

Remote sensing contribution to early drought detection and monitoring.

Felix Kogan

National Oceanic and Atmospheric Administration

Felix.Kogan@noaa.gov

The new millennium has started with nearly 20 percent of the world stricken by droughts. They affected agriculture, fisheries, transportation, tourism, energy consumption, human health, environment and water resources around the world. In poor countries, societal impacts resulted in famine, malnutrition, epidemics, human suffering death and abandonment of whole geographic areas. This presentation describes how the new operational space technology helps to detect drought, evaluate affected area and assess the impacts in any part of the globe. A new method is based on estimation of vegetation stress from AVHRR-derived vegetation health index (VHI), which is a numerical combination of visible near infrared and thermal radiances= measurements. Now, drought can be detected 4-6 weeks earlier than from any other observations. Drought detection and advanced warnings help relief organizations to provide food to drought-stricken areas when the population is in great need. The VHI correlates highly with productivity of crops and pastures and can be used as numerical indicator of drought-related agricultural losses in much advance of harvest. In the last three years, drought-affected area increased considerably in Kenya (55% fo the country), Uganda (45%), Jilin province (45%) in northern China, Afghanistan (60%), Pakistan (40%), Texas (60%), USA. Moreover, the Horn of Africa experienced severe drought five years in a row (2000-2004) and in the western USA, drought triggered many forest fires in the last four years. The recent studies indicate that the VHI provides lead-time information about potential for development of mosquito-borne epidemics, insects and crop diseases. The antecedent and physiological effects discernable from the new method can be used for diagnosis of a tendency toward deterioration of vegetation health and potential for vegetation stress development three months before the drought started. This provides added warning lead time, which is critically important for pinpointing the problem, making decisions and implementing measures to mitigate drought consequences. These measures are important steps for sustainability of the developing nations.