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UCSB Climate Experts Help Predict Rainfall Patterns in Central America and Africa to Avert Famine

In Sub-Saharan Africa and Central America too little or too much rainfall can cause famine. Scientists at the University of California, Santa Barbara and the US Geological Survey (USGS) are working with researchers in these countries to monitor, anticipate and mitigate the impact of flooding and drought.

Joel Michaelsen, a professor of geography who specializes in climatology at UCSB, and his team have just received funding to increase their participation in a federal early warning program. The Famine Early Warning System Network, or FEWS NET, was originally developed in 1985 in response to massive starvation in Ethiopia. It pulls together data to predict shortages or excesses of rainfall. It is primarily funded by the U.S. Agency for International Development, with partners in NASA, NOAA (National Oceanic and Atmospheric Administration), Chemonics International and USGS. USGS works closely with the UCSB geography department on the project.

Michaelsen heads a team, based at UCSB, which includes scientists in Washington, D.C., and several African and Central American countries. The group works closely with scientists at the USGS/Earth Resources Observation Systems (EROS) Data Center facility.

"Our objective is to try to locate and foresee areas where there will be food shortages," said Michaelsen. "We're working on ways to track the rainy season as it develops. We are looking to see if there will be a shortfall or an excess. Too little or too much are both problems."

He explained that there is a baseline of climate data for Sub-Saharan Africa that is gleaned from 35 years of information that allows researchers to decide what is average.

Michaelsen and his team get up-to-date data on precipitation from the National Oceanic and Atmospheric Administration and compare it to the historical data to see if rainfall is low or high. Dry conditions can lead to famine while wet conditions can sometimes lead to outbreaks of Malaria and Rift Valley Fever, which can take thousands of lives during wet years.

Researchers expect to improve the several-month forecasts. That data will then be cast in ways that are helpful to decision makers including government leaders, citizens and relief agencies.

Michaelsen said that at UCSB researchers are working with scientists in the field to develop the computer tools that can be used in their own countries to track rainfall and project crop yields.

According a UN world water development report, the average supply of water per person worldwide is expected to drop by a third in the next 20 years, with between two to seven billion people facing water shortages by 2050.

The UCSB Department of Geography has been involved in FEWS NET since 1997. Staff from the USGS International Program have studied at UCSB, and UCSB graduates have joined the USGS team. Now the university will take on a larger and more direct scientific role in FEWS NET activities. Statistical climatology, hydrology, GIS, remote sensing and geostatistics are strengths of UCSB that fit well with the goals and priorities of FEWS NET.

The UCSB FEWS NET team will work on the following objectives:

- Provide successful early warning of hydrologic extremes by issuing accurate reports on the FEWS NET site and interacting with decision makers in Washington, D.C., Africa and Central America.

- Implement the USGS Stream Flow Model, Basin Excess Rainfall Map, and Water Requirement Satisfaction Index crop model at institutions in Western, Eastern, and Southern Africa, as well as Central America.
- Develop improved hydrologic data sets, with a focus on gridded historical precipitation time series.
- Develop improved methods for forecasting hydrologic extremes (flood and drought).
- Develop improved monitoring products to identify regions of high hydrologic risk.
- Publish papers on basic and applied research in first-rank scientific journals.

Professor Michaelsen states, "By extending our basic understanding of the factors controlling hydroclimatic extremes, building intellectual tools to anticipate, mitigate and alleviate these extremes, and shortening the lag time between research and development and critical decisions, we will help FEWS NET countries cope with the vagaries of time-varying water supply and demand."

Related Links

[Joel Michaelsen Website](#)

[Famine Early Warning System Network](#)

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