Breaking the Hydro-illogical Cycle: Progress or Status Quo for Drought Monitoring, Assessment, and Preparedness?

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Abstract

Drought is a normal, recurring feature of climate; it occurs in virtually all climatic regimes. It is the consequence of a natural reduction in the amount of precipitation received over an extended period of time, usually a season or more in length, although other climatic factors such as high temperatures, high winds, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate the severity of the event. Projected changes in climate state and variability, especially the occurrence of extreme climatic events such as drought, are of particular concern today because of their potential impact on food security in many nations, especially those where water supplies are already scarce.

Many people consider drought to be largely a natural or physical event. In reality, drought, like other natural hazards, has both a natural and a social component. Drought risk is best defined as a combination of these two components, exposure and vulnerability. Exposure to drought can be characterized by the historical climatology of a region, i.e., the frequency, severity, and duration of previous drought episodes, including an analysis of trends or changes in climate state and/or its variability. With the projected increase in drought occurrence for many regions, there is concern about whether a region's drought climatology is indicative of the future for water management and planning purposes.

Impacts are a key indicator of vulnerability. Therefore, conducting a vulnerability assessment through an analysis of the historical impacts associated with previous drought episodes represents an excellent measure of societal resilience. These assessments when completed for regions, communities, population groups, and others will provide critical information on whom and what is at risk and why. These assessments, when integrated into the drought mitigation planning process, can enhance the outcome of the process by identifying and prioritizing specific areas where progress can be made in minimizing risk. Since societies are constantly changing, vulnerabilities are also changing. Thus, each drought occurrence will result in differing impacts resulting from these changing vulnerabilities. A key question for drought mitigation and preparedness planning is determining how or if societal changes are increasing or decreasing societal vulnerability.

One of the trends associated with recent drought events has been the growing complexity of drought impacts. In the past, drought impacts have been linked most closely to the agricultural sector, reducing the capacity of many nations to be food secure. Today, the impacts associated with drought are more far-reaching, touching many other sectors including energy, transportation, recreating and tourism, urban water supply, and the resilience of ecosystems. These impacts are often an indicator of unsustainable land and water management practices. It has been demonstrated that drought assistance

or relief provided by governments and donors encourages land managers and others to continue these practices. It is precisely these existing resource management practices that have often increased societal vulnerability to drought (i.e., exacerbated drought impacts). This approach to drought management may result in decreased resilience of individuals and communities and an increased dependence on government. One of the principal goals of drought policies and preparedness plans is to move societies away from the traditional approach of crisis management, which is reactive in nature, to a more pro-active, risk management approach. The goal of risk management is to promote the adoption of preventative or risk reducing measures and strategies that will mitigate the impacts of future drought events, thus reducing societal vulnerability. This paradigm shift emphasizes preparedness, mitigation, and improved early warning systems (EWS) over emergency response and assistance measures. Many governments and others now understand the fallacy of crisis management and are striving to learn how to employ proper risk management techniques to reduce societal vulnerability to drought and therefore lessen the impacts associated with future drought events.

There has been considerable progress towards improved drought mitigation and preparedness in the United States over the past 25 years. Although the United States has fallen short of the adoption of a national drought policy, there has been a dramatic increase in the number of states with drought plans. The formation of the National Drought Mitigation Center in 1995, passage of the National Drought Policy Act of 1998 by the U.S. Congress, the recommendations of the National Drought Policy Commission in 2000, and passage of the National Integrated Drought Information System Act in 2006 have all contributed to this progress and are signs of a changing paradigm for drought mitigation. However, even with this increased attention to improved drought early warning, mitigation, and preparedness, much remains to be done.

The presentation will discuss the science of drought and the various elements of drought management. Progress in the United States and other regions over the past 25 years to move away from the traditional crisis management approach to a more risk-based management approach will also be chronicled. The presentation will also provide a roadmap for future drought mitigation and policy development that must take greater advantage of the windows of opportunity associated with future drought episodes and the impacts of climate change on water supplies and other natural resources. Recent international initiatives in integrated drought management will also be highlighted. Hopefully, the lessons learned in the United States will be transferable to other nations striving to improve it management of drought and other extreme climatic events.