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Improving Federal Response to Drought*

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ABSTRACT

Severe and widespread drought occurred over a large portion of the United States between 1974 and 1977. Impacts on agriculture and other industries, as well as local water supplies, were substantial. The federal government responded with forty assistance programs administered by sixteen federal agencies. Assistance was provided primarily in the form of loans and grants to people, businesses and governments experiencing hardship caused by drought. The total cost of the program is estimated at \$7–8 billion.

Federal response to the mid-1970s drought was largely untimely, ineffective and poorly coordinated. Four recommendations are offered that, if implemented, would improve future drought assessment and response efforts: 1) reliable and timely informational products and dissemination plans; 2) improved impact assessment techniques, especially in the agricultural sector, for use by government to identify periods of enhanced risk and to trigger assistance measures; 3) administratively centralized drought declaration procedures that are well publicized and consistently applied; and 4) standby assistance measures that encourage appropriate levels of risk management by producers and that are equitable, consistent and predictable. The development of a national drought plan that incorporates these four items is recommended. Atmospheric scientists have an important role to play in the collection and interpretation of near-real time weather data for use by government decision makers.

1. Introduction

Drought is a characteristic feature of the climate of the Great Plains. Although scientists disagree on what constitutes a drought (Wilhite and Glantz, 1985), it represents a common experience that, in a sense, binds the region together. During the past century the Great Plains has been plagued by five major and numerous minor drought episodes as well as innumerable dry spells. In fact, drought occurs somewhere in the Great Plains almost every year.

Although severe drought generally occurs more frequently in the Great Plains than elsewhere in the United States, no part of the nation is immune (Karl and Knight, 1985). Severe drought is generally associated with cumulative moisture deficiencies of sufficient magnitude that, when extended over a substantial length of time, result in far-reaching impacts over a rather large geographical area. For example, in response to the severe drought of July and August of 1983 the federal government designated 1123 counties in 22 states as drought disaster areas. In addition to the designations that were made in the Great Plains states of

Nebraska, Kansas, New Mexico and Texas, the federal government also declared parts of Alabama, Georgia, Virginia, West Virginia, Tennessee, Kentucky, South Carolina, Pennsylvania and parts of most Midwest states eligible for low-interest disaster loans because of drought.

The actions of the federal government in responding to the 1983 drought are not unique. In fact, these actions seem almost inconsequential when compared to the massive drought relief programs formulated in response to the major episodes of severe drought that have occurred in the United States during the 20th century. For example, during the droughts of the mid-1970s the federal government was responsible for the most massive drought relief program in United States history. The General Accounting Office (GAO, 1979) calculated the cost of the drought program to four federal agencies alone at over \$5 billion during 1976–77. Wilhite et al. (1984) estimated expenditures by all federal agencies involved in the response effort, plus administrative costs at both the federal and state level, between \$7–8 billion from 1974–77.

In 1981 we began to document and evaluate federal and state response to the mid-1970s drought in the United States. A preliminary report of our findings appears elsewhere (Wilhite, 1983). Since each drought relief effort has relied, to some extent, on the precedents

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set in previous episodes, it is not surprising that some mistakes and failures have been repeated. Here we document and evaluate efforts to respond to drought in 1976-77. Recommendations are given on ways to improve the effectiveness of the federal government's response to future droughts. The advantages of a national drought plan that would incorporate most of these recommendations will also be discussed.

2. Methodology

The task of documenting and evaluating federal and state response to drought in the United States was divided into four subtasks in order to address the project objectives most efficiently. The first subtask was to document the history of government and nongovernment drought response in the Great Plains from the period of settlement up to the 1950s. In subtask 2 we documented, in greater detail, federal and state response to the mid-1970s drought. This involved study of the overall federal drought response structure, including assistance programs, designation procedures, information availability and flow, and policy formulation procedures. In subtask 3 the federal drought actions were evaluated with reference to each of the components listed in subtask 2. In subtask 4 we documented and evaluated federal and state government actions in response to drought in Nebraska, South Dakota and Texas. In this paper we report the results of subtasks 2 and 3, particularly. The results of each of the subtasks are presented in greater detail elsewhere (Wilhite et al., 1984).

Information about the actions of federal and state agencies in assessing and responding to the mid-1970s drought was derived through an analysis of official government files, personal interviews with government and nongovernment officials, and by mail questionnaire. The following were the main sources of information:

- 1) Gerald R. Ford Presidential Library, Ann Arbor, Michigan;
- 2) Secretary of Agriculture Executive Correspondence Files, Washington, DC;
- 3) Agricultural Stabilization and Conservation Service files, Washington, DC;
- 4) Corps of Engineers files, Ft. Belvoir, Virginia;
- 5) Office of Intergovernmental Affairs, U.S. Department of Agriculture, Washington, DC;
- 6) National Archives, Washington, DC;
- 7) History Branch, U.S. Department of Agriculture, Washington, DC;
- 8) National Agricultural Library, Beltsville, Maryland;
- 9) Dwight D. Eisenhower Presidential Library, Abilene, Kansas;
- 10) Western Governors' Policy Office (WESTPO), Denver, Colorado;

11) State and federal agency files in Nebraska, South Dakota, and Texas.

By analyzing both primary sources of information and numerous secondary sources, we were able to reconstruct the timetable of events associated with the mid-1970s drought and evaluate the series of assessment and response actions implemented by federal and state government.

3. Federal response to drought in 1976-77

That the federal government would attempt to mitigate some of the most severe impacts of widespread drought during the mid-1970s was not unexpected. Droughts of greater intensity and duration during the 1930s and 1950s had produced similar responses. Although the organizational structure for administering drought relief and the forms of assistance available changed significantly during the fifty years before the mid-1970s drought, the fundamental approach did not.

During the mid-1970s drought, the Federal Disaster Assistance Administration (FDAA) was responsible for administering grants to presidentially declared disaster areas from the President's Disaster Relief Fund. Moreover, the FDAA was responsible for directing and coordinating the assistance efforts of all federal agencies (FDAA, 1975). The list of federal disaster assistance programs available in 1975 was extensive. Few, if any, of these programs had been designed specifically to respond to problems caused by drought.

The series of state and federal actions that resulted in response to the drought of 1976-77 are described in detail below. Table 1 provides a timetable for these actions.

Federal Drought Response, 1976. The first federal actions were initiated during the last year of the Ford administration in response to requests from Governor Richard F. Kneip and Representative James Abdnor of South Dakota in July of 1976. The governor requested federal agencies to provide maximum assistance to the severely stricken drought areas in his state (Kneip, 1976). This request prompted the president to direct the Domestic Council to review the socioeconomic impacts of drought in the Dakotas, Minnesota and Wisconsin and to determine if additional assistance could be provided under existing federal laws and programs (May, 1976). The governor's letter was followed by a request from Representative Abdnor to the secretary of agriculture for the creation of a special task force to review and improve current drought assistance programs (Abdnor, 1976). In response to Abdnor's request, a special cabinet-level drought committee was formed by the president in late October. The committee's objectives included the development of a drought monitoring scheme and a comprehensive plan and program for delivering short-term assistance to drought-affected areas.

TABLE 1. Drought-related actions and responses of the federal and state government, 1976–77.

Action/Date	Response/Date
1976	
Request for action from South Dakota governor and others— July	Domestic Council directed by President Ford to review socioeconomic impact—September
Request by Rep. Abdnor (South Dakota) for the creation of a drought task force—July	President Ford appoints special cabinet-level task force— October, issues report in December
1977	
States form regional alliances, Western Governor's Task Force on Regional Policy Management meets to discuss drought conditions—January	Western States Water Council begins to monitor drought— January
Western governors meet with Secretary Andrus—January	Commitments by federal and state governments for action, President Carter and governors appoint drought coordinators—January to early March
Federal drought coordinator requests drought-related information from 13 federal agencies—February	Drought appraisal report prepared under leadership of the Corps of Engineers for submission to President Carter— mid-March
Presidential drought package for \$844 million submitted to Congress—March 23	Drought package passed almost intact by Congress, except for two items—April to early May
Formation of an Interagency Drought Coordinating Committee to designate Emergency Drought Impact Areas under the president's drought program—April	2145 counties declared by this committee between April 25 and September 12
Drought conditions improve between April and August in the Great Plains and Upper Midwest states, and by December in the Far West states	Federal drought assistance estimated between \$7–8 billion for 1976–77

The special cabinet-level drought committee reported to President Ford on 28 December 1976. By this time, 325 counties had been declared emergency disaster areas. Basically, the report provided a summary of federal response to date, a status report of the current situation and an indication of problem areas. Their findings suggested that current programs “may not be able to cope effectively if the situation deteriorates much further” (Bell, 1976). The report concluded, “. . . When drought occurs it is difficult to determine the nature and extent of federal assistance required, and some emergency programs are not designed to cope with agricultural drought.”

The drought committee's report reached President Ford on 3 January 1977, seventeen days before the end of his term of office. The committee's report provided only a cursory examination of the drought problem and did not deal with the questions of long-term policy cited among the committee's original objectives. Included in the report was a tabulation showing federal assistance in presidentially declared emergency areas up to 1 December 1976 (Table 2).

Federal drought response during the Ford administration is best summarized as reaction-oriented. Little, if any, planning was done to develop alternative actions under possible scenarios of future conditions. No new programs were developed and no coordinated effort was made to respond to deteriorating conditions.

Federal Drought Response, 1977. In January of 1977, regional alliances were formed by states to put added political pressure on Washington for action. On 23 January 1977, the Western Governors' Task Force on Regional Policy Management met to discuss the scope and magnitude of western drought (WESTPO, 1978). Following this meeting, the western governors' lead agency for water policy and development, the Western States Water Council (WSWC), began to monitor the drought situation at regular intervals. The governors met with the newly appointed interior secretary, Cecil Andrus, to discuss state needs and federal actions to mitigate the societal impact of drought. Although many areas of the nation were entering their second, and a few locations their third, consecutive year of drought, this was the first such joint discussion of mitigation alternatives by state and federal officials.

The meeting with Secretary Andrus concluded with several commitments by the secretary and the governors. The secretary agreed to seek the appointment of a federal drought coordinator and to encourage the president to discuss the drought issue at the National Governors Conference. The governors also agreed to consider the need for alternative approaches to cooperative, multilateral drought response actions and to designate state drought coordinators. [By early March, twenty states had appointed drought coordinators (WESTPO, 1978)].

TABLE 2. Summary of federal grant and loan programs providing assistance due to drought, 1 December 1976 (Bell, 1976). This summary reflects the applications for grants and loans received and the funds requested therein following the presidential emergency declarations and through November 1976 in the States of Minnesota, Missouri, North Dakota, South Dakota, Virginia and Wisconsin. Eleven counties in Arkansas were declared eligible for assistance on 3 December 1976. The data contained herein is limited to assistance provided in the areas covered by the presidential emergency declarations due to drought. The assistance included in this report is being provided through emergency and regular program authorities.

Agency/Program	Applications received	Estimated amount (\$)	Applications payments	Amount paid (\$)
Federal Disaster Assistance Administration, DHUD				
Hay and Cattle Transportation Assistance	18,456	83,312,926	9,701	7,154,121*
Small Business Administration				
Economic Injury Disaster Loans	31	1,101,500	19	701,500
Agricultural Stabilization and Conservation Service, USDA				
Disaster Payment Program	151,869	172,050,000	70,712	65,497,000
Emergency Livestock Feed Program (Now being phased out due to lack of CCC-owned feed grain stocks)	N/A	4,300,000	N/A	4,300,000
Farmers Home Administration, USDA				
Emergency Loans	7,300	207,263,000	2,956	133,263,000
Economic Development Administration, DOC				
Economic Development-Special Economic Development and Adjustment Assistance Program	22	Undetermined**	8	1,556,000*

* Partial payments on some applications.

** Amount to be determined after further evaluation.

In response to these initiatives President Carter appointed Jack Watson to be federal drought coordinator. One of Watson's first actions was to request each of thirteen federal agencies to prepare a report by 3 March (a lead time of less than one week) that would include: 1) a brief evaluation of the impacts and drought-related problems in each agency's area of responsibility; 2) a list and description of drought assistance programs; 3) a statement of administration or funding problems; 4) an evaluation of complaints from state and local governments and drought victims; 5) suggestions of legislative changes or initiatives that might help to better organize and deliver federal assistance in support of state and local government efforts (Watson, 1977).

The agency reports submitted to Watson totaled several thousand pages and were, not surprisingly, lacking in uniformity and consistency. Watson recognized the inability of his staff to restructure the raw information provided by the agencies into a format that would be useful in the decision-making process (Kallaur, 1977). The Corps of Engineers was asked to coordinate this assimilation process. The Corps accepted this task and completed it within one week, as directed. The thirteen reporting agencies became known as the White House Drought Study Group. The Drought Appraisal Report, as it was called, was completed on March 18 and served as the basis for President Carter's drought program.

The Drought Appraisal Report described drought conditions in the United States and addressed questions

of water conservation, water supply augmentation and management measures, and suggested possible immediate mitigating actions. The report concentrated heavily on drought impacts in the Far West, sometimes to the point of downplaying, if not neglecting, those areas plagued by extreme drought in the Midwest and northern plains states.

Federal response activities continued to expand during March as drought conditions intensified and encompassed larger geographic areas. Emergency loans from FmHA were made available to 706 counties in 27 states. Livestock feed assistance was provided in 436 counties in 12 states by ASCS. By the end of March the FDA was providing aid to 16 states, by presidential declaration, through three assistance programs (FDA, 1977). The three programs provided assistance for hay transportation, cattle transportation and emergency feed. The USDA was responsible for coordinating most of the assistance activities in the agricultural sector.

President Carter sent a request to Congress on 23 March for \$844 million in loans and grants for farmers, ranchers, communities and businesses stricken by drought. Table 3 provides the details of the president's program. This program was passed intact by Congress, except for the Small Business Administration legislation and a reduction in funds, from \$225 to \$175 million, for the Economic Development Agency (EDA) loan and grant program (Crawford, 1978). The water bank bill was signed by the president on 7 April. Other

TABLE 3. President Carter's proposed drought program, 23 March 1977 (WESTPO, 1978).

Title	Purpose/Description	Amount (\$)
Emergency Loans Program (FmHA)	5% loans to cover prospective losses to farmers and ranchers	100,000,000
Community Program Loans (FmHA)	\$150 million in 5% loans and \$75 million in grants to communities of less than 10,000 for emergency water supplies	225,000,000
Emergency Conservation Measures Program (ASCS)	Soil Conservation cost-sharing grants	100,000,000
FCIC Insurance	Increase FCIC capital stock	100,000,000
Drought Emergency Program (BuRec)	Creation of water bank, protection of fish and wildlife, grants to states, 5% for water supply and conservation measures	100,000,000
Emergency Fund (BuRec)	Emergency irrigation loans	30,000,000
Emergency Power (SWPA)	Purchase of emergency power supply	13,800,000
Community Emergency Drought Relief Program (EDA)	\$150 million in 5% loans and \$75 million in grants to communities of more than 10,000 for emergency water supply	225,000,000*
Physical Loss and Economic Injury Loans (SBA)	Low-interest loans for small businessmen (including farmers)	50,000,000**
Total		844,000,000

* Only \$175 million of this amount was finally appropriated.

** Action on this proposal resulted in the lowering of interest rates for Physical Loss and Economic Injury Loans (both ongoing, funded programs) but none of the additional appropriation originally requested was granted.

portions of the "package" were delayed until early May. Program funds were to be expended or committed by 30 September 1977.

In late March, discussion was initiated on the formation of an Interagency Drought Coordinating Committee (IDCC), the major function of which was to designate areas eligible for federal assistance. This federal assistance, however, referred only to programs authorized in President Carter's "drought package." Members of the IDCC included representatives of the United States Department of Agriculture (chairman), the Small Business Administration and the Departments of Interior and Commerce. Geographic areas designated by the IDCC were referred to as Emergency Drought Impact Areas (EDIAs).

During the first formal meeting of the IDCC, held on 25 April 1977, the committee designated 1183 counties as EDIAs. Of these, 842 had already received presidential or secretarial declarations (Stockton, 1977). The EDIAs were located in 24 western and midwestern states. The list of declarations grew during the summer months. By 12 September 1977, the date of the last declaration, 2145 counties (70 percent of all counties in the United States) were included as EDIAs (Fig. 1). These designations were to expire on 30 September.

In the early stages of the IDCC there were no distinct criteria for the designation of EDIAs. At least half of the counties designated during this time period were so designated with no supporting documentation. The need for such criteria was discussed during the third meeting of the IDCC, on 3 May. It was agreed that ASCS would draft a list of criteria. The list was pre-

sent to and approved by the committee on 20 May. The list included the Palmer Drought Severity Index (PDSI). This index was apparently the principal criteria used by the IDCC to determine eligibility for drought assistance (GAO, 1979).

Considerable confusion appears to have developed over IDCC designations. Many federal and state officials assumed that counties were automatically eligible for all federal programs after they had been designated by the IDCC. Although it is not so specified in the

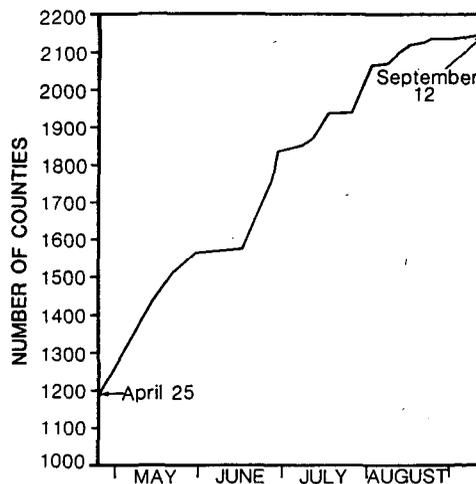


FIG. 1. Emergency Drought Impact Areas (EDIAs) designated by the IDCC between April 25 and September 12, 1977 (Federal Register).

original memorandum of agreement, IDCC designations were intended to apply only to programs included in the presidential drought package. Following IDCC designation, counties became automatically eligible for only one of the many drought package programs, FmHA's Emergency Loan Program. To qualify for other programs in the package, counties had to meet the special eligibility requirements of each program. Eligibility for programs not included in the presidential drought package was determined on a program-by-program basis and was not linked to IDCC designations.

The only distinction between IDCC designated and non-IDCC counties was that the former had access to the special drought funds associated with the president's drought package. IDCC designations were sweeping, usually focusing on states rather than individual counties. The detailed, county-level evaluation process was left to the several involved federal agencies.

Although the presidential drought package was substantial (\$844 million)—one of the largest single appropriations for drought relief in the nation's history—it represented only a small portion of the total federal drought assistance program. Forty programs were available to provide assistance to the private sector during 1976–77. However, six programs accounted for the vast majority of funds disbursed. These were: 1) the Farmers' Home Administration's Emergency Loan Program; 2) the Small Business Administration's Disaster Loan Program; 3) the Department of Commerce's Community Emergency Drought Relief Program; 4) the Bureau of Reclamation's Emergency Fund Program; 5) the Bureau of Reclamation's Emergency Drought Program; and 6) the Farmers' Home Administration's Community Program Loans and Grants. The authorizations and activities associated with each of these programs during the 1976–77 drought have been summarized in a General Accounting Office report (GAO, 1979) entitled "Federal Response to the 1976–77 Drought: What Should Be Done Next?" The GAO reported that the Departments of Agriculture, Commerce, and Interior and SBA alone administered more than \$5 billion in drought relief programs to water users during 1976–77. However, if the cost of programs administered by other federal agencies is included, as well as the cost of the relief programs of 1974 and drought-related administration costs to states during 1974–77, the total cost of the drought to government can be conservatively estimated at between \$7–8 billion (Wilhite et al., 1984).

4. Improving federal response to drought: Recommendations

In view of the experiences of the mid-1970s and previous drought relief efforts, certain lessons emerge about ways to improve governmental response to pe-

riods of widespread and severe drought. Based on the foregoing information, four basic requirements for more effective response by federal government are suggested: 1) reliable and timely information and dissemination plans; 2) objective and reliable impact assessment procedures; 3) objective and timely designation procedures; and 4) appropriate disaster programs and efficient program administration and delivery systems.

Information products and dissemination plans. The drought response efforts of the mid-1970s were not based on adequate and systematic provision of timely information on drought conditions and impacts to individuals and agencies involved in administering programs. Although the availability of reliable, current and properly formatted information does not ensure correct and timely decisions on the part of government officials, it is at least reasonable to believe that good decisions are less likely to be made on the basis of inadequate or incorrect information.

Many types of information are needed during periods of drought if the widely ranging impacts associated with water shortages are to be adequately addressed. For example, meteorological data is necessary to describe the degree of water shortage and to identify those geographical areas most affected. Such data, in conjunction with information on soil moisture conditions, can be used for early projections of yield. Commodity prices, in conjunction with projected yield figures, can be used to estimate monetary losses for principal grain, vegetable and hay crops. Data on stream flow and ground water depletion rates provide important information on the outlook for water supply to the agricultural, municipal and industrial sectors.

A common requirement for all types of drought-related information is that it be reliable, effectively organized and timely. In almost all cases during the mid-1970s drought, government agencies did not assemble assessments of the drought situation until drought conditions had reached critical proportions.

To improve the ability of government to respond effectively in times of drought, the drought situation and its consequent impacts must be continually monitored. Since weather data form the basis for virtually all other assessments, special attention should be given to providing relevant observations of precipitation and calculations of evapotranspiration and soil moisture status. Networks of automated weather stations such as the one being developed in Nebraska, South Dakota, Colorado, Kansas and Wyoming under partial support of the National Climate Program Office, can provide the data needed for the aforementioned calculations. This network currently provides near real-time data for seven meteorological parameters—solar radiation, wind direction and speed, precipitation, humidity, temperature and soil temperature (Hubbard et al., 1983).

Regional automated weather networks in drought-prone areas and terrestrial sensors in space can provide the data base for drought early warning and surveillance systems. Atmospheric scientists have a significant contribution to make in the improved collection and interpretation of weather data for drought management.

Impact assessment procedures. A long-standing problem in responding to drought has been the lack of reliable procedures for assessing probable impact. Because drought normally has its most immediate and substantial impact on the agricultural sector, improved techniques for assessing, in near-real time, the impact of weather conditions on crops and rangeland should greatly improve our ability to identify and, therefore, to speed assistance to areas affected by drought.

Historically, the most common criterion used by government to identify areas stricken by drought has been percent of normal precipitation. This information, as well as local reports of crop, pasture and livestock conditions and human distress, were used extensively during the 1930s and 1950s.

During 1976–77 the PDSI was used by federal agencies and the IDCC to establish eligibility of areas for drought relief (GAO, 1979). A map showing the distribution of PDSI values was (and is) published regularly in the *Weekly Weather and Crop Bulletin*. The PDSI is intended to describe long-term moisture conditions. More recently, the Crop Moisture Index (CMI), a modification of the PDSI and more agriculturally appropriate, has been used by federal agencies to assess short-term moisture conditions (Palmer, 1968; National Weather Service, 1977). The CMI was not widely used during 1976–77.

The PDSI has been increasingly criticized in recent years by scientists (Changnon, 1980; Wilhite, 1983; Alley, 1984). Inconsistencies have been noted between the PDSI and actual severity of the drought impacts observed. There are several reasons for the lack of agreement between calculated PDSI values and actual drought severity, particularly with respect to agricultural drought. Specific crop responses to drought were not considered in the derivation of the index, nor do they figure in the calculation of index values. Yet, the PDSI is used, qualitatively, to assess drought impacts on crops. Additionally, the Thornthwaite method (Thornthwaite, 1948) of estimating evapotranspiration (ET) is used in the calculation of PDSI values. The Thornthwaite method is unable to account for sensible heat advection, a major source of the energy that drives the ET process in the Great Plains region. Thus, there is concern that the Thornthwaite method severely underestimates ET in subhumid and semiarid regions (Rosenberg, et al., 1983) and, accordingly, that the PDSI tends to overestimate the amount of water remaining in the soil (Smith, 1983).

Regional differences in land use and cropping sys-

tems should be considered in the impact assessment issue. For example, a PDSI of -3.0 in July may signal substantial reduction in yield of nonirrigated corn because of destruction of reproductive tissue. Were moisture conditions to improve, corn yield would still be low but soybeans, whose reproductive activity continues through much of the growing season, may produce near normal yields.

Clearly, new techniques must be developed to enhance our drought impact assessment capability. Impacts are most precisely estimated on a crop-specific basis. Agricultural meteorologists and agronomists, working together, have the skills needed to develop crop-specific drought indices. Automated weather data networks are now providing the data to support the development and operation of these indices in some drought-prone regions. These data can also support numerous other assessment-related activities of state government. Therefore, states should play an important role in supporting the development and maintenance of these networks.

Drought designation procedures. The development of objective and timely procedures to determine eligibility for federal disaster assistance is a necessary condition for the improvement of government response to drought. Although standby legislation and response plans may reduce delays in program formulation and implementation, the lack of appropriate designation procedures and reliable, objective criteria on which to base those designations hampers the delivery of programs to the affected area and leads to ineffective response.

Procedures for designating counties eligible for assistance have changed with each drought episode. During a particular episode, procedures have been altered in response to deteriorating weather conditions. Changes in political administration in the middle of a drought can also be expected to result in changing designation procedures. During the mid-1970s drought the procedure for designating counties eligible for disaster assistance was more complicated and confusing than it had been in previous droughts, partly because more agencies and committees were involved in administering the programs (Wilhite et al., 1984).

The GAO (1978) has summarized the substantial differences in the disaster declaration procedures used by major agencies—FmHA and SBA during 1977. The effect of these differences in disaster declaration procedures was such that, during the period July 1977 through January 1978, FmHA and SBA operated their programs in 45 and 14 states, respectively. Within states where both agencies operated, certain counties were covered by only one of the two agency programs.

Our examination and evaluation of the function, procedures and actions of the IDCC has identified several specific problem areas (Wilhite et al., 1984). First,

the existence and precise function of the IDCC was poorly understood by government officials, especially at the state level. In many cases, designations by the committee were interpreted by government officials as an automatic qualification of their state or county for all federal disaster assistance programs. FmHA's Emergency Loan Program was the only government program actually enabled by IDCC action.

Second, IDCC designations were broad and sweeping, and impacts identified by states were not verified by the committee on the basis of a common set of objective data. No IDCC evaluation criteria were actually available until early June, and then they were not widely understood. Of the 2145 counties designated by the IDCC between 25 April and 12 September 1977, approximately 1575, or 73 percent, were approved before the criteria had been properly defined. Although entire states were often designated by the IDCC, actual impact areas were of limited geographical extent. For example, the primary impact area in Nebraska in 1977, in terms of production losses of the principal grain crops, was confined to a nine-county area in the extreme southeastern corner of the state. The IDCC designated the entire state (93 counties) on April 25. These sweeping designations provided many counties throughout the nation not affected by the severe drought with access to FmHA emergency loans. This action also led to the illusion of a severe nationwide drought. Such an illusion can, in the long run, be detrimental to the establishment of future drought relief programs. The following editorial on the 1977 Federal drought response effort (*Washington Post*, September 27, 1977) is given as an example:

THE DISASTER THAT WASN'T

The corn crop this year is the largest in the country's history. The wheat and soybean crops are huge and come close to setting records of their own. California's vegetable production is up. It's been a big year on the farm.

Now consider this curiosity: Two-thirds of the country is currently designated a drought disaster area by the federal government. There are 3,044 counties in the United States, and some 2,100 of them are Emergency Drought Impact Areas. They include everything west of the Mississippi except parts of Texas and Washington. They also include much of the Midwest and a swath of the South from Virginia's Shenandoah Valley down to the Gulf Coast. A farmer in a drought area is eligible for special loans at interest rates as low as 3 percent.

The weather this year has been, once again, eccentric. It was the dry winter that induced President Carter and Congress to collaborate on drought-aid legislation last spring. Then rain came—not enough to end all of the shortages in communities around the country, but enough to produce a tremendous harvest.

Drought aid has now degenerated into a kind of general relief for farmers, extended in the form of cheap

credit. Most of the beneficiaries are currently threatened not by drought and shriveled crops, but by precisely the opposite condition: crops so magnificently bountiful that prices have dropped dramatically. Some of these farmers, you could argue, genuinely need help. But it's a bad practice to bend an aid program covertly from one purpose to another. That generally results in a lot of aid going to people who don't need it.

The emergency-drought program ends on Sept. 30, and the question at the Agriculture Department is whether to do it again next year. The danger of drought is certainly real. It is necessary to think carefully about the possibility that the climate—and in particular the rain pattern—may be shifting. While this summer's rain was enough for the corn and wheat, it wasn't enough to fill reservoirs and restore water tables. If next winter is as dry as last winter, a much larger number of communities will feel the water shortage. A dry summer next year would certainly justify federal aid to farmers.

But the drought aid needs to be tied to the actual effect of weather on individual farmer's final harvests. The Carter administration has been doing it the other way, providing aid on the basis of regional rainfall at the beginning of the season. As this year's experience shows, that can mean an expensive program of disaster aid when, as it turns out, there was no disaster.

Third, the criteria established by the IDCC were not fully reliable for the purpose of identifying affected areas, although they were probably the best available at the time. Assessments by federal agencies were improvised from the data at hand. However, these needed data were not available to the committee that was charged with evaluating all requests for assistance. Also, the data available to the committee was, in some cases, out of date. Therefore, decisions were, at times, based on information that may not have represented the situation accurately.

Disaster programs, program administration and delivery systems. As many as forty separate programs were available to provide assistance to drought victims in the form of loans, grants and insurance during the mid-1970s (Table 3). These programs can be clustered into two broad categories. The first included short-term actions to avoid or lessen the impact of drought by augmenting water supplies. This was the primary objective of President Carter's drought program. The second group involved programs designed to make loans to farmers to compensate them for production losses and to provide them with working capital. The wide range of assistance programs available reflects the variety of groups and economic sectors affected by drought and the lack of a coordinated federal disaster response plan.

Two characteristics of these disaster programs can be noted. First, only a few of the programs available in the mid-1970s were designed to address the specific problems associated with drought. Rather, they were originally formulated by Congress to respond to prob-

lems of soil and water conservation and to other natural disasters such as flooding. Second, other than the ongoing programs implemented in response to previous 20th century drought episodes (e.g., Great Plains Conservation Program), the programs of the mid-1970s were intended to be short-term or tactical. No new long-term program initiatives were instituted during this period.

The GAO (1979) indicated four major problem areas in its study of the programs and the administration of programs that were part of the 1976-77 federal drought response effort. First, several drought programs were enacted too late to lessen the effects of drought. For example, President Carter's drought program did not receive congressional approval until April and, in some cases, May. In the Far West it had been apparent since January 1977 that a water shortage would occur during the irrigation season. As another example, delays in congressional approval also sharply reduced the effectiveness of certain programs. For example, \$75 million was authorized to the Bureau of Reclamation for the Water Bank Program. However, only \$4.8 million was spent in this manner because most growers of lower value annual crops had already planted by the time the program was implemented. It was too late to reallocate water to the higher value perennial crops.

Second, many projects that were approved violated congressional intent to augment water supplies on a short-term basis. Several projects were initiated so late that water could not be supplied during the drought for which the aid had been given. Construction of other projects did not even begin until after the drought had ended. Also, drought loans and grants appear to have been used to provide a low-cost source of federal financing for nondrought-related projects.

Third, eligibility and repayment criteria for emergency drought programs were inconsistent, inequitable and confusing. Although substantial differences in criteria existed between many disaster programs, the differences between the FmHA's Emergency Loan Program and SBA's Disaster Loan Program are, perhaps, the most interesting because they were directed to the same target groups. (For specific differences between these two programs, see the 1978 GAO report.) Loans obligated through these two programs totaled \$4.63 billion during 1976-77.

Fourth, inadequate coordination among agencies led to program overlap and nonuniform standards for determining eligible drought relief projects. The GAO cites several specific examples of loan applicants applying to two agencies. In some cases, applications were approved by both agencies, and applicants could choose the loan with the most favorable terms.

The GAO (1979) concluded its examination of the 1976-77 federal drought response effort with the recommendation that Congress direct the four primary agencies administering assistance programs (USDA,

SBA, Departments of Interior and Commerce) to assess the problems encountered in providing emergency relief. Based on the findings of this assessment, GAO recommended that a national drought plan be developed to provide assistance in a more timely, consistent and equitable manner. According to GAO, this plan should identify the respective roles of agencies to avoid the overlap and duplication that has been associated with previous drought response efforts. They recommended that the Congress consider legislation that would more clearly define those roles, and also recommended standby legislation (i.e., authorizing assistance programs) to permit more timely response to drought-related problems.

In the light of our research, the recommendations of GAO appear eminently sensible. The number of agencies participating in drought assistance activities during 1976-77, as well as the number of programs available, indicates the obvious need for an assessment and response plan organized under the leadership of a single agency. In the process of developing such a plan, all disaster assistance programs should be reviewed in terms of their consistency, efficiency and equity, as well as their relevance in dealing with the problems and impacts associated with drought. Most assistance programs were developed, originally, to address problems resulting from the occurrence of other natural hazards other than drought or in response to specific water supply problems. During droughts these programs have simply been redirected. Also, more attention needs to be given to alleviating drought impact and facilitating recovery in the agricultural sector.

We recommend that multidisciplinary studies be initiated to define the impacts of past droughts. We further recommend that scenarios be used to help evaluate probable impacts of future drought. The results of such studies could aid in identifying real needs for drought assistance programs, reduce the number of such programs and lead to improved efficiency in their administration.

5. Conclusions

Governments in the United States often respond to drought through crisis management. This was the case in the mid-1970s as well as in previous episodes of widespread and severe drought. In crisis management the time to act is perceived by decision makers to be short. Reaction to crisis often results in the implementation of hastily prepared assessment and response procedures that lead to ineffective, poorly coordinated and untimely response. If planning were initiated between periods of drought, the opportunity would exist to develop an organized response that might more effectively address issues and specific problem areas. Also, the limited resources available to government to mitigate the effects of drought might be allocated in a more beneficial manner.

In 1979 the General Accounting Office recommended the formulation of a national drought plan to provide assistance in a more timely, consistent and equitable way to drought-affected areas (GAO, 1979). The GAO proposed that this plan identify 1) the respective roles of agencies involved in drought response to avoid overlap and duplication; 2) the need for legislation to more closely define these roles; and 3) the need for standby legislation to permit more timely response to drought-related problems.

Our report has identified four requirements for effective response to drought by government. First, reliable and timely information on drought conditions and drought-related impacts must be developed and properly assembled and disseminated. This requires near-real time meteorological data on which informational products can be based. Second, impact assessment techniques must be improved. In the case of agriculture, usually the first economic sector to experience the hardships of drought, new types of analyses must be developed to provide decision makers at all levels with the types of information necessary to understand the severity of drought and its impacts so that appropriate actions can be implemented in a timely manner. Third, designation procedures must be centralized under a single agency or committee with complete authority to determine eligibility for all assistance programs. Criteria must be determined in advance of drought, well publicized when drought occurs and applied in a consistent manner. Finally, assistance programs must be developed in advance of drought to avoid the delays in program formulation and congressional approval that occurred in the mid-1970s. These programs should be administered by a single agency through the mechanism of an interagency committee composed of representatives from all federal agencies with responsibility in drought assessment and response. State and/or regional representatives should be included in the membership of this committee. Assistance programs must address the specific problems associated with drought.

The GAO's recommendation for a national drought plan has considerable merit. For such a plan to be effective, however, states must take a more active role in planning for drought. In the past, most states have played a passive role, relying almost exclusively on the federal government to rescue residents of the drought area. Although federal government has, for lack of an alternative, accepted this role, improving government response to drought requires a cooperative effort. States must develop their own organizational plans for collecting, analyzing and disseminating information on drought conditions. This information should form the basis for more objective and timely assessments of impact. Each plan should be unique, reflecting the water supply characteristics and problems of the state and potential impact areas. State plans should be linked to

a national drought plan through the interagency committee(s) with responsibility for drought designation and program administration. Because of the limited resources available to states, they can be expected to provide only a minimal level of financial assistance to drought disaster victims.

One unique aspect of the mid-1970s drought was the effectiveness of regional organizations of states in focusing the attention of the federal government on the problem. The Western Region Drought Action Task Force, the Western Governors' Policy Office and the Western States Water Council, working in concert, were able to make a more unified representation to federal officials. This lesson should not be forgotten. Regional organizations should consider centralizing their monitoring and assessment activities as one means of improving the efficiency and accuracy of information flow to the federal government and, by so doing, increasing their influence on drought policy.

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