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Seasonal drought forecast system for food-insecure regions of East Africa

Shraddhanand Shukla (1,2), Amy McNally (1,4,5), Greg Husak (1), Chris Funk (1,3)

(1) University of California, Santa Barbara, Department of Geography, United States (shrad@geog.ucsb.edu), (2) University Corporation For Atmospheric Research, Boulder, CO, (3) U.S. Geological Survey, (4) Earth System Science Interdisciplinary Center, University of Maryland, College Park, MD, USA , (5) Hydrological Sciences Laboratory, NASA Goddard Space Flight Center, Greenbelt, MD, USA

In East Africa, agriculture is mostly rainfed and hence sensitive to interannual rainfall variability, and the increasing food and water demands of a growing population place further stresses on the water resources of this region. Skillful seasonal agricultural drought forecasts for this region can inform timely water and agricultural management decisions, support the proper allocation of the region's water resources, and help mitigate socio-economic losses. Here we describe the development and implementation of a seasonal drought forecast system that is being used for providing seasonal outlooks of agricultural drought in East Africa. We present a test case of the evaluation and applicability of this system for March-April-May growing season over equatorial East Africa (latitude 20 south to 80 North and 360 E to 460E) that encompasses one of the most food insecure and climatically and socio-economically vulnerable regions in East Africa. This region experienced famine as recently as in 2011.
The system described here combines advanced satellite and re-analysis as well as station-based long term and real-time observations (e.g. NASA's TRMM, Infra-red remote sensing, Climate Forecast System Reanalysis), state-of-the-art dynamical climate forecast system (NCEP's Climate Forecast System Verison-2) and large scale land surface models (e.g. Variable Infiltration Capacity, NASA's Land Information System) to provide forecasts of seasonal rainfall, soil moisture and Water Requirement Satisfaction Index (WRSI) throughout the season – with an emphasis on times when water is the most critical: start of season/planting and the mid-season/crop reproductive phase.
Based on the hindcast assessment of this system, we demonstrate the value of this approach to the US Agency for International Development (USAID)'s efforts to mitigate future losses of lives and economic losses by allowing a proactive approach of drought management that includes early warning and timely action.