Early warning systems for food security in Eastern Africa: Linking the Food Security Outlook with the Climate Outlook Forum

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INTRODUCTION

The service. Food security in Eastern Africa is highly sensitive to climate, due to drought risk and erratic rainfall patterns. Recent climate trends have highlighted the increasing magnitude of droughts in the region and their potential impacts on food security and livelihoods.

To address these risks, the Climate Outlook Forum (COF), which feeds into the Food Security Outlook (FSO) process, has been developed as a user-developed tool for the Greater Horn of Africa. This service strengthens the links between early warning information and effective response by translating seasonal climate information and early warning data into projected food security conditions. The information produced through these services provides the context for decision-making and is therefore mainly targeted at disaster risk managers.

Information requirements. The Food Security Outlook process provides relatively coarse information, focusing on seasonal climatic changes over relatively large areas. The process is based on an examination of the neutral El Niño-Southern Oscillation over the tropical Pacific Ocean, the prevailing and projected sea surface temperatures over the Indian and Atlantic oceans, and other factors that influence precipitation patterns during the most relevant seasons in the Greater Horn of Africa. The data are obtained through collaboration between the Intergovernmental Authority on Development (IGAD's) Climate Prediction and Applications Centre (ICPAC) and national meteorological and hydrological services (NHMSs; Figure 1). Additional climate data are obtained from Famine Early Warning Systems Network's (FEWS NET) network of partners, including the U.S. Geological Service (USGS), the National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA).

Implications of these factors for rainfall performance are assessed using model forecasts provided by the Global Producing Centres (GPCs), statistical modelling, expert analysis, and interpretation. Based on the analysis, the Forum members establish probability distributions to indicate the likelihood of above-, near-, or below-normal rainfall for each zone. Above-normal rainfall is defined as within the wettest third of long-term recorded rainfall amounts in each zone; near-normal is defined as the third of the recorded rainfall amounts centred on the climatological median; and below-normal rainfall as within the driest third of the recorded rainfall amounts. Dry refers to a situation in which rainfall season is not significant.

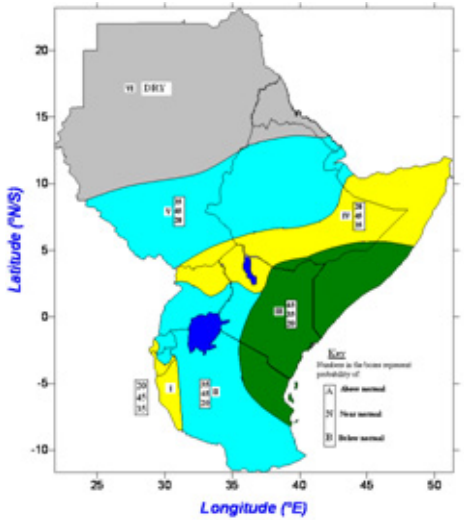

Figure 1. Example of a consensus climate outlook map for the Greater Horn of Africa (September to December 2011).

Climate information is corroborated with food security and vulnerability data. These data are obtained from regional partners such as the World Food Programme (WFP), the Food and Agriculture Organisation (FAO), and several non-governmental organisations (NGOs). The Outlook process gauges current food security using a number of relevant outcome variables such as household food deficits, food prices, impacts on livelihoods and livelihood assets, acute malnutrition and mortality. The process also examines the potential impact of shocks, such as climate-related disasters, on food security by comparing analogue years. For example, projected rainfall for a specific season might be compared with years that had similar conditions to identify the potential changes in crop production, and the impacts of those changes in crop production on food security.

This information is delivered through a Food Security Outlook report, in which current and future food security outcomes are classified using a food security severity scale displayed on user-tailored products such as timelines, evaluations of at-risk populations, and maps of projected food security conditions over a six-month period (Figure 2).

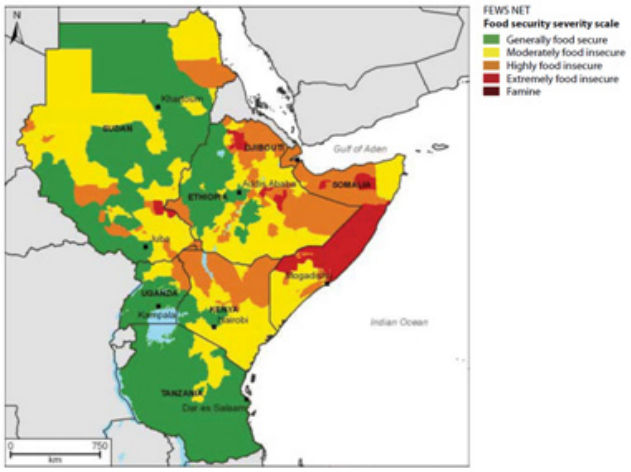

Figure 2. The most likely food security scenario in East Africa, April to June 2010.

The scenario development provides decision makers with an early indication of what risks are likely to affect food security up to a six-month period. This information provides both the context for prioritizing areas that are most at risk of food insecurity and a foundation for emergency preparedness, contingency planning, and additional risk reduction strategies that can be implemented by disaster managers and food security stakeholders.

IMPLEMENTATION

PROCESSES AND MECHANISMS

STAKEHOLDER IDENTIFICATION

The Food Security Outlook process is led by the Famine Early Warning System Network (FEWS NET) and is implemented through the Food Security and Nutrition Working Group (FSNGW) – a regional network of international NGOs and UN agencies, receiving technical support from FAO.

Contributors to the regional consensus climate outlook include both providers and users of climate information. The process engages representatives of national meteorological and hydrological services (NHMSs), and regional and international climate service providers (see Box 1 for a full list of climate service providers) as well as national governments, UN agencies, and non-governmental organisations (NGOs) as users.

STAKEHOLDER INVOLVEMENT

The conclusions of the Food Security Outlook process are distributed via country and regional level food security coordination systems as well as online. Through the online system, regional and national maps are complimented by a range of additional resources, including information on livelihood zones and market analysis. The FEWS NET website also highlights current weather hazards identified through a weekly Weather Hazards Assessment process conducted by NOAA, NASA, USGS, and others. These weather hazards are overlaid on current food security conditions to provide a context for interpreting the potential impact of emerging weather hazards on food security. In this way, the Outlook process incorporates climate information into an existing food security analysis platform, integrating the many factors that contribute to food security and concluding with a single, easy to use tool.

Box 1. Providers of climate information for the Food Security Outlook process

The Food Security Outlook process involves representatives of the Meteorological Services from the Greater Horn of Africa (GHA) countries (Insititut Geographique du Burundi, Meteorologie Nationale de Djibouti, National Meteorological Services Agency of Ethiopia, Kenya Meteorological Department, Rwanda Meteorological Services, Somalia, Sudan Meteorological Authority, South Sudan Meteorological Services, Tanzania Meteorological Agency and Uganda Department of Meteorology) and climate scientists as well as other experts from national, regional and international institutions and organizations [IGAD Climate Prediction and Applications Centre (ICPAC), United Kingdom Met Office and Hadley Centre, World Meteorological Organization (WMO), and University of Nairobi]. Additional input is supplied by partners such as the Korea Meteorological Administration (KMA), United States Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA)/National Centers for Environmental Prediction/Climate Prediction Centre (NCEP/CPC) and Columbia University's International Research Institute for Climate and Society (IRI).

FUNDING MECHANISMS

International donor organisations such as NOAA, USAID-OFDA (Office of Disaster Assistance), the World Bank, and World Meteorological Organization (WMO) have provided the funding for the Climate Outlook Forum process. However, there is no concrete strategy for exploring other options at local or regional level to take full financial responsibility for the process.

Regional networks, through the Food Security Outlook and the Integrated Food Security Phase Classification (IPC) processes, provide the foundation for taking the COF forecasts beyond weather, through a user interface that integrates climate science with food security and vulnerability information. In addition to the product development and operation, other funding mechanisms need to be identified to support the user interface component of this activity.

MANAGEMENT AND DECISION MAKING

The FSO and COF outputs are produced based on multi-stakeholder consensus involving regional partners. The process of linking COF forecasts with information from the FSO involves the standardisation of data inputs so that they can be combined: Weather, climate forecast, agrometeorological and food security data are all standardised. In addition, these are followed by meetings with users to facilitate the process of interpreting findings and linking them with food security information.

EVALUATION

The FSO process engages users and stakeholders at critical stages of service development to ensure that the greatest range of climate data is incorporated into forecasts, and that the resulting services provide clear analysis of implications for food security.

The Food Security Outlook products have significantly contributed to adaptation to climate variability at seasonal scales. Contingency plans and emergency preparedness interventions have been influenced by FSO analyses. Currently, the products are being tested for their utility in providing inputs for longer-term regional climate change adaptation efforts.

CAPACITIES

EXISTING CAPACITIES

The COF process involves training of NMHS staff to provide skilled climate information. This capacity building component involves improving the understanding of dynamics of climate variability (particularly the El Niño-Southern Oscillation) through simple climate analysis techniques such as statistical and dynamical modelling, to more sophisticated models which capture the erratic nature of seasonal climate.

To ensure that climate information is used by decision-makers, the COF process also includes a capacity building component for users. This component includes training users to understand climate variability, as well as associated uncertainties, so that the climate information can be used as part of the decision-making contexts.

CAPACITY GAPS

In the initial stages of the FSO and COF processes, there have been problems associated with different levels of experience among participants (new versus experienced practitioners) and lack of experience among user categories. To overcome these inter-related challenges, the COF process now incorporates a series of pre-meetings where regional and international climate experts develop a consensus for the regional climate outlook in a probabilistic form. This is then followed by the Forum proper, which involves both climate scientists and representatives from the user sectors, for identification of impacts and implications, and the formulation of response strategies. After the Forum takes place, a training workshop on seasonal climate prediction to strengthen the capacity of the national and regional climate scientists is carried out. Finally, special outreach sessions involving media experts, to develop effective communications strategies are organised. Challenges related to provider and user capacities have been addressed through this consultative process, which ensures that stakeholders are engaged where they can provide useful inputs.

LOOKING TOWARD THE FUTURE

GOALS

As the COF process continues to develop, additional climate information will be added. The Greater Horn of Africa Climate Outlook Forum (GHACOF) already disseminates climate change information products, but additional capacity is needed to incorporate decadal and long-term climate analysis into the Forum.

The COF will also seek to improve communication between providers and users of climate information, particularly in the context of uncertainties. This will be achieved through wider engagement of providers and users of climate information during the Forum.

Improvements will also be made in evaluating the cost-effectiveness of the COF process to identify the most efficient ways of communicating climate forecasts, disseminating information, and identifying the appropriate responses.

PROJECT EXPANSION

Climate Outlook Forums already take place in other key regions, including Southern Africa, West Africa, Central Africa, Asia, southeast South America, the western coast of South America, Caribbean, Central America, the Pacific Islands, and Southeastern Europe. The level of capacity varies by region. It is important to ensure that the COFs allow provision of feedback among each other to identify mechanisms to improve the efficiency and effectiveness of the process.

LESSONS LEARNED

One of the lessons learned through the COF process is that the successful applications of climate services can be promoted by simultaneously engaging providers and users of climate information. Capacity building should therefore focus on training the food security community to analyse climate forecasts and identify key issues as part of efforts to enhance the user interface.

THE WAY FORWARD

One of the most important challenges moving forward is the long-run financial sustainability of the process, including both Food Security Outlook and the COF processes. To date, the majority of funds have come from international donor organisations including NOAA, USAID-OFDA, the World Bank, and WMO. However, there is no concrete strategy for other options at local or regional level to take full financial responsibility for the process.

At the technical level, the quality and skill of the COF products can influence users' perception, trust and confidence in the information. The current status of seasonal-to-inter-annual climate forecasting allows prediction of rainfall at large spatial and temporal averages relative to the long-term mean conditions. Current analyses are based on state-of-the-art science, but they might not fully account for all the physical and dynamical processes that influence the succession of wet and dry events at particular local areas. These limitations also influence the extent to which COF products are mainstreamed into development and risk management planning. To overcome this challenge, additional resources should be committed to the development of better analytical tools. However, it will also be important to communicate the opportunities – as well as the limitations – associated with climate information in order to establish realistic expectations from users and providers of climate information.

PRINCIPLES OF THE GFCS

The climate service presented here reflects several of the principles of the GFCS:

Principle 1: **All countries will benefit, but priority shall go to building the capacity of climate-vulnerable developing countries.**
The Climate Outlook Forum and the Food Security Outlook illustrate how food security and vulnerability risks can be addressed by building capacities in developing countries that are highly sensitive to climate impacts.

Principle 2: **The primary goal of the Framework will be to ensure greater availability of, access to, and use of climate services for all countries.**
The Food Security Outlook ensures collaboration between global, regional, and national providers of climate information so that they are available and used by decision-makers in governments, UN agencies, and non-governmental organisations.

Principle 3: **Framework activities will address three geographic domains; global, regional and national**
The Food Security Outlook addresses two of the three geographic domains (regional and national) and incorporates stakeholders and analysis at both levels.

Principle 4: **Operational climate services will be the core element of the Framework.**
The Outlook process has a clear operational output, resulting in contingency planning and emergency preparedness.

Principle 5: **Climate information is primarily an international public good provided by governments, which will have a central role in its management through the Framework.**
The climate service was developed in close collaboration with relevant government ministries, which were responsible for managing and disseminating the information.

Principle 6: **The Framework will promote the free and open exchange of climate-relevant observational data while respecting national and international data policies.**
Data for the climate service were provided for free, allowing for open exchange of climate-relevant observational data.

Principle 7: **The role of the Framework will be to facilitate and strengthen, not to duplicate.**
The climate service provided a new to identify climate trends and the potential food security impacts on vulnerable populations.

Principle 8: **The Framework will be built through user – provider partnerships that include all stakeholders.**
The climate service allowed for a close collaboration between all stakeholders including providers of climate information (regional climate centres, NHMSs, and international providers of climate information) and users of such information (governments, UN agencies, and non-governmental organisations).