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# Reducing Societal Vulnerability to Drought: A Methodology

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# Reducing Societal Vulnerability to Drought: A Methodology

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**Abstract**
Given worldwide experience with drought during the past several decades and the magnitude of associated impacts, it is apparent that vulnerability to extended periods of water shortage is escalating. Developing a national or provincial drought policy and preparedness plan is a complicated but essential first step toward reducing societal vulnerability. Until recently, nations had devoted little effort to drought preparedness, preferring instead the reactive or crisis management approach. Presently, an increasing number of nations are pursuing a more proactive approach that emphasizes the principles of risk management and sustainable development. Because of the multitude of impacts associated with drought and the numerous governmental agencies that have responsibility for some aspect of monitoring, assessment, mitigation, and planning, developing a policy and plan must be an integrated process within and between levels of government. This paper will outline a generic process that can be adopted by governments that desire to develop a more comprehensive and long-term approach to drought management and planning. Countries and states or provincial authorities that have adopted this approach will be presented as case studies. This process is timely, given the declaration of the 1990s as the International Decade for Natural Disaster Reduction and the recent International Convention to Combat Desertification and Drought (June, 1994), an offshoot of deliberations at the United Nations Conference on Environment and Development.

**Keywords:** drought management, drought planning

## Introduction

Drought is the most complex but least understood of all natural hazards; it also affects more people than any other natural hazard (Hagman, 1984). The occurrence of severe drought, especially when extended over one or more consecutive years, often results in serious economic, social, and environmental consequences in both developing and developed countries. To understand the phenomenon of drought, society must first realize that it is not merely a natural event but rather the result of an interplay between a natural event (precipitation deficiencies due to natural climatic variability on varying time scales) and the demand placed on water supply by human-use systems. Thus, in reality, drought is a product of the relative vulnerability of both natural and social systems, each of which change with time.

Literature is replete with references to extended periods of drought that have resulted in or contributed significantly to food supply disruptions, famine, massive migrations of people, and wars. The impact of drought is often exacerbated by human beings. Is societal vulnerability to drought escalating as pressures on water and other limited natural and biological resources increase? Is our growing sensitivity to drought-induced water shortages an indicator of an ever-increasing disharmony between human activities and the environment in which we live? We know that the earth's rapidly expanding population is placing an ever-increasing demand on local and regional water resources and, in many areas, increasing the magnitude of drought impacts and accelerating land degradation processes.

The purpose of this paper is to outline a framework or planning process that can be followed to build a comprehensive and integrated national drought preparedness policy and plan. Where appropriate, this policy and plan can be integrated with existing food security and desertification plans to form a comprehensive plan to mitigate the effects of drought, famine, and desertification (UNSO, 1992). This approach emphasizes the principles of risk management and sustainable development. These principles, with appropriate modifications, have proved to be transferable to drought-prone nations worldwide.

### *Constraints to Drought Planning*

Although the principles of drought planning have been known for some time, progress toward preparedness in most countries has been conspicuously absent. This lack of progress would indicate that impediments or constraints to drought planning exist and must be addressed if the planning process is to be successful.

Participants of a recent conference, *Drought Management in a Changing West: New Directions for Water Policy* (Wilhite and Wood, 1994 ), were asked to identify constraints to improved drought management and preparedness for the western United States. This region was shocked by a series of drought years that has continued with little or no relief, with the exception of 1993, since 1987. Precipitation patterns in late 1994 and early 1995 have improved the outlook for 1995; however, it is premature to signal an end to the drought at this writing. As a result of this remarkable series of water-short years, residents of the western states have become quite sensitive to the inefficiencies of the current water and

natural resources management systems. Constraints identified by participants can be divided into two categories: ( 1) data and informational; and (2) organizational, legal, financial, and political. Data and informational constraints include lack of drought prediction skill, deficiencies of current monitoring systems, definitional problems, inaccessibility of water and drought-related data and information, deficiencies of information on water uses and legal or regulatory options, unavailability of post-drought audits (i.e., describing lessons learned), and the lack of a centralized information source on potential mitigative actions. Organizational constraints include the lack of political will, expectations for emergency relief, lack of a coordinated response because of poor interagency cooperation, deficiencies of legal mechanisms to reallocate water between users during emergency situations, and inadequacy of human and financial resources to develop drought preparedness plans at local, state, and national levels.

***Developing a National Drought Policy and Plan: A Methodological Approach***

The common approach to drought management has been one of crisis management. This approach implicitly assumes that drought is a rare and random event rather than a normal part of a variable climate. However, from past experiences we know that droughts will recur and that the frequency and severity of those recurrences are dictated by or are a product of each region's climatic regime. The crisis management philosophy results in a reactive response to drought that is associated with the provision of relief or assistance to victims in the distressed areas. This assistance, usually provided by government, international organizations, or nongovernment organizations (NGOs), often serves as a disincentive to the adoption of proper risk management or risk minimization practices by discouraging self-reliance on the part of individual citizens, agriculturalists, businesses, municipalities, and others. Relief or assistance can reinforce nonsustainable practices. In most developing countries, response to drought has been untimely, often lagging severe drought occurrence and food supply shortfalls by six to fourteen months.

An alternative approach is to initiate planning between periods of drought, preparing a plan that incorporates risk management as its goal (Wilhite, 1993). This alternative promotes the development of policies and plans that mitigate or reduce some of the risks from drought and, therefore, some of the associated impacts. This approach allows governments to allocate their limited resources for drought mitigation in a more beneficial manner. But, because drought is not as well understood as other natural hazards and its impacts are nonstructural and difficult to quantify, until recently most governments have been less inclined to invest resources to develop well-conceived policies, plans, and mitigation programs. To be successful, the risk management approach to drought management must always integrate the objectives of drought policy with longer term national development policies that promote environmentally sustainable development.

A planning process was developed recently in the United States to facilitate the preparation of drought plans by state government decision makers (Wilhite, 1991). This process has been evolving since 1986, when it was conceived to synthesize the discussions and recommendations from participants of an international symposium and workshop on drought (Wilhite and Easterling, 1987a). The process was further modified through direct

interaction with foreign governments as well as through a series of regional training seminars on drought management and preparedness organized and conducted by the International Drought Information Center, University of Nebraska–Lincoln. The most recent seminar was held in Montevideo, Uruguay, in March 1993 for the Latin American Region. A product of these seminars was the publication of a guidebook on drought preparedness for developing countries (Wilhite, 1992).

The framework presents ten steps considered essential in the planning process (fig. 1). The first four steps actually involve appraising the resources available to support plan development and designing tactics to gain public support for the process. However, the process is intended to be flexible (i.e., governments can add, delete, or modify steps as necessary). The process can and should be instituted at several levels (local, state, and national) with appropriate linkages. The intended emphasis of the process is on strengthening existing institutions rather than on developing new ones. The emphasis is also directed toward developing and improving self-reliance at the local level while moving away from intervention strategies (emergency relief) by government, international organizations, and NGOs. The ten-step process is summarized in the following paragraphs. For a more detailed discussion, consult *Preparing for Drought: A Guidebook for Developing Countries* (Wilhite, 1992).

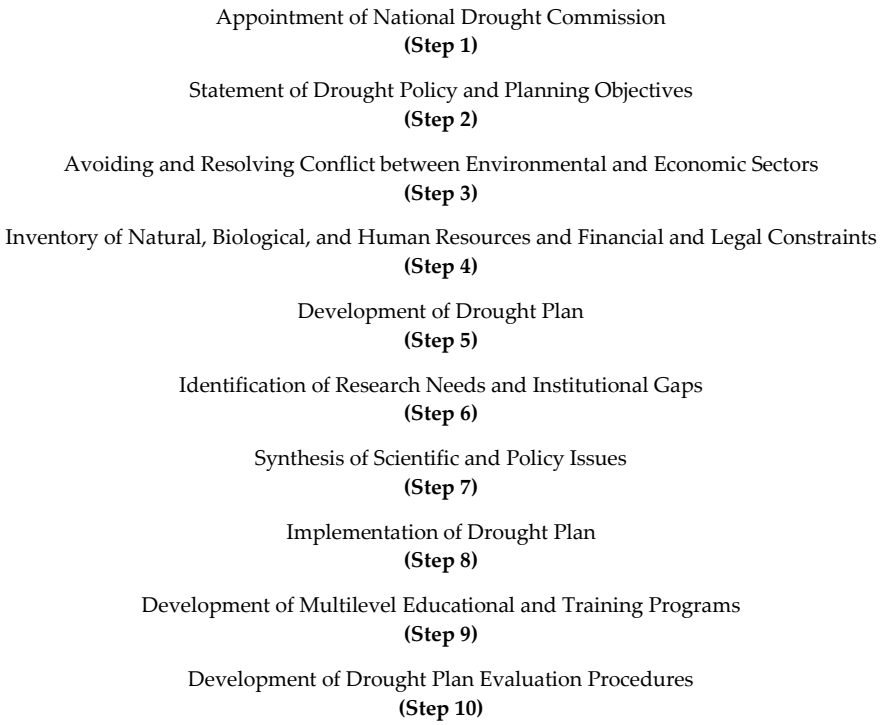


**Figure 1.** The ten-step methodology proposed for the development of a national drought plan.

*Step 1. Appointment of National Drought Commission*
The planning process is initiated through the appointment of a national drought authority or commission (NDC). The NDC will supervise and coordinate the development of the plan and, after the plan is implemented and during times of drought when the plan is activated, will assume the role of policy coordinator, reviewing alternative policy response options and making recommendations to political officials and/or legislative bodies. The NDC should include representatives of the most relevant mission agencies, recognizing the multidisciplinary nature of drought, its diverse impacts, the importance of both the assessment and response components in any comprehensive plan, and how this plan must be integrated with long-term sustainable development objectives.

*Step 2. Statement of Drought Policy and Planning Objectives*
The NDC must formulate a national drought policy and the objectives of the drought plan. The objectives of a drought *policy* differ from those of a drought *plan.* A clear distinction of these differences must be made at the outset of the planning process. A drought *policy* will be broadly stated and should express the purpose of government involvement in drought assessment, mitigation, and response programs. Ultimately, the goal of a national policy should be to reduce vulnerability to drought by encouraging sustainable development. Drought *plan* objectives are more specific and action-oriented. Typically, the objectives of drought policy have *not* been stated explicitly by government. What generally exists in many countries is a *de facto policy*, one defined by the most pressing needs of the moment. Without clearly stated drought policy objectives, the effectiveness of assessment and response activities is difficult to evaluate.

*Step 3. Avoiding and Resolving Conflict between Environmental and Economic Sectors*
Political, social, and economic interests often clash during drought conditions as competition for scarce water resources intensifies, and it may be difficult to achieve compromises under these circumstances. To reduce the risk of conflict between water users during periods of shortage, it is essential for the public to receive a balanced interpretation of changing conditions through the media and from other sources. The NDC should ensure that frequent, thorough, and accurate news releases are issued to explain changing conditions, complex problem areas, and situations in which solutions will require compromises on both sides. Public interests and environmental concerns are best addressed early and often in the drought planning process. Creating an advisory group made up of representatives of these groups is recommended as a means of addressing their concerns.

*Step 4. Inventory of Natural, Biological, and Human Resources and Financial and Legal Constraints*
An inventory of natural, biological, and human resources, including the identification of financial and legal constraints, would reveal assets and liabilities that might enhance or inhibit fulfillment of the objectives of the planning process. In some instances, much information already exists concerning available resources, particularly in the natural and biological resource areas. It is also important to determine the vulnerability of these resources to periods of water shortage that result from drought.

*Step 5. Development of the Drought Plan*

The NDC will be the coordinating body for the development of a drought plan. The framework for that plan was developed previously in the national drought policy established in Step 2. Once completed, the plan is envisioned to follow a stepwise or phased approach as water conditions deteriorate and more stringent actions are needed. Thresholds must be established such that, when exceeded, certain actions are triggered within government agencies, as defined by the structure of the plan.

A drought plan should have three primary organizational components: monitoring or early warning, assessment of impact, and response. The monitoring committee must track all principal indicators of water availability and meet frequently to determine the spatial extent and severity of drought conditions. The impact assessment committee must determine the likely impacts of water deficiencies. The NRC's function is to integrate these assessments and identify and evaluate potential short-term response options and long-term programs and policies to reduce vulnerability to subsequent occurrences of drought. Although these are distinct activities, formal linkages between them will need to be incorporated in the plan for it to function properly and be responsive to provincial and local needs and evolving water supply conditions.

*Step 6. Identification of Research Needs and Institutional Gaps*

The purpose of this step is to identify research needed in support of the objectives of the drought plan and to recommend research projects to remove deficiencies that may exist. It is unlikely that research needs and institutional gaps will be known until the various committees mentioned under Step 5 have been through the planning process. Compiling information on research needs and institutional gaps is a function of the NDC.

*Step 7. Synthesis of Scientific and Policy Issues*

The policy maker's understanding of the scientific issues and technical constraints involved in addressing problems associated with drought is often negligible. Likewise, scientists generally have a poor understanding of existing policy constraints that affect short-term drought response and the formulation of policies directed toward vulnerability reduction. A panel of researchers and policy experts concluded that communication and understanding between the science and policy communities is poorly developed and must be enhanced if the drought planning process is to be successful (Wilhite and Easterling, 1987b). Direct and extensive contact is required between the two groups in order to distinguish what is feasible from what is desirable for a broad range of science and policy issues. Integration of science and policy during the planning process will also be useful in setting research priorities and synthesizing current understanding. The NDC should consider various alternatives to bring these groups together.

*Step 8. Implementation of the Drought Plan*

The drought plan should be implemented by the NDC to give maximum visibility to the program and credit to the agencies and organizations that have a leadership or supporting role in its operation. As with emergency response plans, all or a portion of the system should be tested under simulated drought conditions before it is implemented. It is also

suggested that announcement and implementation occur just before the most drought-sensitive season to take advantage of inherent public interest. The cooperation of the media is essential to publicizing the plan, and they must be informed fully of the rationale for the plan as well as its purpose, objectives, assessment and response procedures, and organizational framework. If a representative of the media or a public information specialist is a member of the NDC, as recommended, this person should be an invaluable resource in carrying out this step of the planning process.

In the absence of drought over several consecutive years, the NDC should conduct simulation exercises to keep leadership informed of their responsibilities during drought. This is a common practice in natural disaster mitigation (e.g., earthquakes, hurricanes); it should be no different for drought. Changes in political leadership, retirements, promotions, and transfers to other positions can disrupt the integrity of the plan. Typically, institutional memory is short.

*Step 9. Development of Multilevel Educational and Training Programs*

Educational and training programs should concentrate on several points. First, a greater level of understanding must be established to heighten public awareness of drought and water conservation and the ways in which individual citizens and the public and private sectors can help to mitigate impacts in the short and long term. The educational process might begin with the development of a media awareness program. This program would include provisions to improve the media's understanding of the drought problem and the complexity of the management issues involved, as well as a mechanism to ensure the timely and reliable flow of information to all members of the media (e.g., via news conferences). Second, the NDC should initiate an information program aimed at educating the general population about drought and water management and what they can do as individuals to conserve water in the short run. Educational programs must be long-term in design, concentrating on achieving a better understanding of water conservation issues among all age groups and economic sectors. If such programs are not developed, governmental and public interest in and support for drought planning and water conservation will wane during periods of nondrought conditions.

*Step 10. Development of Drought Plan Evaluation Procedures*

The final step in the establishment of a drought plan is the creation of a detailed set of procedures to ensure adequate evaluation. To maximize the effectiveness of the plan, two modes of evaluation must be in place:

1. An ongoing or operational evaluation program that considers how societal changes such as new technology, the availability of new research results, legislative action, and changes in political leadership may affect the operation of the plan.
2. A post-drought evaluation program that documents and critically analyzes the assessment and response actions of government, NGOs, and others as appropriate and implements recommendations for improving the system.

The first mode of evaluation is intended to express drought planning as a dynamic process rather than a discrete event. The operational evaluation program is proposed to keep the drought assessment and response system current and responsive to national needs. Following the initial establishment of the plan, it should be monitored routinely to ensure that societal changes that may affect water supply and/or demand or regulatory practices are considered for incorporation. Accordingly, drought plans should be revised periodically.

The second mode of evaluation is the post-drought audit, which should be conducted or commissioned by governments in response to each major drought episode. Institutional memory fades quickly following drought as a result of changes in political administration, natural attrition of persons in primary leadership positions, and the destruction of critical documentation of events and actions taken. Post-drought evaluations should include an analysis of the physical aspects of the drought: its impacts on soil, groundwater, plants, and animals; its economic and social consequences; and the extent to which predrought planning was useful in mitigating impacts, in facilitating relief or assistance to stricken areas, and in post-drought recovery. Attention must also be directed to situations in which drought-coping mechanisms worked and where societies exhibited resilience; evaluations should not focus only on those situations in which coping mechanisms failed. Provisions must be made to implement the recommendations emanating from this evaluation process. Evaluations of previous responses to severe drought are recommended as a planning aid to determine those actions (both technical and relief) that have been most effective.

To ensure an unbiased appraisal, governments should place the responsibility for evaluating drought and societal response to it in the hands of nongovernmental organizations such as universities and/or specialized agencies or corporations. An excellent example of this practice in operation is the evaluation of India's Food for Work Program. Although the program is implemented by state government, it is evaluated by an independent body, the Planning Commission (Wilhite and Easterling, 1987a). Private foundations, research organizations, and international organizations should be encouraged to support post-drought evaluations.

***Institutional Implications of National Drought Preparedness Efforts***

Efforts to develop drought preparedness plans for most countries will require the *creation* of an institutional structure to coordinate the activities and strengthen the capacity of *existing* governmental and nongovernmental entities. The preparedness process is best characterized as an effort to better coordinate existing functions of government; this effort will result in some resources (financial and human) of government being diverted to this new activity. To the extent that the drought plan can use existing governmental and nongovernmental entities, the costs associated with drought preparedness will be minimized.

To generate the resources required to implement the drought planning process will require governments to market the concept on the basis of the cost/benefit ratio (i.e., the costs and losses associated with drought versus the potential benefits of preparedness) of these activities. Although the costs and losses of drought are not well documented, they are reasonably well understood by policy makers. However, the benefits of preparedness are not as clear. Given the experiences of many policy makers with drought in recent decades,

convincing them of the cost effectiveness of preparedness actions should be an achievable goal. Estimates of the costs and losses associated with drought (assuming no preparedness activities) must be compared to the costs of preparedness minus the savings accrued by a reduction in the future impacts of drought and reduced relief costs. In estimating the drought costs and the losses that do not occur, it should be emphasized that many of these values are not easily quantifiable. For example, indirect economic costs and the social and environmental impacts of drought are seldom estimated.

## Conclusions

A ten-step planning process was described in this paper that can serve as a framework for the development of a national drought policy and plan for drought-prone nations. As vulnerability to drought is increasing worldwide, it is with some urgency that national governments implement drought preparedness plans and that these activities are coordinated with appropriate international organizations and donors. It is essential that these policies and plans focus on the protection of livelihoods, rather than emphasizing relief and response actions that are reactive in nature. These reactive approaches have done little to lessen vulnerability to drought and may, in fact, have been a disincentive for the adoption of sustainable management practices. It is also important to remember that preparedness should occur at multiple levels (e.g., household, local, provincial, and national level). A national policy and plan must be linked to an existing development plan and food security strategy.

It is imperative that national and regional-scale efforts toward drought preparedness be promoted through the conduct of training seminars and the establishment of networks of policy makers and scientists. These forums provide opportunities to share experiences and ideas. Appropriate international and regional organizations should be an integral part of training programs and be a vehicle to implement recommendations emanating from these training sessions.

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