

UNISDR Scientific and Technical Advisory Group Case Studies - 2015 Climate Science Research Partnership

The problem

Climate variability and change have enormous impacts on many aspects of human development. The majority of African nations depend on climate-sensitive activities for their livelihoods, in particular rain-fed agriculture. This makes them particularly vulnerable to hazardous weather and climate variability, as food security depends on there being enough rain to sustain crops. Coping with variable rainfall is becoming increasingly important and is compounded by a current lack of appropriate climate information to help inform and develop effective response strategies¹. It is widely recognised that, to fill information gaps, there is an urgent need to improve understanding and modelling of African climate to provide reliable climate early warning systems and information for adaptation. Prediction of the temporal distribution of seasonal rainfall (e.g. season onset, duration, and dry spell frequency) has been identified as a high priority need².

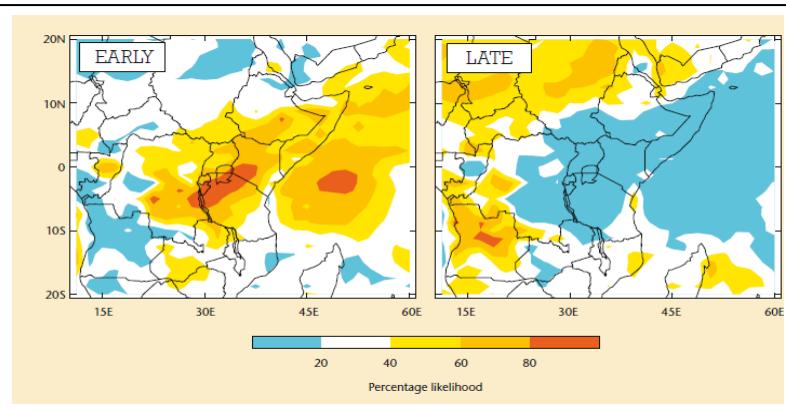


Figure 1: Probability forecast for onset of short-rains season, Greater Horn of Africa, 2011

The science

The Africa Climate Science Research Partnership (CSRP) was established to increase capabilities for sustainable poverty reduction in Africa through advancing the quality, relevance and uptake of climate modelling, related predictions and research. The CSRP was a partnership between the UK's Department for International Development (DFID) and the Met Office Hadley Centre. It was run in two phases: a 3-year programme focused on improved African climate

modelling and prediction on monthly to decadal timescales and strengthened climate science capacity, and a follow-up programme laid foundations for improved predictions for the 10-40 year time horizon.

Research focussed on the Met Office Hadley Centre Global Environment Model and its associated prediction systems³. Model improvement resulted in better simulation of seasonal rainfall climatology in seven of eight African key rainy seasons – with substantial improvements in five seasons and enhanced representation of remote influences on African rainfall (e.g. from El Niño).

A key objective was to improve the application of science and climate models for early warning and adaptation planning in Africa. In this context, specific areas of research focus included: development and trial of predictions for rainy season onset⁴; development of multi-annual range forecasts⁵; climate event attribution⁶; and development of new rainfall monitoring information products.

The experimental forecasts of rainfall onset timing were developed using the Met Office's dynamical seasonal forecast system⁴ and provide the probability that the season onset will be earlier or later than normal (Figure 1). The forecasts performed well in trials in East, West and Southern Africa⁴.

Monitoring of observed rainfall to identify accumulating deficits and surfeits is a key component of early warning systems, along with rainfall prediction. A new suite of monitoring products was developed to fill gaps in information, and was made available to regional centres and National Meteorological and Hydrological Services (NMHSs). The new products enable continuous monitoring of developing anomalies and include monitoring of season onset.

The application to policy and practice

Better prediction of climate variability and change can reduce poverty substantially. Improved forecasting could help farmers schedule their seasonal activities, planners design effective early warning systems, and decision-makers prioritise most effective response and adaptation strategies. Use of climate-model based predictions together with outputs from national and regional prediction tools can improve the quality of climate outlooks. It was therefore a priority to work with African regional climate centres to provide support to NMHSs in interpretation and use of model outputs. This was approached through climate science workshops, and follow-up training at Regional Climate Outlook Forums. Further improvements in forecast reliability can be achieved through continued research targeted at better understanding and modelling of African climate.

Results and lessons-learnt need to be communicated to the international research, applications and decision-making communities to promote uptake of the key results. CSRP has shared knowledge through peer-reviewed papers and input to the Africa-led Climate Research for Development Agenda. Results and implications have also informed the annual Climate Change and Development for Africa conferences, the African Climate Conference (2013), the 17th and 18th Conference of the Parties (COP17 and COP18) and the special session on drought convened at the 29th Greater Horn of Africa Climate Outlook Forum.

Did it make a difference?

The training and knowledge sharing experience has contributed to improvement of climate services delivered by NMHSs. For example, workshop training provided the foundation that later assisted Meteo Rwanda to implement a monthly updating 3-month-ahead seasonal forecasting service. CSRP output has been used by many African climate researchers and practitioners across the continent, including in: collaborations with eleven African climate scientists and their organisations as part of a CSRP fellowship scheme; provision of seasonal prediction information and training in its use to NMHS participants at RCOFs; and supply of monitoring and forecast information to registered users of the CSRP collaboration wiki pages. Training materials have been passed on to over 45 African climate scientists. Trial forecasts for the onset of rainy seasons, the highest priority need from the stakeholder consultation, have been developed for West, East and Southern Africa. Response has been very positive. In West Africa the forecasts have contributed to specific statements on onset in the official forecast communication issued by the African Centre of Meteorological Application for Development.

The fellowship scheme, in which fellows worked on CSRP themes with climate scientists from the Met Office and UK Universities, has helped these scientists further their careers. All eleven fellows published a summary of their work in the first WCRP African Newsletter (November 2012) and three have published their work in the peer-reviewed literature.

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