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Breaking the Hydro-Illogical Cycle: Changing the Paradigm for Drought Management

Donald A. Wilhite

Drought knows no political boundaries. It affects all U.S. states and most regions of the world on a frequent basis, impacting many diverse sectors. Drought played a significant role in the starvation deaths of millions of people in the Greater Horn of Africa last year, and millions more people are threatened this year due to a drought in West Africa. Much of Australia, meanwhile, experienced severe drought conditions for a decade. In some areas of the country, it was the worst drought of the last century. Texas experienced its worst drought in state history last year; portions of the western part of the state and much of the Southwest are still under severe to exceptional drought conditions.

The problem, worldwide, nationally and locally, is that we respond to drought on a reactive basis, only after drought becomes severe. The challenge is to move away from simply responding to crises and instead to develop a more proactive approach that identifies populations and sectors most at risk and targets programs to reduce that risk. A risk-based approach can lead to increased institutional capacity and reduced impacts because risk-reducing policies and preparedness planning builds resilience. This approach lessens the need for crisis-oriented government interventions. We must break this “hydro-illogical” cycle.

Drought occurs in all of the world’s climatic regimes and often results in significant economic, social and environmental impacts in both developing and developed countries. The characteristics of these impacts differ markedly from country to country and even within country, depending on the primary economic activities and the vulnerability of the population to extended periods of water shortage. Societal vulnerability to drought changes in response to increases in population, regional shifts of population, changes in land use, urbanization, applications of new technology, and many other factors. Increases in the frequency, severity, and duration of drought may also increase the magnitude of negative

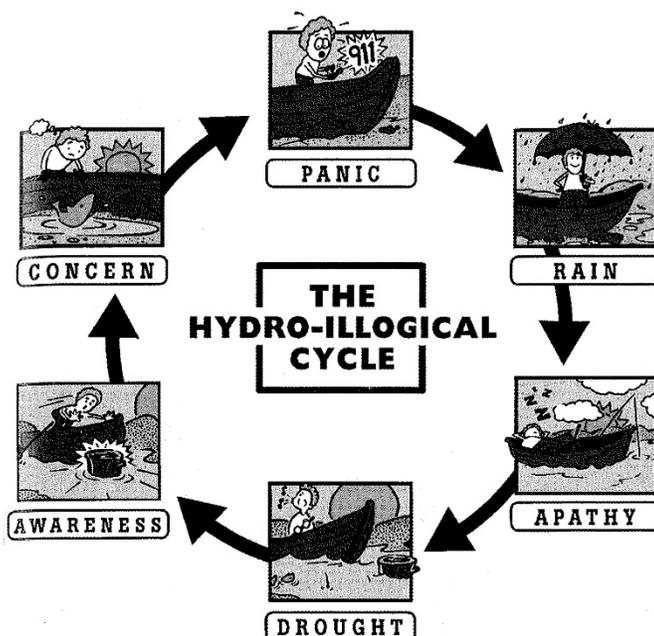
impacts and potentially decrease the amount of time between severe drought episodes, which affects a country's ability to recover.

Drought is most closely associated with the agricultural sector because of its effects on water availability and food supplies. Rain-fed agriculture is particularly vulnerable to drought, but irrigated agriculture also experiences significant impacts if drought conditions persist long enough to reduce both surface and groundwater supplies. In developing countries, droughts can be especially devastating, as reduced agricultural productivity usually compromises food security and raises other public health concerns.

The impacts of drought today are more complex and affect more than just agriculture, however. Drought also has an impact on transportation, energy production, tourism and recreation, ecosystem services and health, and has broader environmental, social, and economic implications. For example, NOAA's National Climatic Data Center has estimated that between 1980 and 2010, drought in the United States resulted in total losses of more than \$185 billion. This is likely a conservative estimate given that it is difficult to quantify impacts on diverse sectors as well as the related indirect impacts that ripple through local and regional economies. This figure also does not include the 2011 drought in the southern Great Plains and southwestern and southeastern states, where drought impacts were estimated at \$10 billion.

How governments and societies respond to drought (and other natural disasters) has become a topic of considerable debate in the past decade as governments and nongovernmental organizations continue to distribute increasing amounts of money to victims and sectors for drought relief. Studies have shown that drought or disaster relief does little to reduce societal vulnerability to the next event. It could even increase vulnerability because it encourages the status quo. In other words, vulnerability to drought is often the direct result of poor planning and resource management. If we are to reduce societal vulnerability to drought, we need to encourage improved planning and resource management by redirecting disaster relief to mitigation programs that target those people and sectors most at risk and, thus, create a greater coping capacity.

The crisis management approach that has historically characterized responses to drought throughout the world is illustrated by what I call the hydro-illogical cycle. Drought is a slow-onset, creeping phenomenon. Absent a comprehensive, integrated early warning system that gathers and assesses the status of water supplies on a regular basis, the severity of drought often goes undetected until the water shortage reaches crisis stage. Once we have reached a state of crisis, there are few alternatives other than providing relief to the most drought-affected sectors.



To break this cycle, nations need to establish national integrated drought monitoring and early warning systems that compile information on the status of all segments of the hydrologic cycle and deliver that information to decision-makers quickly so risks can be reduced. Needed information includes not only precipitation deficiencies and temperature anomalies but also the status of surface and groundwater supplies, soil moisture, snow-pack, and vegetation. Long-term climate forecasts, although not always reliable for many regions, may provide useful information for decision-makers as well, especially in areas where phenomena such as El Niño and La Niña result in significant climatic anomalies.

Documenting impacts on the ground is important to verify the severity of the drought and to identify those communities and sectors most at risk. The development of drought mitigation and preparedness plans is one of the most important outcomes of the planning process. These plans not only coordinate government actions among agencies at all levels but will also identify mitigation actions that can address risk and improve coping capacity.

Two United Nations agencies are attempting to move countries toward the development of national drought policies. A recent initiative from the World Meteorological Organization and the United Nations' Convention to Combat Desertification calls on all drought-prone nations to adopt policies that are based on the principles of risk management. If adopted, these approaches could help break the hydro-illogical cycle.

In the U.S., we have no cohesive national drought policy. In response to a severe drought in 1996 in much of the southwestern and south central portions of the country, Congress in 1998 passed the National Drought Policy Act. The bill created the National Drought Policy Commission (NDPC) to "provide advice and recommendations on creation of an integrated, coordinated federal policy designed to prepare for and respond to serious drought emergencies." The NDPC's initial report, submitted to Congress and the president in May 2000, recommended that the United States establish a national drought

policy emphasizing preparedness and proactive mitigation measures, including public education and greater collaboration among scientists and public officials.

The NDPC further recommended creation of a long-term, continuing National Drought Council composed of federal and nonfederal members to implement the recommendations of the NDPC. An interim National Drought Council was established by the secretary of agriculture following submission of the NDPC report. However, nothing has happened in the decade since. If the droughts of last year and those ongoing in the U.S. and elsewhere teach us nothing else, they should at least teach us that we need to develop a national policy and plan ahead. In light of current and future changes in climate variability, the time to create more drought-resilient societies is now—in the U.S. and around the world.

Donald A. Wilhite is director of the School of Natural Resources at the University of Nebraska in Lincoln and founding director of the National Drought Mitigation Center, located at the University of Nebraska. The views expressed are his own. For more, visit the NDMC website: <http://drought.unl.edu/Planning/HydroillogicalCycle.aspx>.