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Government Response to Drought in the United States: With Particular Reference to the Great Plains¹

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(Manuscript received 17 July 1982, in final form 7 September 1982)

ABSTRACT

Drought relief has become an expected response of the federal government to periods of widespread drought in the United States. A wide range of emergency, short-term and long-term drought programs were formulated to deal with the extreme drought of the 1930's. By 1977 there were 40 separate programs administered by 16 different federal agencies. This paper traces the development of federal drought relief bureaucracy, including drought designation criteria and procedures.

Two obvious deficiencies of past drought relief efforts in the United States are noted. First, drought relief organizations and programs have been hastily assembled during periods of crisis. This has resulted in reduced program effectiveness as implementation has often been delayed pending program formulation and congressional approval. Second, previous efforts have had no adequate and systematic provision of timely information on drought conditions and impacts to persons or agencies involved in administering drought programs. The design, implementation and evaluation of a near real-time drought surveillance and early warning system is mentioned as one way atmospheric scientists can contribute to improved drought response in the United States.

1. Introduction

White and Haas (1975) estimated that droughts cause an estimated \$1.2 billion in direct losses annually in the United States. This is second only to flood and frost. While informative, the average annual total may be misleading. While drought may affect a portion of the United States each year, the major economic dislocations occur primarily during major drought episodes. Droughts, such as those that occurred in the 1930's, 1950's and 1970's, affect large areas of the nation and produce much greater losses. For example, direct losses from the 1976-77 winter freeze and western drought have been placed at \$36.6 billion (1980 dollars). Total direct losses for the 1980 summer heat wave and drought have been estimated at \$18 billion (NOAA, 1982), although the reliability of this figure has been questioned. These figures include direct losses in foodstuff, transportation, energy, production and sales. Yet another, though often neglected, impact of drought is the cost to taxpayers of providing relief programs to the drought-affected area.

Beginning with the early settlement of the Great Plains, drought, a recurring feature of its climate, has had repeated and substantial impact on the region.

Traditionally, governmental or nongovernmental organizations have responded by providing direct relief to those most affected. However, the pervasive nature of drought, in contrast to other natural disasters, makes the assessment of drought impact difficult.

Impact assessment is further complicated by three characteristics of drought; intensity, duration and spatial coverage. Each of these characteristics will likely affect its impact and, ultimately, the nature of the governmental response to drought.

Intensity and duration are generally measured by the departure of a certain climatic index (or indices) from normal. The most commonly used indices are percent of normal precipitation and the Palmer Drought Severity Index (PDSI) (Palmer, 1965). PDSI values range from $\sim +6.0$ to -6.0 . A value less than -4.0 indicates extreme drought. In rare instances the PDSI value will be less than -6.0 , as it was for portions of the Pacific Northwest and upper midwest during August 1977 (see Fig. 1).

Fig. 2 shows the PDSI series for three principal drought periods in southeast Nebraska. Note the contrasts between intensity and duration. For instance, the 1930's and 1950's droughts were similar in intensity but not in duration. The 1970's were not comparable to the 1930's drought in either intensity or duration.

The spatial characteristics of drought may affect governmental response or the implementation of drought management strategies in two principal ways.

¹ Published as Paper No. 6940, Journal Series, Nebraska Agricultural Experiment Station. The work reported was conducted under Nebraska Experiment Station Project 27-001.

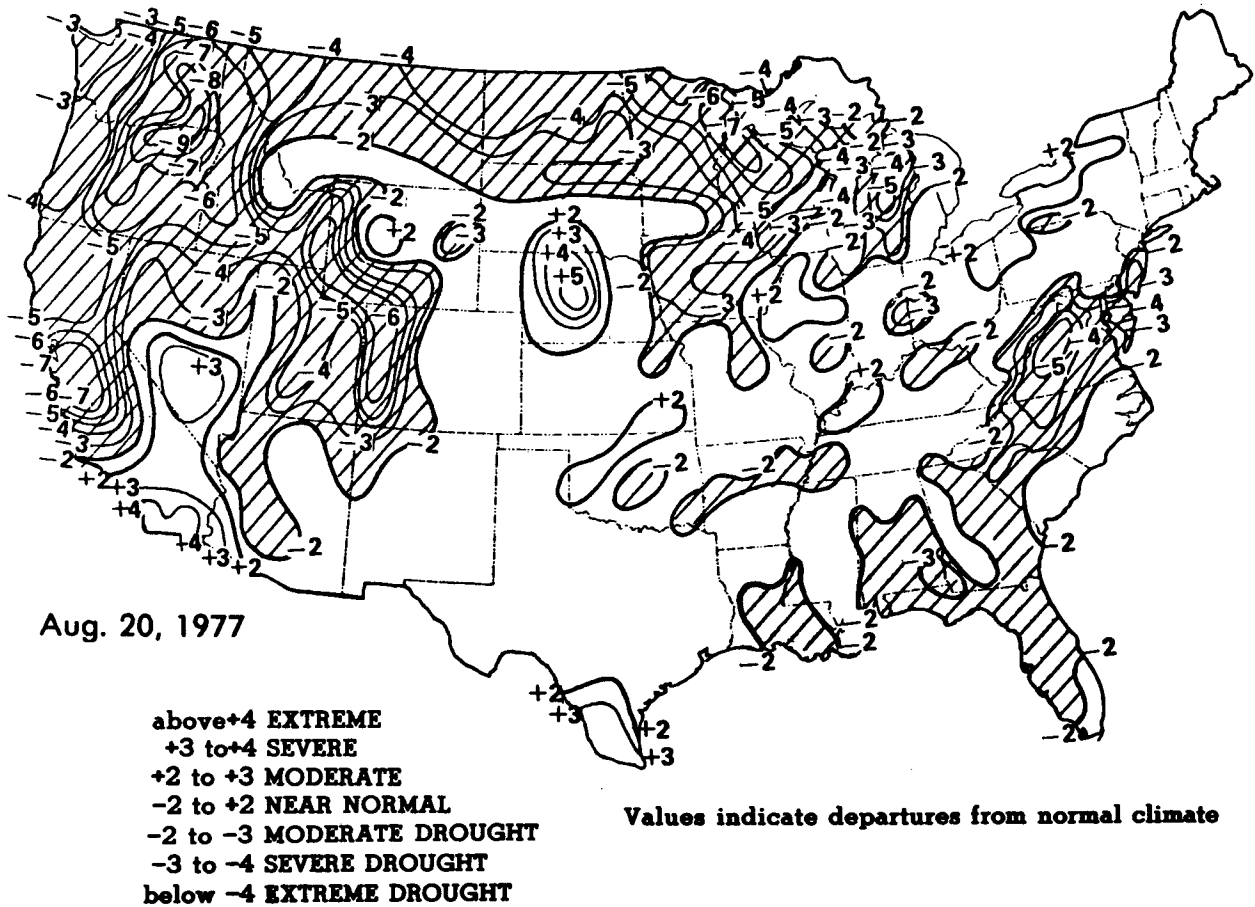


FIG. 1. Map of the Palmer Drought Severity Index for 20 August 1977. (From Weekly Weather and Crop Bulletin.)

First, the return period for drought is highly variable from one region to another. For areas such as the Great Plains where drought is a relatively frequent and recurring problem, long-term drought mitigation programs have been implemented to lessen its impacts, e.g., the Great Plains Conservation Program. In addition, a great deal of basic and applied research at the land grant colleges in those states frequently affected by drought is directed toward water management. Second, the geographic scope of drought determines the degree of media interest and exposure and, to some extent, the political response. We can only speculate about how the federal government's 1977 drought response plan would have differed had, for example, California not been affected. Obviously, droughts of equal severity in South Dakota and California will have different impacts, both in kind and in magnitude. However, the effects may be proportionally damaging to each state's economy.

This paper focuses on the history of drought relief in the United States, with special reference to the Great Plains states. Particular attention is given to the organization of drought relief, including drought

impact assessment and disaster designation procedures.

2. Drought response

Drought relief can take several forms. First, provisions, primarily food, clothing and fuel, may be required at times to prevent malnutrition or even death. Although nearly 1300 persons died during the combined heat wave and drought in 1980 in the United States, these deaths were due to heat rather than drought. Second, short-term strategies or programs are often required to help mitigate drought impact. This may include government-sponsored measures such as well-drilling for irrigation or stock-watering purposes, strategic irrigation, soil moisture conservation measures, or low-interest emergency loan programs to help farmers and others meet current and projected financial obligations. Third, government may promote and subsidize long-term strategies intended to reduce the impact of future droughts. Some examples include the construction of reservoirs for irrigation purposes, the regulation of land use, the

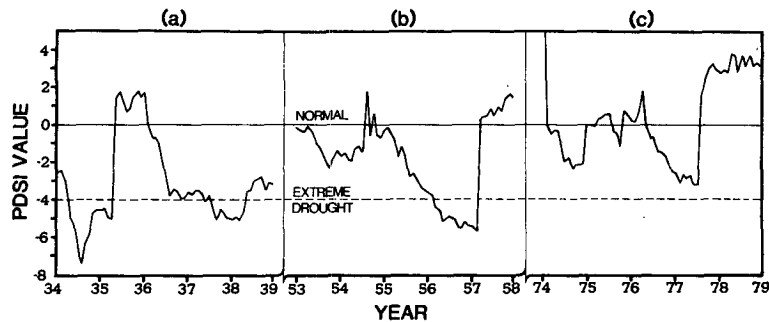


FIG. 2. Palmer Drought Severity Index values for southeast Nebraska for three major drought episodes. (a) 1934–39; (b) 1953–58; (c) 1974–79.

construction of windbreaks and the institutionalization of federally subsidized crop insurance. Each approach has been used to relieve emergency conditions created by drought.

a. Drought relief efforts, 1850–1900

Settlement of the Great Plains region proceeded rapidly after 1850. Immigrants arrived with little money, few possessions and scanty knowledge of the climate and other features of the environment. Technological options to cope with the vagaries of climate were also limited. Most of the settlers in the Great Plains states had migrated from the more humid eastern states. Therefore, crops and cultivation practices were incompatible with the Great Plains environment. Drought and harsh winters were quick to cause significant economic hardship and human suffering.

In general, the drought relief efforts of the 1850–1900 period proceeded in an “anti-relief” environment. Private relief organizations were active, but involvement by state and federal government was negligible. Many residents of the newly settled Great Plains states, especially land speculators, local newspapermen and politicians, had much at stake and were the source of much of the anti-relief sentiment (Gambone, 1970). Speculators feared that reports of distress due to drought would discourage immigration. As a result, news about famine was often suppressed.

A few concerned Easterners made visits to confirm the occurrence of drought and famine. As a result, relief efforts were organized. Funds and provisions were raised in the eastern states. In 1860, relief efforts in Kansas were centralized in an organization known as the Territorial Relief Committee. Local committees assessed relief requirements and requested aid from the Territorial Relief Committee. If the request was approved, provisions were distributed to local committees. These committees were responsible for determining how money and provisions were to be dispersed. Thus, local control was emphasized (Gambone, 1970).

This early attempt at drought relief was important

for two reasons. First, it established a local bureaucracy for verifying need and administering drought relief programs. Second, funds and provisions were successfully solicited from areas outside the drought-affected area. Little or no assistance was provided by state or federal government.

The first direct involvement by the federal government in drought relief took place, apparently, in Nebraska in 1874 when the United States Army distributed surplus clothing and food. Although such action was not permitted under existing law, President Grant authorized implementation of the program. Congressional approval was then requested and was received in February 1875. Eligibility was determined by Army personnel, and provisions were allocated on the basis of need. From February to May 1875 almost two million rations were disbursed to more than 100 000 persons in Minnesota, the Dakotas, Iowa, Nebraska, Kansas and Colorado (Fite, 1966).

An attempt was made to involve state government as an active participant in relief programs in Kansas in 1874. The governor called a special session of the legislature to deal with the issue of human suffering in western Kansas. While direct appropriations were recommended, the legislature chose instead to authorize the issuance of county relief bonds. If county residents voted to issue bonds, the state was to be the bond buyer. This approach proved ineffective. Residents preferred direct appropriations, rather than loans. The relief bond approach also discriminated against persons in the newly settled areas who were incapable of repaying loans (Fite, 1966).

Voluntary contributions remained the primary source of relief funds throughout the 1850–1900 period in the Great Plains. Attempts to obtain aid from state governments met with increased but still limited success in the late 1880's and early 1890's. For example, the Nebraska legislature appropriated \$200 000 for food and seed grain in 1891. In 1894 an appropriation for drought relief by the Colorado legislature was vetoed by the governor (Fite, 1966).

The controversy over state and federal government involvement in drought relief prevailed in Texas during the late 1880's. Appeals were made to the state

TABLE 1. President Roosevelt's Drought Relief Program
Proposed June 9, 1934.

Program	Amount (million \$)
Special work program and human relief	125
Livestock purchase in addition to the funds already available under the Jones-Connally Act	75
Shipping, processing and relief distribution of purchased cattle	100
Loans to farmers to finance emergency feed purchases and shipments	100
Emergency acquisition of submarginal farms and assistance in relocating destitute farm families	50
Work camps to afford employment in the drought area for young men principally from cities and towns	50
Purchase of seed for 1935 plantings, and for loans to get seeds into farmer's hands	25
Total	525

legislature by the relief committee and voluntary donations were also solicited. However, conflict developed because of the spatial variability of drought severity and the disparate impacts on farmers and ranchers. Basically, the problem was one of drought assessment. An appeal was made to Congress in 1886 for \$50 000 to purchase seed for drought-stricken areas. A \$10 000 appropriation passed Congress but was vetoed by President Cleveland who believed such action to be unconstitutional (Holden, 1928).

The historical significance of these early attempts at drought relief in the Great Plains lies in the establishment of drought relief organizations and the negligible level of federal/state participation.

b. Drought relief, 1930's

The decade beginning in about 1929 ushered in a new era of drought relief in the United States. Previous relief efforts had been organized primarily by nongovernmental relief committees and had relied on voluntary contributions for support. President Hoover continued this tradition. His approach to relief was based on the philosophy of self-help and local participation. The President convinced the chairman of the Red Cross in August 1930 to accept full responsibility for directing relief measures (Aistrup, 1956). The Red Cross had first to modify its charter before it could accept responsibility for the administration of the program. Previously, the Red Cross had participated only in relief programs that resulted from those disasters considered an "Act of God." Drought was not so considered (Woodruff, 1977).

President Hoover, in late 1930, also requested the United States Department of Agriculture (USDA) to

make a county-by-county survey of the drought area (Aistrup, 1956). The National Drought Relief Committee was established by the president to help coordinate relief activities (USDA, 1930). Representatives of Federal Farm Board, Federal Reserve Board, Treasury Department, American Railway Association and a member from the banking community served as members of that committee. The composition of the committee reflected the importance of the private sector in Hoover's approach to relief. State drought relief committees, appointed by governors, had a similar composition. The Red Cross had a representative on most of these state committees (USDA, 1930). County committees were appointed by state committees if local conditions warranted (Hamilton, 1982).

As drought conditions deteriorated, President Hoover realized that additional relief measures were necessary. He chose to avoid measures that would require congressional action. Instead, he proposed another relief campaign in October 1930. This approach met with strong opposition from members of Congress. As a result, Hoover supported legislative action in the form of a bill to provide crop production loans (Hamilton, 1982). Eventually, \$45 million was authorized. The only other appropriation passed during the Hoover Administration was the Feed and Seed Loan Bill, which made available \$45 million (Woodruff, 1977). The "self-help" approach used by the Hoover Administration represents what may have been the last attempt by a United States president to address drought relief problems through voluntary programs.

The election of Franklin D. Roosevelt as President in 1932 ushered in a new era for drought relief. His approach was through legislative action. FDR's program focused on emergency, short-term and long-term measures. By 9 June 1934, the administration had put together a comprehensive drought program totaling \$525 million (Table 1) (U.S. House of Representatives, 1934). It included emergency livestock and feed programs, seed purchase programs, human relief programs and the acquisition of submarginal lands. As drought continued, additional programs were assembled, including the Shelterbelt Project, dam construction for irrigation development and soil conservation programs (Hurt, 1982).

The President's Drought Relief Committee was formed in August 1934 (USDA, 1934). The chairman of this committee was Secretary of the USDA, Henry A. Wallace. Other members included administrators of the Agricultural Adjustment Administration and the Federal Emergency Relief Administration and the governor of the Farm Credit Administration. Each of the members were "action" agencies. By contrast, President Hoover's drought committee had been composed of regulatory and private agencies. Subcommittees, established to carry out the responsibility

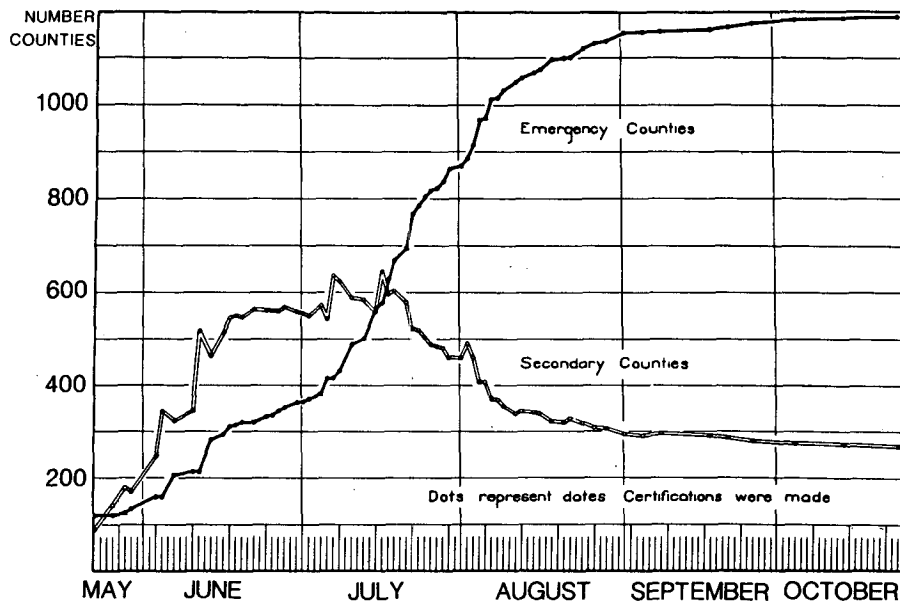


FIG. 3. Emergency and secondary drought county designations for 1934, by month. (From Murphy, 1935.)

of President Roosevelt's Committee, were charged with specific tasks such as drought area designations, livestock purchases, food surveys and the provision of livestock feed.

Two types of county designations for drought relief were made during 1934, secondary and emergency (Murphy, 1935). In both types of counties, planting restrictions were modified to permit greater planting of forage, and pasturing of acreage than had been previously contracted. Planting restriction applied only to wheat, cotton, corn-hog combinations and tobacco. Emergency counties were also eligible for the cattle purchase program. Both designations were based on recommendations of the Bureau of Agricultural Economics and Federal-State Cooperative Extension Service of USDA. Assessment was based mainly on field reports of crop and pasture conditions, departure from normal precipitation, percent change in cattle numbers and reports of human distress. Appeals for federal relief were made by state drought committee officials or by the governor. Verification of need was the responsibility of representatives of the USDA or other involved agencies.

The first designation of 121 emergency and 91 secondary counties was made on 23 May 1934. The emergency counties were located mainly in North and South Dakota. Secondary designations were principally applied to counties in Montana, Minnesota and Wisconsin. By 24 October 1934, 1187 counties (Fig. 3) had received an emergency designation (Murphy, 1935). The distribution of counties designated for emergency assistance during 1934 is shown in Fig. 4.

In the fall of 1934 precipitation increased substan-

tially over most of the drought-affected area and conditions continued to be favorable through spring. Since the 1934 drought designations were to expire on 1 June 1935, new designations were made for 131 counties in Texas, New Mexico, Oklahoma, Kansas and Colorado on 18 May 1935 (Murphy, 1935).

Drought area designations were again established in 1936 and 1937. For 1936, designations were made on 1 and 15 September and involved approximately 1070 counties (see Fig. 4). Concentrated mainly in the Great Plains states, these counties extended from the Canadian border south to northern Texas. The drought relief organization and associated designation procedures remained relatively static during the 1934-37 drought period. One major alteration in procedure occurred in 1937, when the USDA drought committee became responsible for decisions on area designations (Wilson, 1937). Previously, these decisions had been based on recommendations of the Extension Service and the Bureau of Agricultural Economics.

In summary, the drought relief efforts of the Hoover and Roosevelt Administrations differed sharply. In the former administration voluntarism and self-help were emphasized, while in the latter, legislative action was favored. Actions of the Hoover Administration generally proved inadequate to deal effectively with the problem. It must be said, however, that no previous administration had encountered a relief problem of this magnitude. As the situation further deteriorated, it became obvious that more drastic action was required. The early years of the Roosevelt Administration represented a major turning point in federal drought relief efforts. Federal involvement in-

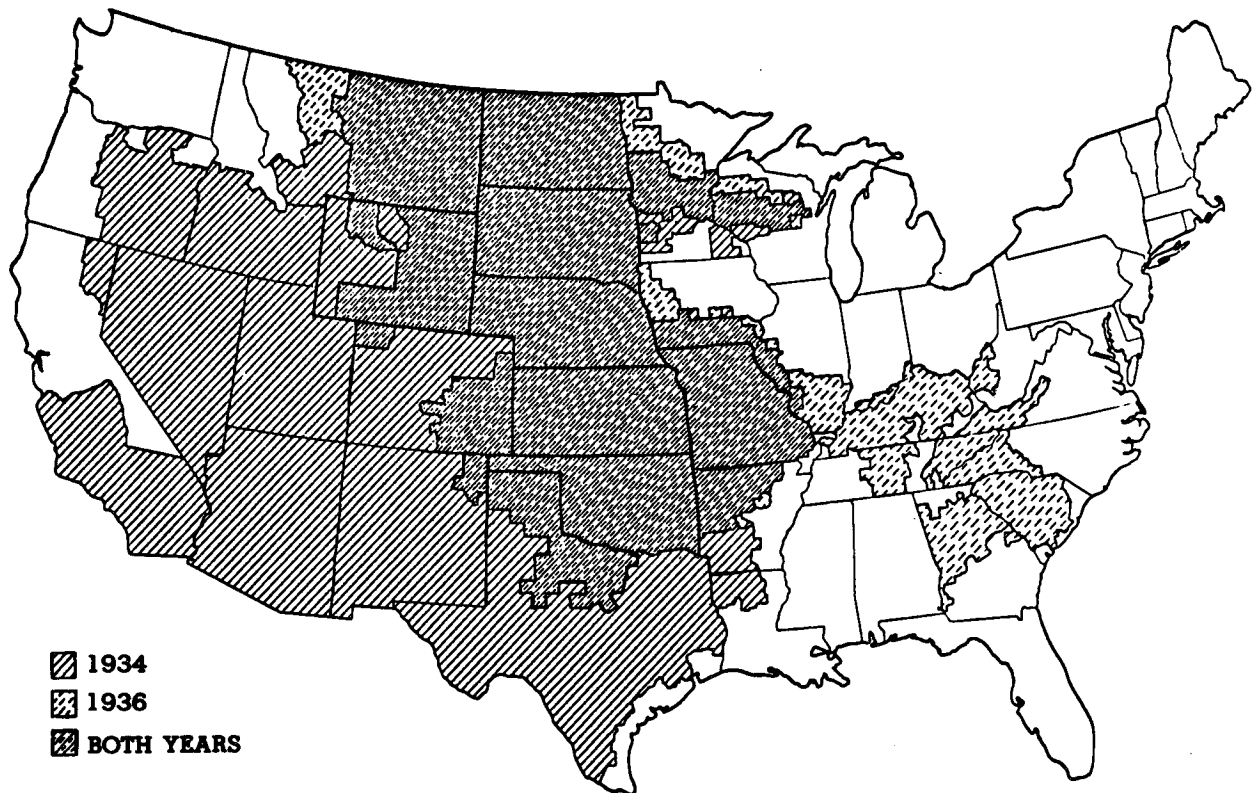


Fig. 4. Officially designated drought counties, 1934 and 1936. (From Works Progress Administration, 1937.)

creased dramatically to the point that the federal government assumed complete authority for drought relief. Also, a more comprehensive federal drought relief organization under the leadership of USDA was developed to deal with problems of distress. This included the development of procedures for area designation and numerous drought response/planning activities. Planning and implementation of long-term programs aimed at the reduction of drought risk were also accomplished. Many of these programs have, in the years since their initiation, effectively focused the attention of Great Plains' farmers on proper management of soil and water resources.

c. Drought relief, 1950's

Drought once again plagued the Great Plains in the 1950s. Beginning in the southwestern United States in the late 1940's, drought gradually spread eastward into the southern Great Plains and, by the middle of the decade, northward to the central plains. Portions of west Texas experienced ten consecutive years of drought, while Nebraska was affected in only two of those years, 1955 and 1956. This geographic pattern was quite different than that which had occurred in the 1930's. Some drought relief measures were initiated during the Truman Administration,

particularly the Hay Program which paid one-half of hay transportation costs. As the drought intensified, a broader program was developed by the succeeding Eisenhower Administration.

The Eisenhower Administration became involved only reluctantly in drought relief. Advisors suggested that President Eisenhower follow the precedent set by President Cleveland who had, in 1887, vetoed a congressional appropriation of \$10 000 for drought relief in Texas. However, the precedent set by FDR seemed too strong for Eisenhower to ignore (Lambert, 1977). The philosophy of the Eisenhower Administration was for states to share the cost of relief measures. This philosophy met with considerable opposition.

A USDA Drought Committee was first appointed in 1953 to administer the Emergency Feed Program (Scott, 1954). As the drought intensified and the area affected expanded, so did the drought program and the counties eligible for disaster assistance. By 14 October 1954, 869 counties in a fifteen state region had been designated as eligible for drought relief (USDA, 1954).

Three major forms of emergency and short-term drought aid were provided by the Eisenhower Administration (Lambert, 1977). First, massive loans were made available. Second, the Hay Program sub-

sidized transportation costs. Third, the Feed Grain Project was employed to distribute surplus feed grains controlled by the Commodity Credit Corporation. Other short-term measures, including wind erosion control, construction of stock ponds and lakes, and federal assistance for cattle sales to foreign countries, were also supported.

Economic assistance programs of a more long-term nature, were also formulated. Government credit was expanded under these programs to include the provision of soil and water conservation, and farm ownership loans through the USDA (United States Executive Office of the President, 1959). Industrial development was promoted by the Department of Commerce to diversify the economy of the drought region. The USDA's Economic Research Service initiated a variety of studies pertaining to crop insurance, farm tenure, land prices and shifts in land use. Long-range water resources planning was also undertaken on the basis of various scenarios of population growth and movement in the Great Plains region (U.S. Executive Office of the President, 1959).

During 1954-56, federal drought relief amounted to more than \$729 million (see Table 2) (U.S. Executive Office of the President, 1959), including the distribution of \$100 million in government-owned surplus foods, \$140 million in surplus feed grains, \$260 million in emergency credit and livestock loans, and \$184 million to strengthen livestock prices. Other relief actions included a reduction in railroad rates, permission to graze soil bank reserves and timely releases of water from reservoirs to provide irrigation water for crops.

The federal drought relief organization of the 1950's was similar to that which the Roosevelt Administration employed in 1934. A USDA disaster committee was appointed by the Secretary of Agriculture. Membership included representatives of the Farm Credit Administration, Commodity Stabilization Service, Farmers Home Administration, Agricultural Conservation Program Service, Soil Conservation Service, Federal Crop Insurance Corporation, Office of Budget and Finance, Cooperative Extension Service, Agricultural Marketing Service and General Counsel's Office. The United States Weather Bureau provided information and periodically met with the committee (USDA, 1959).

A USDA disaster committee was formed in each state and in those counties where conditions warranted. State committees were appointed by the Secretary of Agriculture and included the state chairmen of the Agricultural Stabilization and Conservation Service, Farmers Home Administration and Civil Defense. The county USDA disaster committees had a similar composition, but also included representative farmers or businessmen (USDA, 1954).

Requests for assistance were initiated at the county level. The county committee provided information

TABLE 2. President Eisenhower's Drought Relief Program, 1953-1956.

Program	Amount (million \$)
Distributed government-owned surplus foods free through state welfare offices to needy people in cities, towns and rural areas	100
Distributed government-owned surplus feed grains to help farm and ranch families maintain foundation livestock	140
To help purchase hay and other roughage to maintain foundation livestock, including dairy cattle	26
To help implement wind erosion control measures	18
Emergency credit and livestock loans	260
Purchased beef and pork products to strengthen distressed livestock prices. Frozen hamburger was purchased to help stabilize prices of certain grades of cattle	184
Long-term, favorable-rate loans for small businesses in drought-stricken communities	1
Free grain furnished to small farm families through state welfare offices to maintain subsistence livestock	
Special permission in 562 counties in 12 states to graze soil bank reserved acres	
Total	729

to the state committee, including: current condition of pasture, range and crops; supply of feed grains, hay and roughage; percent of normal precipitation; availability of hay and roughage supplies within reasonable distance of the county; livestock condition; economic condition of affected farmers and ranchers; and other supporting evidence on the extent and severity of drought (USDA, 1959). The state committee forwarded its recommendation and supporting information to the national committee for consideration, and the governor simultaneously sent a letter to the president requesting assistance. The national committee evaluated the material received from the state committee and supplemented it with other data available from various federal agencies. The committee then made its recommendation to the Secretary of Agriculture. Following a review of the material, the Secretary forwarded his personal recommendation to the President for consideration. If a declaration was made by the President, it was the Secretary's responsibility to indicate those assistance programs eligible to the drought-affected area (USDA, 1959). The Washington-level review normally took one or two months to complete (Gruenther, 1954).

The complexity of the drought-relief bureaucracy often resulted in substantial delays in the designation process. Two problems arose because of this delay.

First, drought programs were not initiated in a timely manner and, therefore, the programs were not responsive to the needs of those in the affected area. Second, drought conditions could change drastically between the time of the request to the national drought committee for designation, and the time when a decision on the declaration was made. Designations may have been purposely delayed for this reason, as many committee denial actions appear to have been due to apparent improvements in the weather—recent rains, for example. However, in many cases drought had already taken its toll.

d. Drought relief, 1977

Widespread drought returned to the United States in the mid-1970's. The first effects of this drought occurred in the southwest in 1974. By August, drought was evident in half the western states. In early 1976 drought affected all of California and portions of the Middle Atlantic states. As the 1976 season progressed, the drought area expanded to include parts of the northern Great Plains and the upper Midwest. By July, drought was most intense in California, especially around the San Francisco Bay area (USDA, 1976). Conditions further deteriorated during 1977 as the far western states, especially California, Washington, Oregon and Idaho, experienced extremely dry conditions. The drought also intensified over the upper Midwest and the northern and central plains states. By August 1977 the drought area extended from Michigan to Washington, including most of the western states (see Fig. 1). Drought of lesser intensity also affected the Middle Atlantic and southeastern states.

Federal involvement in drought relief was initiated on a large scale in early 1977; before then, efforts had primarily involved only USDA and the Federal Disaster Assistance Administration. The year 1977 is important for two reasons. First, impacts were rapidly compounding as drought entered its second year. States began to form regional alliances to put added political pressure on Washington for action (WESTPO, 1978). Second, drought represented the first critical domestic issue to confront the Carter Administration which took office on 20 January 1977.

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, began to monitor and publish regular updates on the drought situation in the western states. The governors also requested a meeting with Interior Secretary Cecil Andrus to discuss state needs and federal actions to mitigate drought impact. The meeting, held on 20

February concluded with "(1) a commitment by Secretary Andrus to seek the appointment of a White House level drought coordinator to be located in the Executive Office of the President; (2) a commitment by Secretary Andrus to encourage the President to set aside time for a discussion of the drought issue during a meeting of the President with the nation's governors scheduled for February 28; (3) a commitment by the governors to consider the need for and alternative approaches to cooperative, multi-lateral actions in response to the drought and its impacts; (4) a decision by the governors to designate state drought coordinators; and (5) a decision by the governors to consider and make decisions with regard to more concrete approaches to these issues at a meeting in Washington the following week in conjunction with the winter meeting of the National Governors Conference" (WESTPO, 1978).

The regional drought action initiatives by the western governors had almost immediate impact. Two days after the 20 February meeting, President Carter appointed Jack Watson as federal drought coordinator. The governors met with the President on 28 February to discuss the drought problem. By early March, twenty states had appointed state drought coordinators. The Carter Administration began to work with the western states affected by drought to examine ways to better coordinate federal response. On 23 March, President Carter sent a request to Congress for \$844 million in loans and grants to farmers, ranchers, communities and businesses allegedly impacted by drought. Table 3 provides the details of the Carter Administration's program. This program was passed without change by Congress, except for the Small Business Administration (SBA) legislation and a reduction in the Economic Development Agency (EDA) loan and grant program from \$225 to \$175 million (Crawford, 1978).

On 25 April 1977, the Departments of Agriculture, Commerce, and Interior, and the SBA signed a Memorandum of Agreement to "establish an interagency committee with authority to designate areas eligible for federal assistance as a result of drought" (Cutler, 1977). The committee was called the Interagency Drought Coordinating Committee (IDCC). The USDA was asked to chair the IDCC, with the Federal Disaster Assistance Administration (FDAA) serving as secretary. The governor of a state could request that all or a portion of his state be designated as an Emergency Drought Impact Area (EDIA). Requests were accompanied by supporting documentation. If approved, the designation would make the affected area eligible for federal assistance under the president's program. The governor was notified of the IDCC decision.

The IDCC based its declarations on the following criteria: 1) request from governor with supporting documentation; 2) Palmer Drought Severity Index

TABLE 3. President Carter's Proposed Drought Program, 23 March 1977 (WESTPO, 1978).

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

* 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 no additional appropriation as originally requested.

(PDSI) data; 3) soil moisture map; 4) monthly reports of the Rural Development Committee (USDA); 5) local information illustrating drought severity; 6) federal agency reports of the drought situation; and 7) other available data (Stockton, 1977). According to the General Accounting Office (GAO), the PDSI may have been the principal criterion used by the IDCC (GAO, 1979). The index must have been at least -2 over the previous two to three-month period in order to qualify (Stockton, 1977). The reliability of using the PDSI to measure drought severity and assess impact has recently been the subject of some criticism (see Changnon, 1980; Wilhite, 1982). In case of denial of a request, the applying governor was advised of the reasons for denial and of the availability of other federal assistance programs.

At the time of its formation the IDCC 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 (two-thirds of all counties in the U.S.) were included in the list of EDIAs (Fig. 5). These designations were to expire on 30 September.

It seems that considerable confusion developed over IDCC declarations. The declarations applied only to programs included in the presidential drought package. While this package was substantial, probably the largest single drought relief allocation in the na-

tion's history, it represented only a small portion of the total drought assistance program. The total relief program included some forty separate programs administered by sixteen different federal agencies. GAO has reported that the departments of Agriculture, Commerce and Interior and the SBA alone admin-

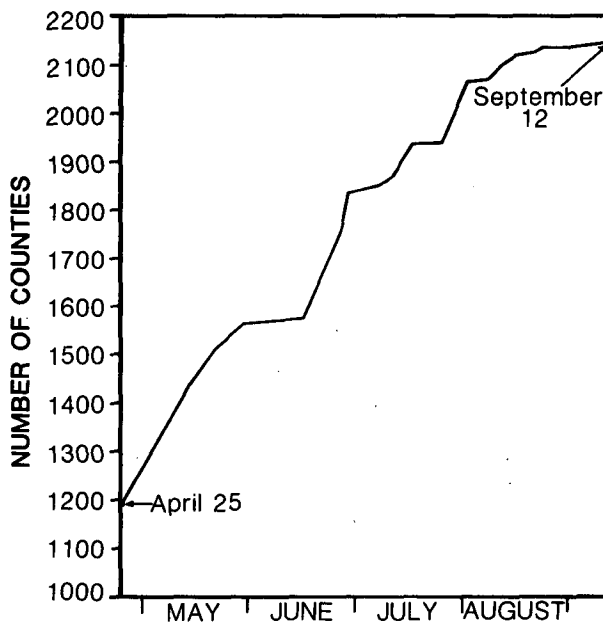


FIG. 5. Emergency Drought Impact Areas designated by the IDCC, 1977. (From Federal Register.)

istered programs that distributed over \$5 billion in drought relief to water users (GAO, 1979). Eligibility for these programs was determined on a program-by-program basis.

GAO (1979) reported four major problems in the management and coordination of the 1976-77 federal drought relief effort. First, emergency legislation was enacted too late and some drought programs were late in implementation. The Drought Emergency Act of 1977, for example, was not passed until 7 April, although it was evident as early as January that the water shortage in the western states would continue due to a lack of snowfall. Second, millions of dollars in loans were approved for projects which had little, if any, impact on reducing the effects of the drought. In many cases loan applicants were already planning to build or rehabilitate projects prior to the drought. According to the GAO, "the drought, it appears, provided a low-cost source of Federal financing for constructing projects to meet future needs." Third, eligibility and repayment criteria were inconsistent between the various drought programs which were available to drought victims. These inconsistencies were mainly associated with interest rates and loan repayment periods. Finally, coordination between agencies was inadequate and resulted in overlapping responsibilities and duplication of effort. Agencies, for example, did not agree on what constituted an eligible drought-relief project. In certain instances, applicants applied to several loan programs, sometimes resulting in rejection by one program and acceptance by another. At times, applicants were accepted by more than one agency, in which case applicants chose the one offering the most favorable terms.

In an attempt to improve future drought relief, the GAO recommended that the primary agencies jointly address the problems of administering drought programs. Furthermore, GAO recommended that a national plan be developed for "providing future assistance in a more timely, consistent and equitable manner." It was suggested that this plan identify the role of each agency, the legislation required to more clearly define each agency's role, and the legislation needed to permit more timely drought response by the federal government.

3. Summary and conclusions

The programs and actions discussed in this paper were initiated in response to conditions of widespread drought. While private relief organizations were formed to administer drought relief during the 19th Century, the federal government undertook that duty in the early 1930's. The federal government now dominates drought relief efforts.

Historically, drought relief has taken many forms. Between 1850 and 1900 private organizations gave provisions primarily in the form of food, clothing,

fuel and seed grain to drought victims. In the 1930's, emergency, short-term and long-term measures were undertaken by the federal government. Today, drought relief is provided primarily through various loan, grant and conservation programs and through federal crop insurance.

The impact assessment and designation process has taken various forms since drought relief began in the United States. Traditionally, distress has been measured at the local level, but the decision on drought assistance has been made at a higher administrative level. The decision-making process has increased in complexity as the magnitude of relief funds and the number of federal agencies involved and programs available have grown.

The designation of areas eligible for disaster assistance has been based on a multitude of criteria. Eligibility during the early settlement period in the Great Plains generally followed local appeals and a visit to the drought-stricken area by members of the relief committee. As government became increasingly involved and other types of information concerning drought severity and impact became available, other criteria were used. In the 1930's, declarations were based on departures of precipitation from normal, on crop and pasture conditions, unusual livestock movements and economic hardship. By 1977 the government was using a complex "drought index" and numerous other physical criteria as indicators of economic distress.

From this review, it is apparent that there have been two obvious deficiencies of past United States drought relief efforts. First, drought relief organizations and programs have been developed during periods of crisis. As a result, bureaucracies have been hastily assembled and program implementation has been delayed pending program formulation and congressional approval. A national drought plan should focus on alleviating these weaknesses of previous drought relief efforts. This plan might also reduce the role that politics play in governmental decisions regarding drought relief.

Second, previous drought relief efforts have had no adequate and systematic provision of timely information on drought conditions and impacts to persons or agencies involved in administering drought programs. The ability of government to respond effectively in times of drought is closely related to the adequacy of information available to it. While 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 cannot be made on the basis of inadequate or inaccurate information, except by chance.

Atmospheric scientists can help resolve these problems. First, they can lead efforts to design, implement and evaluate a near real-time drought surveillance

and early warning system for those portions of the country frequently affected by severe drought. Second, atmospheric scientists can investigate the reliability of indices currently used to measure drought severity. If these indices prove inadequate or inaccurate, they should be modified or new indices should be developed. Third, atmospheric scientists can prepare statements of conditional probabilities and climatological outlooks for use by state and national drought committees, and participate in committee deliberations about impacts and disaster declaration.

The research results reported in this paper are part of a more detailed study in progress which focuses on an evaluation of governmental drought response efforts in the United States during the mid-1970's. The ultimate goal of this study is to provide local, state and federal agencies with recommendations on procedures to improve future drought response. These recommendations will focus on the identification of drought affected areas, disaster designation procedures and information flow within and between levels of government.

Acknowledgments. The author wishes to thank Professor Norman J. Rosenberg, Michael H. Glantz and Kenneth G. Hubbard for their critical review of this paper. Deborah Wood and Roberta Sandhorst assisted with the library research and the preparation of the manuscript, respectively. Sheila Smith drafted or modified the illustrations. Their help is gratefully acknowledged.

The work reported was conducted under Nebraska Experiment Station Project 27-001. This material is based upon work supported by The National Science Foundation under Grant ATM-8108447.

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