, in 2012, rainfall forecasts are still presented in this way in the newspapers). For the whole of southern Kenya, the KMD forecast a 35 per cent likelihood of above-normal rainfall, a 40 per cent likelihood of near-normal rainfall and a 25 per cent likelihood of below-normal rainfall (see Figure 1, boxes in the map). For northern Kenya, near-normal to below-normal rainfall was predicted. However, from the experience of farmers in Makueni County, these seasonal KMD **forecasts are coarse and do not reflect the localised patterns of rainfall** (Ifejika Speranza 2006). Forecasts often summarise rainfall in zones with heterogeneous rainfall patterns, leading farmers to believe they are inaccurate. Thus, as in many other SSA countries (Hansen et al. 2011), the seasonal forecasts for agriculture are largely supply-, that is KMD-driven, and Kenyan smallholder agriculture has little influence on their contents.

Moreover, the **terminology used in forecasts limit their usability** and usefulness to farmers and other users. Farmers do not understand the technical terms, which continue to be difficult to translate into local languages.

Furthermore, **misinterpretations of forecasts by the media** not only spread “incorrect” forecasts, but also detract from the credibility of the KMD's performance. In 2004, press reports communicated forecasts, which were

Figure 1: Coarse-scale map of seasonal rainfall forecasts in Kenya



different from those intended by the KMD. The Daily Nation of 9 September 2004, for example, reported "hopes of alleviating hunger dashed as weather experts predict doom", although "a worsening food crisis" had not been the message communicated by the KMD, but "near-normal to above-normal" and "near-normal to below-normal" rainfall (see figure 1).

Even when farmers use the forecasts, what are perceived to be **"incorrect" data** continue to limit responses. In December 2009, wheat farmers of Narok District threatened to sue the KMD for predicting that the El Niño rains would start in late September. However, they did not begin until almost the end of December 2009 leading to harvest losses for the farmers concerned.

Many farmers thus still **lack confidence in seasonal forecasts**. In response to three days of rain in most parts of Kenya at the end of February 2012, the KMD advised farmers not to plant crops as it considered the rain to be temporary. Having experienced crop losses as a result of complying with KMD's advice in the past, farmers in the Embu

study ignored it this time and planted during the three-day period of rain –and suffered a loss of crops.

Most farmers interviewed in Embu district **did not have access to this broadcast**. They said that, while the local radio stations may have broadcast this information in local languages, they did so at the wrong time of day, when the farmers were out in the fields. They requested that such **information be broadcast after six o'clock** in the evening, when they are at home and able to listen to such communications.

Options for the effective communication of seasonal forecasts to smallholder farmers

In view of the challenges discussed above, there is a need to restore farmers' confidence in seasonal forecasts and to encourage them to take account of such information in agricultural production. To achieve this, the Kenyan government should scale up and institutionalise the following measures, some of which have been researched and successfully tested, but only in pilot studies at local level, or they are currently being piloted at national level:

- **Downscaling seasonal forecasts to homogeneous rainfall zones/weather station level:** The KMD can improve its predictions by downscaling national forecasts to local areas of homogeneous rainfall patterns to reflect localised rains or by working with local KMD meteorological officers to downscale the national forecasts to station-level/local areas for cases where rainfall is highly localised. In this way, farmers will be provided with information that takes account of their local rainfall patterns. The Sakai research project in Makueni has shown that seasonal forecasts can be downscaled to local areas (Opondo 2012). Experience in Zambia also shows that downscaling station-scale seasonal forecasts can trigger overwhelming responses from farmers (Hansen et al 2011).
- **Adopting a collaborative approach to communicating seasonal forecasts:** The KMD distributes climate information to various sectors, including agriculture. It would thus be beneficial for the MoA and the MLD to advise the KMD on how to communicate climate information effectively to farmers and pastoralists. In a very new development (concurrent with the writing of this „Briefing Paper"), these ministries have begun to request the KMD to issue seasonal forecasts of relevance to farmers or pastoralists on a trial basis. By discussing these forecasts with the KMD, the ministries can identify aspects that require clarification before the KMD broadcasts the information. A demand-driven approach of this kind promises to ensure better ownership and to give agriculture an effective voice with which to influence climate information products and services (Hansen et al. 2011). The MoA can also approach the Ministry of Information and Communica-

tion for its support in disseminating seasonal forecasts to their clientele at various levels.

- **Conducting pre-season forecast workshops** at which local agricultural extension officers and meteorologists from local weather stations discuss downscaled seasonal forecasts with farmers and their implications for local agricultural production may improve farmers' understanding of forecasting terminology. The review by Hansen et al. (2011) of seasonal climate forecasting for agriculture in Africa shows that the challenge in understanding the probabilistic nature of seasonal forecasts can be overcome through closer interaction with and improvement of the capacities of affected smallholders, as case studies in Burkina Faso, Zimbabwe, Kenya and Ethiopia have demonstrated. Institutionalising such pre-season forecast workshops in Kenya can give farmers an opportunity for direct interaction with experts and trigger appropriate responses to climatic risks.
- **The KMD can train media partners to ensure accurate reporting of forecasts in the media.** Journalists in eastern and southern Africa have already formed a network to improve the effectiveness and quality of media coverage of climate information (Hansen et al., 2011). Such self-organisation requires the continuous

support of the KMD and the government in general if it is to have a long-term impact.

- **Exploring the use of telephone short message services to communicate weather forecasts:** About 85 percent of adult Kenyans own a radio and 70 percent a mobile phone. Reaching farmers by mobile phone and using local dialect FM radio stations to simplify the technical language used by professionals would help to ensure that seasonal weather forecasts were communicated effectively. Broadcasts at 7 a.m., 1 p.m. during the lunch break and 7 p.m. are more appropriate to farmers' schedules. Telephone messaging is being piloted in Kenya for the communication of market information. The MoA should join with the KMD and the Ministry of Information and Communication in exploring this medium for the communication of seasonal forecasts in pilot studies, which can then be adapted to local contexts.

In conclusion, the government of Kenya and its development partners need to commit additional long-term funding to secure these measures. If the communication of forecasts is not improved, most farmers will continue to ignore them and the resources invested in their improvement will have been wasted.

Literature

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