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CHAPTER 37 DROUGHT POLICY: TOWARD A PLAN OF ACTION

Donald A. Wilhite and William E. Easterling

INTRODUCTION

From the preceding discussions it is clear that in most cases, governments and international organizations have been unable to respond effectively to drought. This inability to respond was recognized by workshop participants as a serious problem of global dimensions that can only be solved through interdisciplinary studies and cooperation between scientists and policy makers.

The workshop sought to identify information needs and opportunities, develop an agenda of drought-related research priorities, prepare recommendations on ways to stimulate the development of drought assessment and response plans by national governments, and suggest ways of involving international organizations in promoting the planning process. The ultimate goal of the workshop was to initiate a "plan of action" that would represent a first step in enhancing drought planning activities.

The suggestions that follow are the editors' distillation of the collective wisdom of workshop participants into a "plan of action." This "plan" could serve as a model for drought planning at various levels of government and in various socioeconomic and political settings.

BACKGROUND

In a recent comparative analysis of drought policy in the United States and Australia, Wilhite (1986a) separated the features of that policy into three components: (1) organization, (2) response, and (3) evaluation. Organizational components were considered to be planning activities that would provide timely and reliable assessments and function as a drought early warning system, and procedures for a coordinated and efficient response, such as drought declaration. Many of the organizational features could form the foundation of a drought plan, either at the national, subnational, or supernational level.

Response components refer to assistance measures and associated administrative procedures that are in place to assist individual citizens or businesses experiencing economic and physical hardship because of drought. In Australia, relief arrangements are included under the National Disaster Relief Arrangements (NDRA), a program whereby states are expected to meet a certain base level or threshold of expenditures for

disaster relief from their own resources. Expenditures in excess of that base level are cost-shared by the federal government. A wide range of relief measures are included under the NDRA agreements.

Evaluation of organizational procedures and assistance or response measures implemented to mitigate some of the hardships of drought is the third component of drought policy. Post-drought evaluations should be initiated in the recovery period to determine if the instruments of drought policy were successful, and, if not, how policy and programs should be modified to ensure a more suitable response to the next episode of severe drought. Government response efforts seldom include an evaluation component. As a result, the mistakes of the past are often repeated.

The objectives of drought policy will, of course, vary between levels of government and from country to country. In the United States, for example, the objectives of a national drought policy might be:

1. To prepare an organizational structure for assessing and responding to drought-related problems and water shortages.
2. To develop standby legislation that adequately addresses the impacts of drought through relevant assistance measures.
3. To encourage and support basic and applied research leading to the development of appropriate management strategies for all drought-prone regions.
4. To foster and support water planning and management activities at both the state and regional level.

To be successful, whether in the United States or elsewhere, drought planning must be integrated within the national and state or provincial levels of government, involving existing regional (multistate) organizations as well as the private sector where applicable. At the national level in the United States, however, the diversity of impacts associated with drought and the multitude of federal agencies with responsibility for drought assessment and response make it difficult for a single federal agency to assume leadership in the development of a national drought assessment and response plan. The development of a national policy requires an interagency approach in these instances, under the leadership of a single agency. For this as well as other reasons, such as unique local water management problems, Wilhite, et al. (1986b) have suggested that where a complex federal bureaucratic structure exists, as it does in the United States, drought planning efforts may be most effective if first initiated at the state level. In other settings, such as in less-developed countries, the drought planning process may be coordinated more easily at the national level since the bureaucratic structure may be less formidable.

The objectives of drought policy at the state level will differ from those at the national level, reflecting the unique physical, environmental, socioeconomic, and political characteristics of a particular area. For example, drought policy objectives might be:

1. To develop a monitoring system that provides early warning of impending drought conditions and impacts.
2. To develop an organizational structure that enhances drought preparedness and response by linking levels of government.

The development of the organizational structure referred to in the second objective will provide the necessary integration with drought policies at the national level and should ensure adequate coordination between the two levels.

THE DROUGHT PLANNING PROCESS

In the discussion that follows, drought planning is presented as a process involving ten steps (Fig. 1). This process is intended to be flexible so that it can be easily adapted to many sociopolitical situations and levels of government. The first three steps actually involve mustering the necessary resources to initiate development of the plan. Continuous evaluation and updating for the procedures included within each step of the process is intended in order to keep the plan most responsive to the needs of the region.

Step 1

The process is initiated through the appointment of a task force to supervise and coordinate the development of the plan. This task force has the greatest impact if the members are selected by a high-ranking political official (or at his request by a senior-level policy official). The task force should include representatives from the relevant mission agencies within government and from nongovernmental organizations. At the national level the task force structure should also include representatives from selected drought-prone areas or states. At the state level, representatives of both state and federal levels must be included.

Step 2

As their first official action, the task force will develop a general statement of purpose and the specific objectives for the plan. A statement of purpose for a drought plan at the state or provincial level could call for the provision of an effective and systematic drought assessment and response protocol. Suggested objectives for the plan (Wilhite and Wood, 1985) are to:

1. Provide timely and systematic data collection, analysis, and dissemination of drought-related information.
2. Establish criteria for starting and ending various assessment and response activities by governmental agencies during drought emergencies.
3. Provide an organizational structure that assures information flow between and within levels of government and defines the duties and responsibilities of all agencies.
4. Maintain a current inventory of governmental agency responsibilities in assessing and responding to drought emergencies.
5. Provide a mechanism to improve the assessment of the impact of drought on agriculture, industry, municipalities, vulnerable population groups, and so forth.

Step 3

An inventory of natural and human resources, including the identification of financial constraints, should be initiated by the task force. This inventory would reveal

**Appointment of
Drought Task Force
(STEP 1)**

**Statement of Purpose
and Objectives
(STEP 2)**

**Inventory of Natural and Human
Resources, Financial Constraints
(STEP 3)**

**Development of Drought Plan
(STEP 4)**

**Identification of Research Needs
and Institutional Gaps
(STEP 5)**

**Synthesis of Drought Management
Science and Policy
(STEP 6)**

**Identification of Response Options
(STEP 7)**

**Implementation of Drought Plan
(STEP 8)**

**Development of Educational
and Training Programs
(STEP 9)**

**Development of
System Evaluation Procedures
(STEP 10)**

Figure 1. A ten-step drought planning process.

the assets and liabilities that might serve to enhance or inhibit fulfillment of the objectives of the planning process. A comprehensive assessment of available resources would provide the information necessary for further action by the task force.

Step 4

The task force would be the coordinating body for the development of a drought plan. Although the process would vary from one location to another, three primary organizational activities must be completed as part of this step. First, a moisture assessment committee must be established, or coordination achieved with existing mechanisms, to monitor current and estimate likely future moisture conditions (i.e., precipitation, soil moisture, surface water storage, ground water, and streamflow). Second, an impact assessment committee must be established to identify sectors most likely to be affected by drought. Third, a policy committee of senior-level officials should be established as a coordinating body to oversee the activities of the moisture and impact assessment committees.

Moisture Assessment Committee. The moisture assessment committee would have four primary objectives: (1) to inventory data quantity and quality from current observational networks, (2) to determine the needs of primary users, (3) to develop a drought monitoring system, and (4) to develop or modify current data and information delivery systems. The functions of this committee will necessitate close interaction with the impact assessment committee.

Membership of this committee should include representatives from agencies with responsibilities for forecasting and monitoring these features of the water balance. A climatologist should be an active member of the committee for interpretations of current climate conditions. The climatologist would also provide climatological probabilities for the onset, continuation, and termination of drought conditions.

Inventory current observation networks: The moisture assessment committee must also inventory current observational networks (e.g., meteorological, hydrological) and protect and enhance those networks where necessary. It must be recognized that most current drought monitoring systems are based largely or entirely on meteorological data. These data, by themselves, do not necessarily reflect the impact of weather events on agriculture, water availability and use, health, and so forth.

Data must be collected at a sufficient spatial density to adequately represent impending drought conditions to many user groups, and they must be of sufficient quality to ensure accurate assessments. Currently, many observational networks and reports emanating from those networks do not provide sufficient information for operational and research purposes. The committee must ensure that conventional surface observation stations in national and state measurement networks are protected from being downgraded or eliminated. These networks provide essential benchmark data and time series needed for improved monitoring of the climate system.

Determine needs of primary users: For monitoring systems to be successful in both the short and long run, network designers must consider user needs from the initial design phase for data collection networks through the development of dissemination systems. Coupled with this is the need to determine the primary target groups for the network products. Communication channels between suppliers and users of information

must always be open to spontaneous feedback. Agencies and organizations responsible for maintaining drought monitoring or early warning systems must receive and use feedback from users at all levels to establish and modify needs and priorities. System managers must also formally solicit the opinions and suggestions of users on a periodic basis. These solicitations should include requests for opinions about and experiences related to the use of existing products and practices as well as ideas for future product development.

Development of a drought monitoring system: In developed countries, data and information on impending drought conditions is usually available, and available on a timely basis. In less developed countries, however, the problems of monitoring drought are understandably more basic than in developed countries. Often no monitoring system exists. This may be the result of many factors or combinations of factors (e.g., inadequate numbers of trained personnel, limited financial resources, and the lack of necessary historical climatic data sets and supplementary agronomic, hydrologic, and other information). There is certainly a need to identify the minimum data set necessary to support a drought detection system in these instances. The success of a drought monitoring system can only be evaluated in the long run, and thus support and funding for such a program must remain firm, a particular concern in developing countries.

Development of data and information delivery system: In both developed and developing countries, information is not always disseminated to users in a timely manner. Furthermore, once the information reaches the user or decision maker, it may, for a number of reasons, be applied ineffectively. For example, the user may not know how to incorporate this information into a decision strategy, or the product may be badly designed as a conveyor of information.

In less-developed countries the low level of development, widespread illiteracy, relative isolation, and subsistence levels of many producers impede the flow of information from early warning systems about potentially limiting weather-related production factors. This in turn restricts the number of realistic options available to producers. In these settings the flow of data and information about drought should not be separated from the need for information to better manage rural production systems in normal and above-average years. Also, governments should not dismiss the capability of local farmers to adapt to drought through the application of indigenous practices. Although these methods may not be widely known to organizations that have the responsibility for the development and implementation of monitoring systems, they have often stood the test of time and have enabled local farmers to withstand periods of severe environmental stress. On the other hand, subsistence farmers and pastoralists are also often the most vulnerable to drought. These farmers lack reserves of cash, grain, animals, or other assets for use in times of drought. Therefore, a national drought strategy in developing countries must include special provisions for these population groups.

In many less-developed countries, local extension networks are not well established and the linkages between suppliers and users of information are poorly developed. A goal of the moisture assessment committee, working in conjunction with the impact assessment committee, should be to develop more widespread and efficient extension networks. However, without adequate education and training, farmers will not be able to effectively use information from an early warning system.

Impact Assessment Committee. Because of the obvious overlap between the impact assessment committee and the moisture situation committee, frequent com-

munication is essential. The impact assessment committee should be composed of an interinstitutional, interdisciplinary team of experts and planners. The team may contain decision makers or it may make evaluations or recommendations to decisions makers for appropriate action. Depending on the complexity of impacts associated with drought, subcommittees may need to be appointed to concentrate on particular impact sectors. The subcommittees would report directly to the committee. The committee's responsibility is not only to ascertain the impacts of drought but also to identify and muster available resources to mitigate those effects. The committee must then identify those government agencies and nongovernmental organizations that can provide some level of assistance in response to drought as well as the exact nature of that assistance. The committee must also determine the proper protocol for requesting assistance. Communication channels between the impact committee(s) and the agencies and organizations must be well developed to ensure the timely flow of information in both directions.

Policy Coordination Committee. The policy coordination committee, comprising senior-level officials, will serve as a coordinating body to oversee the activities of the moisture assessment committee and the impact assessment committee(s), keep political officials advised of the status of impacts in the distressed area, and make recommendations about further actions that need to be taken. This coordinating committee would have direct access to political leaders. The task force could evolve into this policy committee following completion of the plan, since the composition of the two groups is similar.

Step 5

Step 5 is to be carried out concurrently with Step 4. Its purpose 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. Early assessments of the likely impact of drought on crop yield, for example, may require the development of plant response models or the calibration of existing models.

Institutional deficiencies should be identified as part of Step 5. Agency responsibilities or missions may need to be modified to support activities to be performed under the rubric of the drought plan.

Step 6

An essential aspect of the planning process is the synthesis of the science and the policy of drought and drought management. Previous steps in the planning process have considered these issues separately, concentrating largely on assessing the status of the science or on the existing or necessary institutional arrangements to support the plan. It is clear from workshop discussions that communication and understanding between the science and policy community is poorly developed and must be enhanced if the planning process is to be successful. 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.

Crucial to this integration process is the provision of a structure to facilitate scientific information exchange once there is mutual agreement between scientists and policy makers that such information is useful. Since this is not their primary mission, it is unlikely that scientists will freely devote extensive attention to tailoring and otherwise making available research results on a frequent or continuous basis. Rather, a specific liaison person or group may be needed to facilitate this exchange.

Step 7

Reasonable response options must be determined for each of the principal impact sectors identified under Step 4 by the impact assessment committee. These options should examine appropriate drought mitigation measures on three timescales: (1) short-term (reactive) measures implemented during the occurrence of drought, (2) medium-term (recovery) measures implemented to reduce the length of the post-drought recovery period, and (3) long-term (proactive) measures or programs implemented in an attempt to reduce societal vulnerability to future drought. However, it should be noted that societal vulnerability to drought may be influenced substantially by non-drought-related actions taken or policies implemented during nondrought periods. Thus government must establish agricultural, environmental, and natural resource programs only after giving full consideration to their effects on the vulnerability of drought-prone regions.

Step 8

The drought plan should be implemented in such a way that it gives maximum visibility to the program and credit to the agencies and organizations that have a leadership or supporting role in its operation. 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 media is essential to publicizing the plan and must be informed fully of its purpose, objectives, and organizational framework.

Step 9

Educational and training programs must be established to heighten public awareness of the drought problem and the long-term need for water conservation and environmental management. These programs must be long-term and directed at all age groups and economic sectors. If such programs are not developed, government and public interest in and support for drought planning will wane during long periods of non-drought conditions.

Step 10

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

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

As noted previously, drought planning must be a dynamic process. The operational evaluation program is proposed to keep the drought assessment and response system current and responsive to the needs of society.

Governments should conduct or commission a post-drought evaluation of the responses to each major drought episode. These evaluations should include an analysis of the physical aspects of the drought: its impacts on soil, ground water, 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 relief measures that have been most effective. Questions to be addressed by the post-drought evaluation review team as part of this evaluation process are included in the Task Group 5 report. To ensure an unbiased appraisal it is recommended that governments 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. Private foundations and research organizations should be encouraged to support post-drought evaluations.

International agencies, both intergovernmental and nongovernmental, should also realize the value of post-drought evaluations and be prepared to sponsor them when an emergency extends beyond national boundaries, especially when internationally coordinated relief projects might be mounted.

RECOMMENDATIONS

To stimulate and facilitate the development of drought plans by national and state (subnational) governments, two recommendations are offered. First, model drought plans should be developed. Drought plans have been developed by several countries and by states within countries. Although each drought plan must be unique, reflecting the special water problems and political and socioeconomic characteristics of regions, the development process is much the same. Indices used to monitor impending drought conditions and their potential impact can also often be shared, with minor modification. It is

recommended that model drought plans be developed at the national and state level to facilitate the planning process.

To identify common elements of a model drought plan and the data needed for implementation of the plan, a meeting of representatives of the United Nations, donor organizations, nongovernmental organizations, and national agencies should be convened. Nations electing to prepare drought plans based on the elements identified at this meeting could modify or suggest modifications of these elements for implementation within their boundaries. An integral part of this identification process is the creation of training programs for drought planning and management, the identification of persons capable of serving as advisors to governments desiring to prepare drought plans, and the responses to requests from governments and international organizations for assistance in drought plan preparation.

Second, a drought planning information network should be developed. It is recommended that a roster of researchers and policy officials knowledgeable and interested in drought planning and management be established to encourage drought preparedness internationally. A newsletter would facilitate informing these persons and appropriate government agencies and international organizations of drought planning activities, publications, conferences and symposia, and so forth.

CONCLUSIONS

The workshop participants support the development of a drought assessment and response policy by national and state or provincial governments in drought-prone areas. A ten-step process has been proposed to facilitate drought preparedness. Droughts of both long- and short-return periods should be considered when developing these plans. This policy should rely on area-wide identification of the existence and severity of drought and assessments of drought's current and possible future impacts. A policy must also recognize the need for both coping with and responding to drought. It should stress the creation of an infrastructure to supply the basic data, analysis, and research needed for assessment and response. A key part of the national policy is the development of a general plan (one that is effectively integrated with area-wide plans) to prepare for and respond to drought episodes.

It is recognized that the impacts of drought on society and the environment often linger for years after the drought has passed. Conversely, actions taken during non-drought periods often determine the level of vulnerability to future drought episodes. Thus, it is necessary to avoid the pitfall of focusing only on the impacts of drought and ignoring the effects and interrelationships of decisions made and actions taken during nondrought periods. Governments must commit the financial and human resources necessary to complete evaluations of drought impact and drought recovery to gain a full appreciation of the lingering effects of drought on societies. Above all, drought planning must be viewed as a dynamic process requiring continuous evaluation and updating.

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