

Famine Prevention Program Overdoses on Paper

BY LORRAINE B. KINGDON

Eight men and one woman sit in tiny offices in Rome. Every 10 days, it's their job to warn the world of impending famines—providing they can wade through reams of data. They make up the Global Information and Early Warning System (GIEWS) created by the Food and Agricultural Organization of the United Nations in 1973.

Amazingly, the nine—most of them economists and writers—still depend on information written on paper, not computers. Not so amazingly, they've reached an impasse; they're overwhelmed, overloaded and in over their heads.

That's why Charles Hutchinson and Stuart Marsh from the Office of Arid Lands Studies got involved with GIEWS in March 1990.

A geographer trained in climatology, Hutchinson knows African famine problems because he's observed them firsthand from the ground. He's also familiar with remote sensing data from airplanes and satellites, and has an expert's understanding of computer systems.

Marsh came to The University of Arizona from managing geosciences computer services at the Sun Exploration and Production Co. in Dallas. He's a geologist with experience in remote sensing and computer technology.

After analyzing the difficulties of GIEWS, Hutchinson and Marsh designed truly user-friendly computer software using already available commercial packages. They faced the monumental job of meshing six divergent computer data systems containing digital and analog functions, with graphics, spreadsheets and word processing.

"Even for computer jocks, the original mix was asking a lot," Hutchinson says. "They (in GIEWS) aren't enthusiastic about using computers in the first place. It was up to us to give them a usable package."

The Beginning

International relief responses to the famines started when the current set of droughts in Africa began in 1968. Too often, the relief was late and poorly coordinated because information was lacking, unreliable or contradictory, Hutchinson says. The FAO created GIEWS in 1973 to give earlier famine warnings for improved relief efforts.

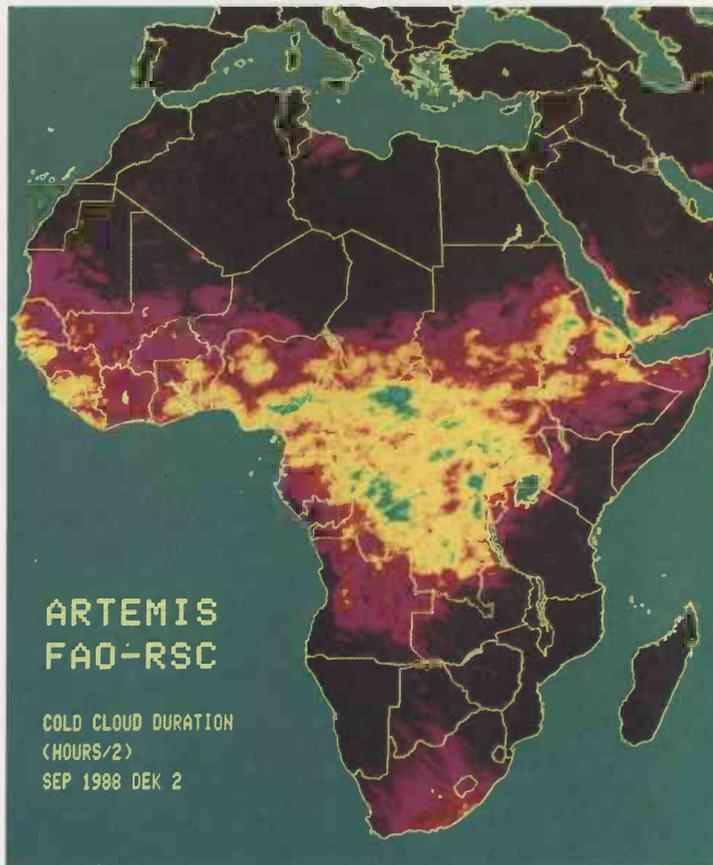
Recently, the FAO Remote Sensing Center in Rome established a satellite-based adjunct to GIEWS called Africa Real-Time Environmental Monitoring Using Imaging Satellites (ARTEMIS). Ultimately, FAO hopes to establish centers in western, eastern and southern Africa. The sophisticated, automated databases of

ARTEMIS accentuate the need for UA involvement in the project.

"The past four years have seen a surprising increase in the number of organizations involved in early warning, in part due to resolutions that came from the 1985 Bonn Summit meeting," Hutchinson says. The proliferation of centers, systems, technology and databases is being sorted out now.

The regional Agriculture, Hydrology, Meteorology Center in Niger issues reports every 10 days that describe rainfall, water balance, crop conditions, pest infestations and range conditions. Soon the center will report biomass development and potential locust infestations.

The U.S. Agency for International Development operates the Famine Early Warning System, which incorporates more diverse data than any other system, including social indicators. That system relies



Satellite-gathered weather information is computerized and colorized to show areas of Africa in greatest danger of famine.



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Charles Hutchinson (left) and Stuart Marsh.

heavily on global vegetation index information from a high resolution satellite instrument, bearing the interminable acronym, AVHRR GAC NDVI.

An experimental system, the *Centre de Suivi Ecologique*, is intended to serve as the first in a proposed network of ecological monitoring units in the Sahel. The *Evaluation et Suivi de la Production Agricole en Fonction du Climat et de l'Environnement*, is a French experiment dealing with Senegal and Mali to produce crop yield models.

The Global Inventory Monitoring and Modeling Studies is a National Aeronautics and Space Administration research unit exploring regional vegetation patterns in sub-Saharan Africa. And the Integrated Livestock Production Project from Tufts University in Medford, Mass., focuses on livestock, and predicts pasture deficits.

Additional agricultural monitoring systems use similar technology, but they don't focus on the Sahel or on famine warning. Eventually, estimating global crop production may be possible, but a long time in the future, Hutchinson says.

Another Look at the Problem—and the Answers

The many players in the famine-warning field add complications, data and the possibility of miscommunication. Inaccuracies had crept into GIEWS analy-

ses for a variety of reasons—problems Hutchinson's and Marsh's software system is designed to help correct.

Data produced by ARTEMIS are in digital form and require special-purpose software for image display and analysis. Related computer tools for managing geographic data and generating graphic outputs are not incorporated in the GIEWS analysis. Currently the data are delivered and analyzed in hard copy.

The analysts are limited because they can't extract changes in vegetation throughout a season and compare with weather data. Also, they have difficulty performing geographic analyses using map overlays and image subtraction.

The software and resulting work station Hutchinson and Marsh are developing will combine data input, management, display and analysis—including images, maps and overlays, statistical plots, simultaneous text and graphics—plus extract temporal and spatial data. All user-friendly.

"Our intent is to make the system as simple and transparent as possible for the GIEWS analyst," Hutchinson says.

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