

INVESTING IN DROUGHT PREPAREDNESS

BY: THE WATER FOR FOOD TEAM

Drought is a normal part of climate for virtually every country. It is a slow-onset, creeping phenomenon with serious economic, environmental, and social impacts. It affects more people than any other natural hazard. Generally, the common response has been reactive, ineffective, and untimely—usually leading to increased dependency on government and other organizations. The conventional response also adds to vulnerability because it provides a disincentive to adopt best management practices.

A risk-based management approach is more cost effective. It emphasizes improved monitoring and early warning systems; development of strong decision-support systems; identification and implementation of mitigation actions; education and training of policy makers, natural resources managers, and the public; and drought mitigation plans that reduce the most serious impacts. This approach addresses the underlying causes of vulnerability rather than the symptoms and impacts. Investments in drought-mitigation planning, management, and appropriate policies will provide individuals and governments with the tools necessary to reduce societal vulnerability to future droughts. A possible complement to this kind of investment is offered by the development of financial weather-related risk-management instruments.

DEFINING DROUGHT

There is no universal definition of “drought,” because its characterization is impact- and application-specific. A conceptual definition of *drought* is a deficiency of precipitation over an extended period of time with serious impacts on human activities and the environment. This definition links intensity and duration to societal impacts. Meteorological drought focuses only on the intensity and duration aspects of drought. As drought conditions persist for months, seasons, or years, other components of the hydrologic system will be affected. For example, agricultural drought is best defined by deficiencies in soil moisture and hydrological drought by deficiencies in surface and subsurface water supplies. The links between precipitation deficiencies and impacts are less direct for these drought types, with impacts lagging meteorological drought. Conflicts between water users increase as drought persists because competition for surface and subsurface water supplies intensifies. Socioeconomic drought is associated with the supply and demand of some commodity, resource, or product that is influenced, though indirectly, by precipitation amounts, timing, and effectiveness, as well as by water resource management practices.

Greater investment should be directed to lessening risk associated with drought. Drought risk is defined by a region's exposure to the natural hazard and society's vulnerability to it. Because climate is variable through time, exposure to drought also varies from year to year and decade to decade. Global warming and the probability that drought and other extreme climatic events may become more frequent in the future may translate into increased exposure to drought. Water resources planning should be based on the assumption that climate is variable and extremes are a normal part of climate everywhere.

Vulnerability to drought is defined by social factors such as increases in population and regional migration trends, demographics, urbanization, land use changes, natural resources policies, water use trends, environmental awareness and degradation, technology, and the like. Vulnerability is dynamic and must be periodically evaluated at the local and national levels.



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The preparation of vulnerability profiles (who and what is at risk and why) can help individuals and governments at every level to better understand and systematically address drought risk.

Drought early warning systems must have the capacity to detect the first signs of an emerging rainfall deficiency, the best indicator of meteorological drought, but other key drought indicators (water reservoir levels, groundwater levels, stream flows) are also important. There are also critical economic and social indicators (market data such as grain prices and changing terms of trade for staple grains and livestock as an indicator of purchasing power in rural communities, migration of household members to search for work, selling of nonproductive assets). All of these indicators provide decision makers with early information on emerging impacts in various sectors. Climate indexes should be used to evaluate the status of climate and water supplies, and potential impacts in specific sectors such as agriculture, energy, and urban water supply. This information should be supplemented by long-range or seasonal forecasts. A drought early warning system must not only encompass mechanisms and procedures for the collection,

analysis, and integration of information from multiple sources in a timely manner, but also include procedures for the dissemination of that information to potential end users. Training end users about the value of this information in the decision-making process is essential. Once drought conditions are detected, there should be continuous information flow on the severity of conditions, potential impacts, and possible mitigation or emergency response actions.

Best practices include development of a comprehensive drought early warning system that includes collection of data for all meteorological and hydrological variables and for critical social indicators which integrates this information into a timely and reliable assessment of severity and impacts. These data are commonly available from national meteorological, hydrological, and agricultural services units. Development of an automated weather data station network is recommended to collect data from a broader spectrum of meteorological variables and in near-real time for locations representative of the agricultural environment rather than the urban setting. Automated networks can be established in most settings.

Box 1: The 10-Step Drought Mitigation Planning Process

The 10-step drought mitigation planning process was originally based on interactions with U.S. states but has been modified greatly to incorporate the experiences and lessons learned from many developed and developing countries. It has been the basis for discussions at regional training workshops and seminars on drought management and preparedness. This planning process has evolved to incorporate more emphasis on risk assessment and mitigation tools in response to the increasing interest in drought preparedness planning. The steps are as follows:

1. Appoint a drought task force or committee.
2. State the purpose and objectives of the drought mitigation plan.
3. Seek stakeholder input and resolve conflicts.
4. Inventory resources and identify groups at risk.
5. Prepare and write the drought mitigation plan.
6. Identify research needs and fill institutional gaps.
7. Integrate science and policy.
8. Publicize the drought mitigation plan and build awareness and consensus.
9. Develop education programs.
10. Evaluate and revise drought mitigation plans.

Source: Author.



POTENTIAL BENEFITS

A comprehensive early warning system can provide decision makers with information for making timely decisions that can reduce the economic, social, and environmental costs and losses associated with drought. Drought management reduces the risk to people, property, and productive capacity. It is a critical part of poverty reduction strategies.

POLICY AND IMPLEMENTATION ISSUES

Shifting from crisis management to drought risk management is difficult because governments and individuals typically take a reactive approach and little institutional capacity exists in most settings to alter this paradigm. A 10-step drought planning methodology to assist in building institutional capacity is illustrated in Box 1.

A drought policy establishes a set of principles or operating guidelines. It should be consistent and equitable for all regions, population groups, and economic sectors, and consistent with the goals of sustainable development. Its overriding principle is an emphasis on managing risk through preparedness and mitigation. This principle can be promoted through more, or better, seasonal and shorter-term forecasts; integrated monitoring, drought early warning systems, and associated information delivery systems; preparedness plans at various levels of government; mitigation actions and programs; a safety net of emergency response programs that ensure timely and targeted relief; and an organizational structure that enhances coordination within and among levels of government and with stakeholders.

LESSONS LEARNED

Individuals, governments, and others consider drought a rare and random event. As a result, little, if any, planning is usually completed in preparation for the next event. Because drought is an inevitable feature of climate, strategies for reducing its impacts and responding to emergencies may and should be well defined in advance. Almost without exception, the crisis management approach has been untimely and ineffective and has done little to reduce vulnerability to the next drought. Also, relief measures have been poorly targeted. In fact, drought relief actually increases vulnerability to future events by reducing self-reliance and increasing dependence on external assistance.

In addition, agricultural producers and natural resources managers that employ best-management practices are usually not eligible for drought relief or assistance programs. In reality, governments not only promote poor management by providing drought relief, but also reward it.

RECOMMENDATIONS FOR PRACTITIONERS

Many drought mitigation actions exist for each impact sector. Conducting a drought risk assessment will help identify the most essential mitigation actions for each of these sectors to reduce drought vulnerability. Some general recommendations that would benefit all sectors follow:

General

- Improving the reliability of seasonal climate forecasts and increasing their use could improve decision making for water management.
- Establishing an automated weather station network could provide end users with near-real time data to improve decision making.
- Altering operating procedures for water reservoir management and augmenting water storage capacity of surface and subsurface systems could improve drought coping capacity.
- Improving information delivery systems and providing technical assistance could improve decision making by government officials, agricultural producers, and water managers during droughts and help create the necessary infrastructure.
- Improving water conservation practices for domestic and agricultural sectors during drought and non-drought periods and monitoring the effects of drought on water quality for both surface and groundwater supplies would help to mitigate risks overall.

Below are more specific recommendations for practitioners in the agricultural, municipal, and industrial sectors.

Agriculture

- Conduct crop irrigation efficiency studies and train farmers on the best water management practices and conservation irrigation
- Encourage the use of innovative cultivation techniques to reduce crop water use and provide guidance on alternative cropping systems and crop types to employ during droughts

- Provide farmers with real-time irrigation scheduling and crop evapotranspiration information
- Monitor and provide farmers with real-time data on soil moisture
- Encourage installation of water-efficient irrigation technology
- Promote the development of an actuarial-based crop insurance program for agricultural producers

Municipal and Industrial

- Provide guidance to local government and water supply providers on long-term water management issues, including drought planning
- Encourage water reuse as part of ongoing water conservation programs
- Provide water efficiency education for industries and businesses
- Develop and implement an incentives program to encourage efficient use of existing water supplies
- Assess and classify the drought vulnerability of individual water supply systems
- Identify vulnerable water-dependent industries, and fund research to help determine impacts and improve predictive capabilities

POTENTIAL WORLD BANK INVOLVEMENT

The World Bank has several lending instruments to stimulate progress in drought risk management. The Specific Investment Loan program may facilitate development of institutional capacity. Since a shift from the crisis management approach to a risk management approach must be gradual, the Adaptable Program Loan instrument may

offer the opportunity to transition to this new paradigm. Moving to risk-based drought management requires restructuring of current emergency assistance programs and building consensus among stakeholders on priorities for mitigation measures. Government agencies possess considerable institutional inertia toward maintaining the status quo (in other words, maintaining current emergency drought relief programs). Effective drought risk management requires building consensus between government and stakeholders.

The best time to develop a drought mitigation policy and a preparedness plan is right after a disastrous drought. The lessons learned in attempting to manage the drought crisis without a viable plan and the far-reaching impacts associated with drought are fresh in the minds of policy makers, natural resources managers, and the public. The World Bank's Emergency Recovery Loan program is intended to restore assets and production levels after a natural disaster. This program could be effective in implementing drought disaster—resilient technology, including creation of a comprehensive and integrated early warning and delivery system, and appropriate training programs to avoid or mitigate the impact of future droughts.

Investment opportunities in drought mitigation are numerous and varied. As part of the drought planning process, a critical step is the identification of appropriate mitigation actions that will address those sectors, population groups, and regions most at risk. As potential mitigation options are identified, each should be evaluated in terms of its potential to decrease both short-term and long-term drought impacts and consistency with sustainable development goals.

This Note was prepared by Donald Wilhite of the International Drought Mitigation Center and updated by Salah Darghouth and Ariel Dinar from the Water For Food Team of the World Bank. It is based on Investment Note 8.1 in the larger volume *Shaping the Future of Water for Agriculture: A Sourcebook for Investment in Agricultural Water Management*. The Sourcebook documents a range of solutions and good practices from World Bank and worldwide experience, concentrating on investments in policy and institutional reforms in technology and management to improve water productivity and farming profitability. You can download a copy of the full report at www.worldbank.org/rural or email ard@worldbank.org.

