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State-level Drought Planning in the United States: Factors Influencing Plan Development

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Abstract

Drought is a recurrent feature of the American landscape. Almost without exception, the occurrence of widespread severe drought in the United States has illustrated the low level of drought preparedness that has existed in federal and state governments. Many state governments, however, have developed formal drought contingency plans since 1982. The primary purpose of this article is to explore some factors that may have influenced the drought planning process at the state level in the United States during the past decade. First, an overview of state drought planning is presented, followed by an exploration of the possible policy influence of a specific set of factors in prompting state drought plan development. This will help to demonstrate that the development of state drought plans is not solely contingent on recent drought experiences. The authors suggest that, in some instances, social, political, and institutional influences on state drought planning since the early 1980s may be as important as, or even more important than, the climatology of drought. The paper concludes by proposing some future directions for state and federal drought planning efforts in the United States. An understanding of the complex issues affecting drought planning in the United States may help other countries understand the factors that might affect the drought planning process in their own unique political setting.

Introduction

Drought is a recurrent feature of the American landscape. In recent years, drought has been a frequent visitor to virtually all parts of the nation, resulting in significant impacts in many economic sectors, including agriculture, transportation, energy, recreation, and health; it has also had adverse environmental consequences. For example, the economic impacts of the 1976–77 and 1988 droughts have been estimated at nearly US\$35 billion and US\$40 billion, respectively [1,2]. Other drought years, such as 1980, 1983, 1986, and 1989–92, resulted in significant losses as well. The present and future impacts of the recent series of drought years in the United States, particularly in the western states, are likely to be substantial and long-lasting.

Almost without exception, the occurrence of widespread severe drought in the United States has illustrated the low level of drought preparedness that has existed in federal and state governments. Assessment and response programs that were implemented during the 1970s have been characterized as largely ineffective, poorly coordinated within and between levels of government, and untimely [3,4]. Although state government has made considerable progress in drought preparedness, the verdict is still out on whether the federal government's response to recent drought episodes was improved significantly from previous response efforts. Riebsame et al. [2] suggests only a moderate improvement in efficiency. The lessons of past response efforts strongly suggest that a "risk management" or proactive approach to drought management would be a more effective mitigation tool than the "crisis management" or reactive approach heretofore practiced. Sharply focused contingency plans, prepared in advance, can assist government and others in the early identification of drought and its likely impacts; improve the economic efficiency of resource allocation; lessen personal hardship; and, ultimately, reduce drought-related impacts, the need for government-sponsored assistance programs, and long-term vulnerability to climate-induced periods of water shortage.

The primary purpose of this article is to explore some of the factors that have influenced the drought planning process at the state level in the United States during the past decade. The trend of drought contingency planning in the United States has obvious implications for the international water resources community. Certainly, the factors that have motivated these planning efforts are relevant to other political settings. As interest in drought preparedness increases worldwide because of recurrent droughts, the International Decade for Natural Disaster Reduction, and the actions emanating from the U.N. Conference on Environment and Development, such as the call for an international convention on desertification and drought, the lessons learned in the United States may help policy makers in other countries better understand the social, economic, environmental, and political forces that influence the planning process. These lessons, along with progress currently being made in several countries, provide nations with models for a more proactive approach to drought management, one that emphasizes the importance of preparedness and promotes the concept of self-reliance and sustainable development through a more proactive approach [5,6].

The paper begins with an overview of trends in and rationale for drought planning, with particular reference to state-level government in the United States. Following this

discussion, the article explores the possible policy influence of a specific set of factors in prompting state drought plan development. This discussion will help demonstrate that the development of state drought plans is not solely contingent on recent drought experiences, as many persons might perceive; in fact, some states that have experienced severe drought in recent years have not adopted contingency plans. Thus, state drought plans are developed—or not developed—in response to nonclimatological factors as well as to climatological ones. This suggests that, in some instances, social, political, and institutional influences on state drought planning may be as important as, or even more important than, the climatology of drought. The article concludes by proposing some future directions for state and federal drought planning efforts in the United States. Clearly, these recommendations are relevant to drought-prone regions throughout the world, given the level of preparedness that exists in both developed and developing country settings.

Trends in State-Level Drought Preparedness in the United States

Progress by states in the development of drought contingency plans (DCPs) in recent years has been extraordinary. During the widespread and severe drought of 1976–77, for example, no state had prepared a formal drought strategy [7]. In 1982, only three states had developed plans: South Dakota (1981), Colorado (1981), and New York (1982). Typically, states have relied on the federal government to come to their rescue with massive relief programs when water shortages reach near-disaster proportions. The federal government provided nearly \$8 billion in relief in response to the sequence of drought years in the mid-1970s; federal assistance efforts totaled more than \$5 billion in response to the 1988–89 droughts [2,4]. This assistance has been provided to drought victims through an assortment of federal programs administered by numerous federal agencies. In 1977, forty separate programs were administered through sixteen agencies [3].

Since 1982, twenty-four states have developed and implemented formal drought contingency plans (see fig. 1). Twenty-seven states now have plans. In addition, four states are developing or have expressed an intent to develop plans in the near term. These planning efforts have often been conducted in conjunction with a state's overall water management planning initiative. Clearly, states can now be labeled policy innovators in planning for drought [8]. At the same time, some federal agencies have attempted to improve their drought management capability but seem reluctant to pursue the development of a more proactive risk management approach that would require the formulation and implementation of a national policy and plan.

Drought planning has been defined as actions taken by individual citizens, industry, government, and others in advance of drought for the purpose of mitigating some of the impacts and conflicts associated with its occurrence [4]. To be successful, drought planning must be integrated between the national and state levels of government, involving existing regional (multistate) organizations as well as the private sector where applicable. Examples of regional organizations in the United States that have been active in drought planning include the Great Lakes Commission, Western States Water Council, and Delaware River Basin Commission.

The increasing awareness of the inefficiency of past response efforts, calls for action by scientists and research and professional organizations, and the impacts of the droughts of the mid to late 1980s and early 1990s seem to have played a part in generating momentum at the state level for the establishment of contingency plans. However, the primary motivating factors for the development of a drought plan vary considerably from state to state. It is important to note that the decision to develop a plan is a highly individual decision that may reflect several factors, some of which may be unique to that state. For example, the decision to develop a plan in one state may be based largely on considerations of climate (i.e., location in a drought-prone region) while the decision not to develop a plan in another drought-prone state may be based solely on political considerations.

Numerous constraints can impede the plan development process [10]. These impediments include an inadequate understanding of drought, uncertainty about the economics of preparedness, lack of skill in drought prediction, variability in societal vulnerability to drought between economic sectors or between geographic regions, information gaps and insufficient human resources, inadequate scientific base for water management, and difficulties in identifying drought impact sensitivities and adaptations. Wilhite [8] has speculated that two key impediments have inhibited drought planning actions at the state level in the United States: an inadequate understanding of drought and uncertainty about the economics of preparedness [6]. Although drought is a normal part of climate, it is often viewed by policy makers and bureaucrats as an extreme event that is, implicitly, rare and of random occurrence. In reality, the recurrence of drought is inevitable; its frequency, intensity, and duration are highly variable from one climatic regime to another. At times, policy makers have difficulty weighing the benefits of drought preparedness versus the costs of being unprepared. There is little doubt that preparedness requires financial and human resources that are scarce. This cost has been and will continue to be an impediment. Preparedness costs are fixed and occur now while drought costs are uncertain and will occur later. Further complicating this issue is the fact that the costs of drought are not solely economic. They must also be stated in terms of human suffering, the effects of drought on biological resources, and the degradation of the physical environment, items whose values are inherently difficult to estimate. After weighing the economic, social, and environmental costs of drought, an investment in preparedness appears to be a wise policy decision. Certainly the costs and losses associated with drought in developing and developed countries are staggering and seem to be increasing at a dramatic rate. Preparedness costs seem inconsequential in comparison.

Factors Influencing Drought Plan Development

As mentioned previously, the most obvious factor that may affect a state's decision to develop (or not to develop) a drought contingency plan is the climatology of the state. This influence could be subtle (i.e., location in a drought-prone region) or more obvious (i.e., recent occurrence of severe drought, concomitant impacts, and frustration over the inefficiency of previous assessment and response efforts). As figure 1 demonstrates, however, the pattern of drought plans currently in existence in the United States cannot be explained on the basis of climatological factors alone since many states with plans lie in the more humid eastern portion of the country, a region that historically has had a lower probability of severe drought occurrence and shorter periods of duration for those droughts that do occur [11].

A typology of state behavior was constructed to explain the current pattern of drought contingency plan development. Lester [12] developed this approach to help decipher the relationships between state commitment to environmental quality and state dependency on federal aid. Lester's typology was modified for this study to attempt to explain state commitment to drought plan preparation on the basis of the frequency of severe to extreme drought during the period 1982–91. The classification of severe to extreme drought was based on the Palmer Drought Severity Index (PDSI), a meteorological drought index used extensively by federal and state government in the United States to monitor long-term climate trends, including the pattern and severity of drought [13]. The PDSI is the only index calculated routinely for all climatic divisions in the United States. Monthly index values have been calculated for each division from 1895 to the present. The PDSI has been used routinely by the federal government as one of the principal criteria for disaster designation (i.e., eligibility to receive federal drought relief [4]). Currently, the PDSI is used by many states to trigger specific state-level responses, including requests for federal assistance. Alaska and Hawaii were not included in this study because PDSI values were unavailable for comparison.

The 1982–91 period was chosen to help explain the relationship between state commitment to drought plan preparation and drought frequency because of the rapid growth in the number of plans developed during these years. To arrive at an average statewide drought frequency value for the period in question, the frequency of severe to extreme drought was first determined for each climatological division (i.e., relatively homogeneous climatic regions). Most states contain between six and nine climatic divisions. The divisional averages were then averaged to derive an unweighted state average. States were then divided into two drought frequency groups, ≥ 10 percent (High) and < 10 percent (Low). The 10 percent threshold was chosen because a one-in-ten probability of severe to extreme drought is often considered significant by decision makers [14].

State commitment to drought plan preparation was divided on the basis of whether or not a plan had been developed (Yes or No). Thus, states with a high frequency of severe to extreme drought during the 1982–91 period and a drought plan would be placed in Sector A. Conversely, states with a relatively low frequency of severe to extreme drought and no drought plan would be placed in Sector D. The outcome of this typological analysis is presented in figure 2.

State Commitment to Drought Plan Preparation		
	High (Drought Plan)	Low (No Drought Plan)
High (≥10%) Frequency of severe to ex- treme drought (PDSI ≤ -3.0) during 1983-89	<p>A</p> California (CA) Idaho (ID) Montana (MT) Nebraska (NE) North Dakota (ND) Oregon (OR) Florida (FL) Nevada (NV) Utah (UT) Washington (WA) Delaware (DE) South Dakota (SD) Iowa (IA) Arizona (AZ) Minnesota (MN)	<p>C</p> Wyoming (WY)
Low (<10%)	<p>B</p> Kentucky (KY) Maine (ME) New Hampshire (NH) Ohio (OH) Colorado (CO) New Jersey (NJ) Missouri (MO) Oklahoma (OK) Texas (TX) Pennsylvania (PA) South Carolina (SC) New York (NY) Virginia (VA) Illinois (IL) Maryland (MD) Michigan (MI) Rhode Island (RI)	<p>D</p> Connecticut (CT) Georgia (GA) Indiana (IN) Louisiana (LA) Massachusetts (MA) Mississippi (MI) Kansas (KS) Vermont (VT) North Carolina (NC) Wisconsin (WI) Tennessee (TN) West Virginia (WV) Alabama (AL) Arkansas (AR) New Mexico (NM)

Figure 2. Typology of state commitment to drought plan preparation versus the frequency of severe to extreme drought, 1982 to present.

A significant number of states (15) was classified in Sector A (high drought frequency and a drought plan or intent to develop one). Most of these states are in the more drought-prone west, where drought is a common feature of the climate. Only South Dakota and Colorado had developed a plan before 1982. These plans were developed primarily in response to the mid-1970s' droughts. In the more humid east, only Delaware falls into this sector, experiencing severe to extreme drought in 10 percent of the months during the

1982–91 period. The only other eastern state included in Sector A is Florida, with a 12.4 percent frequency. Florida is unique in that the authority for water management/drought planning is transferred to water management districts.

Fourteen states fall into Sector D (low drought frequency and no drought plan). The majority of these states are located in the more humid east. Two states in this sector that might be expected to have a plan based on their climatic regimes but do not are Kansas and New Mexico. These states are both located in the drought-prone western states. However, in each of these cases, the statewide average percent frequency of severe to extreme drought was below the 10 percent threshold during the 1982–91 period. Drought frequency greater than 10 percent was associated with portions of Kansas but averaged out to less than 10 percent for the state as a whole.

The states classified in Sectors B and C are much less easily explained on the basis of climatology. In Sector B (states with a low drought frequency and a drought plan or intent to develop one), seventeen states are represented, all but three of which are located in the east. Colorado developed a plan in 1981 in response to two significant droughts—1977 and 1980. Governor Richard Lamm was in office during both of these events and witnessed the inefficiency of assessment and response efforts [8]. In 1981, he requested the Department of Disaster Emergency Services to develop a drought plan to enhance state preparedness and future response. Thus, the existence of the Colorado plan is directly attributable to drought, but in the period before 1982. Oklahoma and Texas have expressed an intent to develop a drought plan, although the frequency of severe drought occurrence during 1982–91 is very low. In Oklahoma, this frequency is unusually low (1 percent); severe drought occurred 12.3 percent of the time during 1951–91. Thus, the past decade has been uncharacteristically wet. New York developed a plan in 1982 in response to numerous factors, including the potential effects of drought on a water supply system stretched by the demands of an enormous urban population. Other factors that may help to explain the development of plans in the remaining thirteen states will be discussed in the next section of this article.

Only one state appears in Sector C (high drought frequency and no drought plan)—Wyoming. Statewide drought frequency during the 1982–91 period was quite high in Wyoming (33.9 percent). Climatology alone would certainly suggest that this state would have developed a plan to address assessment and response issues directly related to periods of water shortage. The absence of a drought contingency plan in Wyoming may be attributed to one or more factors, including its small population base, low population density, reliance on the prior appropriation doctrine for allocating water during water-short periods, and political environment.

Drought Planning and the 1980s' Policy Environment

What has accounted for the large number of states (thirty in Sectors A and B, including those with low frequency of severe to extreme drought during 1982–91) that have developed drought contingency plans over the past decade? It is difficult to identify specific decisions, experiences, or other factors that prompted so many states to undertake the preparation of a formal drought plan. State governments for the most part do not maintain

permanent drought response offices with stable staffing, and state employees routinely move to new responsibilities within government or to the private sector. Thus, institutional memory is often quite short; lessons from recent droughts are soon forgotten.

A general assessment of the U.S. public policy environment during the 1980s suggests several policy themes that may have contributed to a growing awareness and understanding of the complexities of drought management. These themes or issues may have directly or indirectly caused state government officials to pursue development of drought plans. These themes raise philosophical and practical questions about the nature of federal-state relations and particular water resource planning and management innovations that were adopted by several states during the 1980s.

The issue of federal-state relations and their possible influence on state drought planning involves three distinct elements: (1) improved capabilities of state governments in conjunction with the Reagan administration's "New Federalism" initiative and concurrent federal regulatory mandates to state and local governments; (2) states' concerns about federal intrusion into state-level water resource planning and water rights; and (3) some states' early experiences in working with the new Federal Emergency Management Agency in the early 1980s. In the case of several states, a fourth incentive to plan for droughts may have developed as a consequence of policy innovations regarding water supply planning and management. Two specific examples are: (1) the large number of states adopting groundwater management policies during the 1980s, and (2) recent water supply management problems that have been exacerbated by the riparian doctrine of water law, which predominates in the states east of the Mississippi River. Although it cannot be proved that any or all of these influences affected drought planning in any particular state, it is intriguing that these perturbations to federal-state relations and growing government concerns about future water supplies occurred during the period of accelerated state adoption of drought plans.

It is hypothesized that issues such as these may have contributed to an increased awareness of the value of drought planning within some state governments. Coupled with actual drought experiences or knowledge of other states' drought impacts, these policy influences may have helped create conditions conducive to increased state attention to drought planning. This exploratory assessment is intended to stimulate further discussion about the influences that prompted so many U.S. state governments to develop drought contingency plans in such a relatively short span of years. For the international water resources community, this discussion is intended to provide insight about those factors that may influence drought-related policy actions. An improved understanding of these factors may help other nations understand the drought planning process in their own setting.

The "New Federalism" and State Government Modernization

In 1980, presidential candidate Ronald Reagan made a major campaign issue of the intrusions of the federal government into state and local affairs. He promised to reduce national governmental interference in local affairs and also to give state and local governments control over programs that these entities could run more efficiently [15]. Following his election, President Reagan began to pursue his campaign declaration. He promised to undertake "New Federalism" negotiations to devise a significant realignment of governmental

responsibilities [16]. The New Federalism was a notion of greater local autonomy from the central government in the design and implementation of public programs.

Reagan's New Federalism initiative was not driven simply by ideological considerations but by practical influences as well. By the early 1980s it was becoming increasingly evident that the relative capabilities of the federal and state governments to provide social and other services were undergoing fundamental change, with the states becoming increasingly competent in providing public services and managing regulatory matters [16–18].

During the late 1970s and early 1980s, state governments were learning to cope with new, somewhat unanticipated structural changes in programs created by the national government. These helped force state governments to confront limits on federal assistance in entitlement programs and social services, and to become more self-reliant. This, as well as further constraints on federal spending due to the burgeoning federal deficit, obliged states not only to do more without additional federal aid but to do it better [18]. Thus, the Reagan-inspired redefinition of federalism and improved state service capabilities may have indirectly contributed to drought contingency planning by some individual state governments.

Federal Intrusions into State Water Management

At the same time that the federal government was pressing for states to assume greater programmatic responsibility and become more self-reliant, federal intrusions into traditional state sovereignty over water policy became evident. According to Tarlock [19], under the U.S. Constitution, "the federal government may preempt state [water] law and substitute a federal allocation rule for a state rule." Tarlock notes, however, that because "the full scope of federal power over waters was not confirmed until the 1960s and '70s, the federal government has seldom exercised its full authority to allocate and regulate waters. Instead, it has often done the opposite." Indeed, despite repeated efforts since early in this century to develop a national water policy, no significant national water resources coordination program emerged because of states' fears of federal encroachment into their respective water rights [20].

With growing awareness of environmental quality and new state and federal environmental laws beginning in the 1970s, however, the federal government became more intrusive with respect to states' autonomy over their respective water resources. This included, for example, litigation to secure federal reserved water rights to guarantee minimum in-stream flows through Native American reservations and federally owned land [21].

Further, expanding federal regulations regarding water quality began to encroach on state and local governments' water policies. The 1980s witnessed much of the growth in the federal regulatory intrusion. Among new areas of regulation were new federal mandates regarding water quality and pollution prevention that state and local governments were required to implement.

Two U.S. Supreme Court decisions in the 1980s also helped shatter previous assumptions about states' autonomy to manage their own waters [22,23]. Both cases involved the issue of groundwater export from one state to another. In each case, the Court specifically held that water was an article of interstate commerce and was "thereby subject to federal regulation under the commerce clause [of the U.S. Constitution]" [24] (see also [25–27]).

The change in federal-state relations over water resources has significant implications for present and future state water planning. State governments have grown more aware of water-related issues and water planning, which logically would include planning for drought impacts and responses. Thus, consideration of drought response strategies may have emerged in some states at least in part as a consequence of the regulatory and legal questions about future jurisdiction over U.S. water resources.

Water Supply Management Innovations

One stimulus for some states to develop drought contingency plans may have been broader water resource management innovations that occurred during the 1980s. Two innovations stand out as particularly important contributions to increased awareness of water supply management and planning within state governments. These are (1) adoption of groundwater management policies by many states during the 1980s, and (2) administrative changes in several eastern states whose water laws are based on the doctrine of riparianism.

Thirty states adopted substantive new groundwater policies from 1980 through 1989, giving rise to another label for the 1980s: the "groundwater decade" [28]. Many of these states adopted supply management policies because of groundwater overwithdrawals, most embraced policies to protect groundwater quality, and nine adopted policies for both supply management and water quality. Some states were motivated to act on their own under the threat of proposed new federal legislative and regulatory groundwater initiatives during the 1980s. Ultimately, the adoption of groundwater management policies was the result of several policy influences.

The second water resource management innovation that began to emerge during the 1980s was the adoption of changes in water laws in states where water rights are based on the riparian doctrine of water law. This doctrine historically applied in the twenty-six states east of the Mississippi River. Under this water rights doctrine inherited from English common law, a landowner whose land abutted, was intersected by, or overlaid a water resource had a right to make reasonable use of that resource on the "riparian" land.

With population growth and increasing demands for water for municipal, industrial, agricultural, and other uses, however, the relatively unfettered access embodied in the riparian doctrine has come up against the realities of finite water resources. As Sherk [29] explains, "the riparian doctrine [does not] equip state or local water managers with the tools needed to control water use and to respond to a wide variety of water-related issues and crises." In recent years, several eastern riparian states have experienced water-shortage problems [21]. Irrespective of the cause, water managers in many eastern states have come to recognize a crucial weakness of the riparian doctrine in times of water shortage. This is especially true under conditions of drought. Sherk [29] argues that, "it would be nearly impossible to respond to a drought situation if all water users have an equal claim to a diminished water resource and if a proportionate reduction in all water uses is not politically, economically or technologically feasible."

Because of this management constraint and others associated with the riparian doctrine, several eastern states have enacted or are in the process of adopting some form of permit

or license requirements for use of both surface and ground water. These are being accompanied by actions designed to constrain water consumption [19,29]. Much of this regulatory activity has been incorporated into individual state drought plans. In this respect, then, drought plan preparation may have been driven at least in part by the innovations to help resolve water resource management problems attributable to the riparian doctrine.

Early State Experiences with FEMA

The U.S. federal government has been involved for years in responding to natural disasters throughout the nation, with federal assistance coordinated with appropriate subnational governments (i.e., state, county, municipal). In an attempt to help "rationalize" the formulation and implementation of federal disaster relief programs, the Federal Emergency Management Agency (FEMA) was created in 1979 [30]. FEMA programs were transferred from several other agencies and departments in order to bring about a consolidated program under a single administrative authority [31].

FEMA's emphasis has been on responding to extreme events such as earthquakes, floods, and the like—not to droughts. FEMA's mission was based on the concept of "shared governance" with state and local governments during a decade in which the broad framework of intergovernmental relations was being debated for other reasons (e.g., the Reagan New Federalism initiative) [30]. Under FEMA, actual emergency response implementation was intended to be the responsibility of state and local entities rather than of federal personnel.

There is evidence, however, of friction over government responsibilities and the autonomy of states to conduct their own emergency responses during FEMA's early years. A study of states' experiences in working with FEMA in its early years of existence reported that the agency's regional offices had been understaffed and plagued with staff turnovers, ongoing reorganizations, and reductions in force and other personnel adjustments [32]. Mushkatel and Weschler [30] observed that "FEMA is the result of a move to centralize disaster management in a field which has seen many reorganizations at the national level. This centralization at the national level seems to conflict with the increasing move to decentralize functions within the federal system, as witnessed by the new federalism of the current [1985] administration."

State experiences with FEMA in the first half of the 1980s may have contributed to a broader sense of a need for self-reliance in emergency planning and management. Tensions between the forces of centralization and decentralization have led to a greater insistence among the states on controlling their own destinies in emergency management. And although some state governments are dependent on federal assistance to respond to disasters, state officials have not appreciated the actual and perceived federal interference in emergency management that accompanies financial and material aid [33].

FEMA's lack of authority in drought management at the federal level is also reflected in their counterpart agencies at the state level (i.e., emergency management or civil defense agencies). State agencies with emergency management authority seldom provide leadership for drought planning. Although there are some notable exceptions (e.g., Colorado), the role of emergency services is usually more of a support agency. Leadership for drought

planning is more often viewed as the responsibility of government agriculture, natural resources, or water resources agencies.

It would be reasonable to suggest that drought response planning would accelerate as states learned what they could (and could not) expect from the federal government during and after other natural disaster events. Moreover, it may not be a coincidence that the acceleration of this process occurred in the same time period that states were learning what to expect from federal intrusions into state water resource management and from the emerging assumption of new responsibilities by stronger, more mature state governments. In fact, states with drought plans now routinely assist other states in the preparation of plans by sharing plans and experiences. Regional organizations, such as the Western States Water Council and the Great Lakes Commission, have also promoted the formulation of drought plans by states within their regions.

Conclusions and Recommendations

This paper has explored climatological and nonclimatological factors that may have contributed to the adoption of state drought response plans in the United States since 1982. Certainly the drought experiences and concerns about possible impacts of drought have had a direct effect on state drought response planning. However, the broader public policy assessment of the past decade contained in this paper highlights additional factors that may have contributed to increased awareness within state governments of the potential value of being prepared to respond to drought.

Of course, for those states that have not adopted formal drought response plans, specific influences have also affected their decision-making processes. Yet the sheer number of states moving forward with formal drought plans in the past decade prompts the question of why this wave of apparent drought awareness may have occurred. Our assessment suggests a picture of drought policy formulation that is much more complex and multidimensional than can be accounted for by climatological explanations alone.

Given progress made at the state level in the past decade as a consequence of drought experiences and perhaps the other influences discussed in this paper, what drought planning initiatives should be of highest priority for state (and federal) government in the future? First, there must be greater integration of existing drought management and planning activities with existing water management and natural hazard management and planning activities at both levels of government. This lack of integration stems largely from the unique character of drought, a slow-onset disaster, in contrast to quick-onset natural disasters such as earthquakes, hurricanes, and floods. Typically, drought planning has focused on the mitigation of impacts, a shorter-term objective, rather than on longer-term water management and planning issues that have received growing attention in the United States since the early 1980s. At the federal level, the activities of the numerous agencies with drought-related missions in assessment, management, mitigation, and planning have never been integrated to provide a more coherent approach to drought management. A national policy and plan emphasizing a more proactive risk management approach must be developed, as called for by many agencies and organizations.

Second, it is recommended that the mitigation, response, and planning efforts of state and federal government be better coordinated. Drought is a distinctly regional phenomenon with national and international implications. Therefore, linkages should exist between those agencies in each state with primary authority for ongoing drought planning activities. Networking between states will facilitate the dissemination of new mitigation technologies. This network will result in greater interaction with federal agencies on drought-related issues.

Regional organizations can play a vital role in linking the assessment and response activities of states within their region and can also help to establish dialogue with federal agencies. It is also important to note here the need to coordinate drought-related planning activities at the regional level since some federal agencies have distinct regional planning authorities (e.g., U.S. Army Corps of Engineers, Bureau of Reclamation) that may involve drought plan development. It is imperative for district (regional) drought contingency plans developed by the Corps of Engineers, for example, to be compatible with state goals and policies.

Finally, irrespective of the reasons for adopting formal drought response plans, states must expand the scope of their existing plans. It is essential for these plans to move beyond their initial impetus for development (i.e., reaction to crisis) and begin to address longer-term water-related issues as an integral part of the plan. This will require greater integration with other planning activities and improved coordination within and cooperation between levels of government.

Ironically, the policy themes of the past decade suggested here that may have influenced drought planning in some states in the United States are now being influenced by state drought planning efforts. This is evident in our suggestions for the need to (1) integrate drought planning with broader water management and planning efforts; (2) improve federal-state coordination in responding to drought; and (3) build on existing drought plans to address longer-term water issues in the context of federal-state relations. Because of the past decade's experience with state drought planning, issues involving the practice of federalism, water planning and jurisdiction authority, and appropriate responses to drought are becoming increasingly interrelated.

Internationally, interest in drought policy and planning has increased significantly in the past ten years within governments and international organizations, and substantial progress is being made. As this paper indicates, numerous factors may be stimulating this process, and it is hoped that the discussion included here will provide policy makers in these settings with additional insights and understanding that will facilitate the planning process.

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