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Published in *Water Resources Bulletin* 22:3 (June 1986), pp. 425–438.  
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Paper No. 85054 of the *Water Resources Bulletin*. Discussions are open until February 1, 1987. (Published as Paper No. 7733, Journal Series, Nebraska Agricultural Experiment Station. The work reported here was conducted under Nebraska Agricultural Experiment Station Project 27-001.)

## Drought Policy in the U.S. and Australia: A Comparative Analysis

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### Abstract

Federal and state governments in the United States and Australia have come to play a key role in attempts to mitigate the impact of drought. Government actions have usually taken the form of loans and grants to individual citizens, businesses, and municipalities experiencing the hardship of drought. Most of these actions have occurred in an environment of crisis management, rather than as a result of clearly stated policy objectives. Based on a review and evaluation of recent drought policy in the United States and Australia, recommendations are offered on ways to improve the United States' approach. A national drought plan is suggested as an efficient mechanism through which these recommendations could be implemented. States should also become more actively involved in drought assessment and response, but these actions must be coordinated with federal actions.

**Keywords:** drought, drought response, water policy, water planning

### Introduction

Drought frequently affects portions of the United States and Australia and causes substantial economic loss, especially in the agricultural sector. Government has come to play a key role in both countries in attempts to mitigate the impact of drought. The organizational structure for drought response used by federal and state government in the United States

has evolved gradually since the 1930s. Drought assistance has been provided by federal government through a variety of emergency, short-term, and long-term measures. In the 1930s such measures included reduced transportation costs for hay and livestock, loans to farmers to finance emergency feed purchases, shelterbelt planting, and soil and water management and conservation programs. Today, drought relief is provided primarily through loan, grant, and conservation programs and through federal crop insurance. States have not been required to accept fiscal or administrative responsibility for drought assistance.

Generally speaking, the federal drought assistance program in the United States has increased in complexity with each succeeding episode of drought. During the 1930s, for example, the total drought assistance program was administered by three federal agencies (Murphy, 1935). In 1976–77, 16 federal agencies administered 40 separate drought programs. This increase in complexity has not necessarily resulted in increased efficiency or effectiveness (General Accounting Office, 1979).

As a direct result of drought, the federal (Commonwealth) government of Australia faces problems similar to those in the United States. No part of Australia is free from drought, and most of the country suffers from frequent occurrences of severe drought (Foley, 1957; Gibbs and Maher, 1967; Reynolds, et al., 1983). Only 22 of the past 100 years have been drought free (Anonymous, 1983). Much of Australia's agriculturally important area is located in marginal rainfall zones where even a minor drought episode has immediate economic repercussions (Gentilli, 1971; Heathcote, 1967). Hence, Australian agriculture has been forced to make significant adjustments to its precarious situation.

Governmental units in Australia began to formulate drought programs in the 1930s. Both federal and state governments have been actively involved since then in the evolution of an organizational response structure to administer drought assistance programs. Although the philosophy of Australian and United States drought policy is similar, the administration of policy differs considerably. And, like the drought response effort in the United States, the Australian approach has been the target of much criticism from the scientific community and government officials as well as from recipients of relief.

In this paper I review and evaluate the drought programs and policies of state and federal government in the United States and Australia. Emphasis is placed on governmental actions during recent episodes of widespread, severe drought—1976–77 and 1982–83 in the United States and Australia, respectively. Recommendations for improving the drought response capability of government in the United States are offered.

### **The Objectives of Drought Policy**

Drought policy has not been stated explicitly by government in the United States and Australia. The underlying question is, should government be involved in providing assistance to those economic sectors or persons that experience hardship in times of drought? Because of the frequency, severity, and spatial extent of drought in the United States and Australia, government has elected to provide assistance, and through a wide range of measures. These drought assistance measures are the instruments of a *de facto* policy that has evolved over the past 50 years, one of reacting to, rather than preparing for, periods of crisis. And,

the decision on whether or not to provide aid has been based more often on political than economic reasoning.

Without clearly stated drought policy objectives, the effectiveness of assistance measures is difficult if not impossible to evaluate. I propose three objectives for drought policy. First, assistance measures should not discourage agricultural producers, municipalities, and other groups from the adoption of appropriate and efficient management practices that help to alleviate the effects of drought. Second, assistance should be provided in an equitable, consistent, and predictable manner to all without regard to economic circumstances, industry, or geographic region. Third, the importance of protecting the natural and agricultural resource base must be recognized. Although these aims may not be achievable in all cases, they do represent a model against which recent drought measures in the United States and Australia can be evaluated.

### **Governmental Response to Drought: The United States**

#### *Mid-1970s Drought Episode*

A recent episode of widespread, severe drought in the United States occurred in the mid-1970s. The years 1974, 1976, and 1977 stand out as those in which the greatest economic losses occurred. Drought first appeared in the Southwest in the spring of 1974 and by July and August had spread over most of the Great Basin states and central and southern Great Plains states as well (Wagner, 1974). The timing of the precipitation deficiency and heat wave resulted in reduced yields of corn and other grains, particularly in the central and southern plains states.

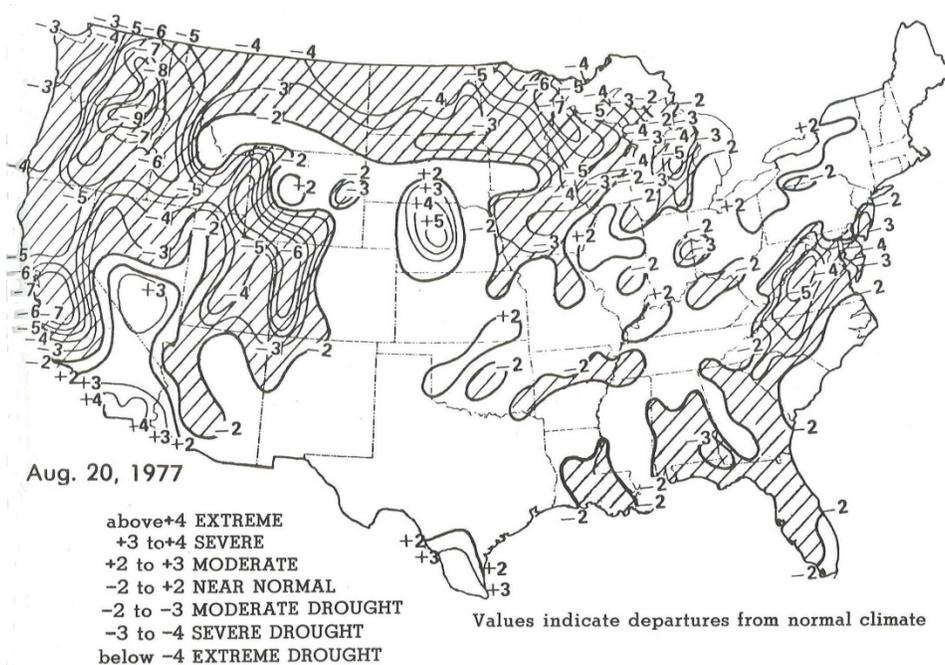
Weather conditions improved considerably during 1975, but drought returned in January 1976 to many of the western states (Wagner, 1976). By May, the drought-affected area included all of California. By July, two pockets of extreme drought had developed. The first was in California and adjacent states. The second drought area extended from north-central Nebraska through eastern South Dakota, southeastern North Dakota, and southern Minnesota to Wisconsin. The drought-affected area in the northern plains and upper Midwest states continued to expand during the remaining summer months. In northeastern Nebraska in 1976, yields of nonirrigated corn were reduced by more than 50 percent (Nebraska Department of Agriculture, 1978).

It became apparent by January of 1977 that, because below-normal snowpack in the Far West, irrigation water would be short the following summer. Precipitation deficits for the October–February ranged from 5–20 inches in the Pacific Northwest (Dickson, 1977 period 7a). Moderate to extreme drought had spread over most of the Far West by early April of 1977. The drought area of the northern plains and upper Midwest extended southward in a narrow wedge to Oklahoma. Moisture conditions improved in parts of South Dakota and the central plains while the drought intensified in Wisconsin and Minnesota (USDA, 1977a).

Drought conditions in the upper Midwest and West deteriorated further during April and May, while expanding significantly in area. By the end of May, moderate to extreme drought was affecting the northern half of the eastern United States and most of the West

as well. Warm weather aggravated the problem as most of the country continued to experience temperatures 2–8 degrees F above normal through June (Taubensee, 1977).

By August, moisture shortages and high temperature conditions were moderating but the spatial extent had changed only slightly (fig. 1). Most of the Great Plains received 100–300 percent of normal precipitation and were 2–6 degrees F below normal (Dickson, 1977b). Conditions also improved in the Far West. By early September, drought had receded from the central plains and central Midwest region but continued to severely affect the extreme upper Midwest and northern plains states. Moderate to severe drought persisted over scattered areas of the Middle Atlantic states (Dickson, 1977b).



**Figure 1.** Palmer Drought Severity Index values, August 20, 1977 (USDA, 1977b).

Extremely wet conditions in the northern plains during September greatly moderated the drought situation. The Middle Atlantic area remained dry while the Far West experienced above-normal precipitation. The San Francisco Bay Area and eastern Oregon and Washington continued to be the most severely affected. From December 1977 through March 1978, weather conditions improved considerably in the far western states. Precipitation was normal or above normal during the entire period, which considerably improved the water supply outlook for irrigation during the summer of 1978.

***Mid-1970s Drought Policy and Assistance Measures***

Although many programs are available to alleviate economic and physical hardship caused by natural disasters, only a few of these programs are designed specifically for drought. The programs used to alleviate the effects of drought during 1974–77 are shown

in table 1. The total funds allocated through these various loan and grant programs during 1974–77, plus the costs of administering the programs, have been estimated at \$7–8 billion (Wilhite, et al, 1986).

**Table 1.** Drought-Related Federal Assistance Programs in the United States, by Agency (WESTPO, 1977)

| Agency  | Program Name  |
|---|---|
| Department of Agriculture   |   |
| Farmers Home Administration (FmHA)  | Emergency Loans*<br>Emergency Livestock Loans<br>Farm Operating Loans<br>Farm Ownership Loans<br>Soil and Water Loans<br>Irrigation and Drainage Loans<br>Community Program Loans |
| Agricultural Stabilization and Conservation Service (ASCS)  | Emergency Conservation Measures<br>Emergency Livestock Feed<br>Agricultural Conservation*<br>Disaster Payments  |
| Federal Crop Insurance Corp (FCIC)  | Federal Crop Insurance*   |
| Forest Service (FS)   | Cooperative Forest Fire Control<br>Cooperative Forest Insect and Disease Management<br>Rural Community Fire Protection<br>Drought-Related Stewardship                             |
| Soil Conservation Service (SCS)   | Great Plains Conservation<br>Resource Development and Conservation<br>Conservation Technical Assistance<br>Watershed Protection and Flood Prevention                              |
| Department of the Interior  |   |
| Bureau of Reclamation (BuRec)   | Emergency Fund<br>Drought Emergency*<br>Drought-Related Technical Assistance  |
| Bureau of Land Management (BLM)   | Grazing Privilege<br>Drought-Related Stewardship  |
| Fish and Wildlife Service (FWS)   | Drought-Related Stewardship   |
| Southwest Power Administration  | Emergency Electric Service*   |
| Economic Development Administration (EDA),<br>Department of Commerce                              | Community Emergency Drought Relief<br>Economic Adjustment<br>Public Works Impact Projects   |
| Small Business Administration (SBA)   | Emergency Drought Disaster Loans*<br>Physical Disaster Loans<br>Economic Injury Disaster Loans  |
| Federal Disaster Assistance Administration (FDAA),<br>Department of Housing and Urban Development | Disaster Assistance (Hay Transportation, Cattle Transportation, Emergency Livestock Feed, Forest Fire Suppression)  |
| Federal Power Commission/Federal Energy Administration (FPC/FEA)                                  | Drought-Related Services and Activities   |

|  |   |
|--|---|
| Employment and Training Administration (ETA),<br>Department of Labor | Unemployment Insurance Grants to States<br>Farm Workers<br>Comprehensive Employment and Training Programs (CETA)<br>Employment Services |
| General Services Administration (GSA)                                | Donation of Federal Surplus Personal Property<br>Sale of Federal Surplus Personal Property  |
| Defense Civil Preparedness Agency (DCPA),<br>Department of Defense   | Civil Defense-Federal Surplus Personal Property<br>Donations  |

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\*Denotes a program in the White House "Drought Package."

Seven programs accounted for the vast majority of funds disbursed during the mid-1970s drought. The most important of these was Farmer's Home Administration's (FmHA) Emergency Loan Program. This program provides credit assistance to established farmers, ranchers, and agricultural operators when a natural disaster causes physical damage to property or has resulted in severe crop production losses. Crop production losses must equal or exceed 20 percent of normal production for the applicant to be eligible for the program. Emergency loans are made in counties designated by the President as major or emergency disaster areas. Designations can also be made by the Secretary of Agriculture or by the FmHA State Director. After April 25, 1977, the Interagency Drought Coordinating Committee (IDCC) also triggered designations. The major function of this committee was to designate areas eligible for federal assistance as a result of drought. During 1976-77 and the first eight months of FY1978, FmHA made more than 92,000 loans totaling \$3.23 billion (GAO, 1979).

A second major program of the mid-1970s, was the Small Business Administration's (SBA) Disaster Loan Program. SBA was authorized to make loans as determined necessary and appropriate because of floods, riots, or civil disorders, and other catastrophes. Two types of loans are available through SBA: physical disaster loans and economic injury loans (GAO, 1979).

Before 1977, SBA did not make loans to farmers; this was considered the responsibility of FmHA. The Small Business Act was amended by Congress in June of 1976 to include farmers. Crop production losses due to drought or other events were first included in SBA's program in June of 1977, and loans were made available to farmers beginning in July of 1977.

SBA loans were made in counties declared to be major disaster areas by the President or SBA Administrator and in counties adjacent to those designated and within the same state. Designation by the IDCC did not trigger the SBA loan program. Congress appropriated \$1.4 billion for SBA to meet the demands of farmers (GAO, 1979).

The Agricultural Stabilization and Conservation Service (ASCS), a subagency of the United States Department of Agriculture, administered the Disaster Payments Program. Under this program, a farmer whose production was reduced by natural disaster to less than two-thirds of his historical average production became eligible for payment of one-third of the target price level (ASCS, 1976). The total amount of funds disbursed nationally through this program is not known. However, in South Dakota, Nebraska, and Texas, this

program provided more than \$600 million in disaster payments during the period from 1974 to 1977 (Wilhite, et al, 1984).

Other programs of significance during the mid-1970s drought were the Emergency Fund and Emergency Drought Programs of the Department of Interior (\$130 million), the Community Emergency Drought Relief Program of the Department of Commerce (\$175 million), and FmHA's Community Program Loans and Grants (\$225 million) (GAO, 1979).

In the United States, states do not have fiscal or administrative responsibility for relief measures under conditions of drought or other natural disasters. Since the 1930s, this responsibility has been centralized with the federal government (Wilhite, 1983). There have been attempts to initiate cost-sharing measures, such as during the 1950s drought, but these have been viewed with disfavor by state government (Wilhite, et al, 1984). State opposition to cost-sharing on drought assistance measures has been based on arguments of limited resources and/or the inequity between states, of available resources.

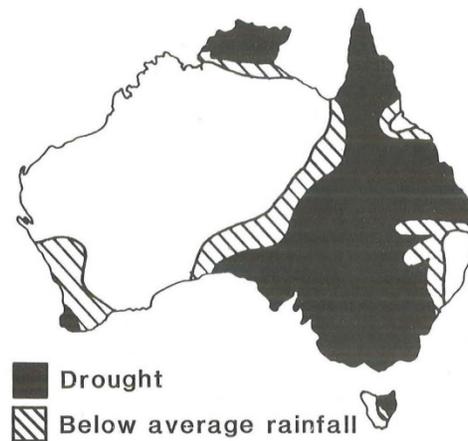
#### *Evaluation of the Mid-1970s Drought Response*

The mid-1970s federal and state response effort in the United States has been documented and evaluated elsewhere (GAO, 1979; Wilhite, et al, 1984). The latter study demonstrated that governments in the United States often respond to drought through crisis management rather than through proactive programs. This was true not only in the mid-1970s but also 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 may lead to ineffective, poorly coordinated and untimely response. The studies cited above suggest that were planning initiated between periods of drought, the opportunity would exist to develop an organized response that might more effectively address issues and impacts specific to drought. Also, the limited resources available to government to mitigate the effects of drought might be allocated in a more beneficial manner.

#### **Governmental Response to Drought: Australia**

##### *The 1982-83 Drought Episode*

The 1982-83 drought was confined primarily to eastern Australia (fig. 2), but portions of this area had been experiencing less severe droughts for a number of years. South Australia and New South Wales, for example, had experienced droughts in each year since 1976 and 1979, respectively (Reynolds, et al., 1983). Clearly, the droughts preceding 1982-83 increased the vulnerability of agricultural producers to additional periods of severe drought.



**Figure 2.** Major drought-affected areas in Australia during 1982 (Reynolds, 1983).

In November of 1982 the Bureau of Agricultural Economics conducted a farm survey to determine the full effects of the drought on the nation's economy (Purtill, et al., 1983). At the time of the survey, 60 percent of the agricultural and grazing farms in the nation were drought declared. In New South Wales, 86 percent were so declared.

The drought in New South Wales began in May 1979, when 8 of the 58 Pastoral Protection Districts were drought declared. By January of 1980, the situation had deteriorated and 23 districts were declared. Drought persisted but was of variable spatial extent and severity until August 1982, when the situation began to deteriorate rapidly. Between September 1982 and April 1983, over 50 districts were drought declared.

The consequence of several consecutive years of drought in New South Wales was that sheep numbers had declined from a peak of about 73 million in the 1970s to about 43 million in 1983. Cattle numbers declined from a peak of 9 million in 1976 to about 4 million in 1983. The 1982–83 wheat crop was reduced from the normal 7 million to 1.5 million metric tons, for a loss of approximately A\$825 million (New South Wales Department of Agriculture, 1983). The magnitude of the agricultural impacts in the other eastern states was similar to that in New South Wales.

As a direct result of the 1982–83 drought, wheat sales per farm in Australia was expected to drop by approximately 45 percent (Purtill, *et al.*, 1983). This decline was due to lower yields, reductions in the harvested acres, and the retention of wheat by farmers for stock feed. Farm receipts from wheat were expected to fall by an average of 58 percent in Australia. In Victoria, South Australia, New South Wales, and Queensland these figures were 83, 76, 67, and 65 percent, respectively. Farm debt in Australia increased by almost 7 percent because of the drought and by almost 15 percent in Victoria.

#### ***Recent Drought Policy and Assistance Measures***

The Australian Constitution does not delegate specific powers covering natural disaster relief to the federal government. These powers belong primarily to the states, which, as a result, have taken a more active role in drought response than state governments in the

United States. Authority for federal involvement in natural disaster relief stems from Section 96 of the Australian Constitution, in which the federal government is empowered to make payments to the states on such terms and conditions as the Parliament determines to be appropriate (Department of Primary Industry, 1984).

Before 1971, natural disaster relief and restoration was provided at a state's request by joint federal/state financing through a wide variety of arrangements. These financial arrangements were on a 1:1 cost-sharing basis. No limit was set on the level of funding that could be provided by the federal government.

In 1971 the Natural Disaster Relief Arrangements (NDRA) were established whereby states were expected to meet a certain base level or threshold of expenditures for disaster relief from their own resources (Department of Primary Industry, 1984). Disasters provided for in this arrangement are droughts, cyclones, storms, floods, and bushfires. These expenditure thresholds were set according to 1969–70 state budget receipts and, therefore, varied between states. The original base levels were:

|                    |                 |
|--------------------|-----------------|
| New South Wales    | A\$ 5.0 million |
| Victoria           | 3.5             |
| Queensland         | 2.0             |
| South Australia    | 1.5             |
| Western Australia  | 1.5             |
| Tasmania           | 0.7             |
| Northern Territory | Not Included    |

Expenditures eligible to count toward a state's NDRA base amount were limited to those provided in response to a "major" disaster. "Major" disasters were defined after 1974 as those necessitating expenditures on agreed assistance measures in excess of one-tenth of the state's base level. The purpose of this provision was to eliminate federal participation in relief of minor or localized disasters.

Under the NDRA arrangements, the federal government agreed to provide full reimbursement of eligible expenditures after the thresholds for state expenditures on natural disasters were reached. The NDRA formalized, for the first time, federal/state natural disaster relief arrangements.

At the time of the establishment of NDRA, a special set of core measures, i.e., federal government-approved drought assistance measures, had evolved in each state on the basis of 30 years of government involvement in disaster relief. These measures were particularly relevant to the needs of each state because they had been designed by state government in response to their own disaster-related experiences. The formalization of NDRA in 1971 resulted in an increase in the number of core measures eligible in each state for reimbursement under this arrangement.

In June 1978 the Commonwealth government altered two features of the NDRA arrangements (National Drought Consultative Committee, 1984). First, the state's base amounts were doubled because inflation had eroded the real value of the original thresholds, and the number of measures eligible under these arrangements had increased. The Northern Territory was included for the first time under this new arrangement with a base

amount of A\$250,000. Second, the cost-sharing formula applied to reimbursements under the NDRA was changed to a 3:1 federal/state ratio for expenditures above the base amount. No change was made in the definition of "major" disasters. [Note: State base amounts under the NDRA agreements were increased significantly in 1984 following the drought. In most cases these amounts doubled over the 1978 figures (Keating, 1984).]

Numerous core measures are eligible for federal reimbursement under the NDRA. However, the types of measures available and the provisions of these measures vary by state. The core measures in each state as of March 1983 are summarized in table 2. The most common core measures used for drought include concessional loans to primary producers for carry-on, restocking, or restoration purposes; freight concessions to primary producers for stock movement, fodder and water; and assistance to state, local, and semigovernment authorities for the disposal of helpless and unsaleable stock.

**Table 2.** Current Drought Relief Measures Available in Australia under the Natural Disaster Relief as of March 1983 (Australian Agricultural Council, 1983)

| Measure                               | New South Wales   | Victoria | Queensland | South Australia | Western Australia | Tasmania | Northern Territory |
|---------------------------------------|---|----------|------------|-----------------|-------------------|----------|--------------------|
| <i>Concessional Loans</i>             |   |          |            |                 |                   |          |                    |
| Carry-On Loans to Primary Producers   | *   | *        | *          | *               | *                 | *        | *                  |
|                                       | (Maximum amount ranges from \$20,000–\$40,000, with interests at 4%. Repayment period generally 7 years with discretionary repayment holiday of 1–3 years in some cases.) |          |            |                 |                   |          |                    |
| Restocking Loans to Primary Producers | *   | (1)      | *          | (1)             | (2)               | (1)      | NA                 |
|                                       | (Maximum amount ranges from \$20,000–\$30,000; repayable over 7–10 years, at 4–5% interest rate.)   |          |            |                 |                   |          |                    |
| Loans for Purchases of Fodder         | *   | NA       | NA         | NA              | NA                | NA       | NA                 |
|                                       | (Loans to dairy companies, repayable over 5 years, at 4% interest rate.)  |          |            |                 |                   |          |                    |
| Loans for Supply of Water             | NA  | NA       | (2)        | NA              | NA                | NA       | NA                 |
|                                       | (80% of cost to local authorities for augmentation of town water supplies. Repayable over 7–9 years at 3–4% interest rate.)   |          |            |                 |                   |          |                    |
| Carry-On Loans for Small Business     | NA  | *        | (2)        | *               | *                 | NA       | NA                 |
|                                       | (Maximum amount of \$40,000, repayable over 7–10 years at 4% interest rate.)  |          |            |                 |                   |          |                    |
| Loans to Cereal Growers               | (2)   | NA       | NA         | NA              | (2)               | NA       | NA                 |
| <i>Freight Concessions</i>            |   |          |            |                 |                   |          |                    |
| Stock Movement                        | *   | *        | *          | *               | *                 | NA       | *                  |
|                                       | (Applies to rail and road at 75%.)  |          |            |                 |                   |          |                    |
| Fodder                                | *   | *        |            | *               | *                 | NA       | *                  |
|                                       | (Applies to rail and road, generally at 50–75% concession.)   |          |            |                 |                   |          |                    |

|   |   |     |     |     |     |     |     |
|---|---|-----|-----|-----|-----|-----|-----|
| Water to Primary Producers  | *   | *   | *   | *   | NA  | NA  | NA  |
|   | (Applies to private vehicle, generally at 75% concession.)  |     |     |     |     |     |     |
| Water to State, Local or Semigovernment Authorities                   | NA  | *   | *   | *   | *   | NA  | NA  |
| Machinery and Equipment   | NA  | NA  | (2) | NA  | NA  | NA  | NA  |
| Stock Slaughter Subsidy for Primary Producers                         | (2)   | NA  | (2) | (2) | (2) | (2) | (2) |
|   | (Generally \$10–15 per head for cattle and \$1–3 per head for sheep.)   |     |     |     |     |     |     |
| Stock Disposal Subsidy to Local, State and Semigovernment Authorities | *   | *   | *   | *   | *   | N   | NA  |
|   | (Generally \$1 per head for cattle and 15 cents per head for sheep.)  |     |     |     |     |     |     |
| <i>Other Subsidies</i>  |   |     |     |     |     |     |     |
| Water   | *   | *   | (2) | *   | (2) | NA  | NA  |
|   | (Generally applies to drilling wells for towns or stock water at 75–100% concession.)                                 |     |     |     |     |     |     |
| Agistment   | NA  | (2) | (2) | NA  | (2) | (2) | NA  |
|   | (Rate of \$1.00–\$1.75 per head for cattle and 10–12.5 cents per head for sheep and/or 50–75% of cost of adjustment.) |     |     |     |     |     |     |
| Other   | NA  | (2) | (2) | NA  | (2) | NA  | NA  |

\* Included in core measures

NA – Not available

(1) – Included in carry-on loans

(2) – Available but not part of core measures

States that desire to add or alter existing core measures must request approval from the federal government before their use for drought or other natural disasters. Otherwise, states accept full financial responsibility for these measures (Department of Primary Industry, 1984).

Table 3 shows the state expenditures for drought aid from 1970–71 to 1983–84 under the NDRA. The magnitude of these expenditures are significant, especially when compared to the limited financial responsibility of states in the United States. The governments of New South Wales, Queensland and Western Australia spent the most under these arrangements. The total for all states was just over A\$570 million. Of this total, approximately A\$180 million was expended during 1982–83 and A\$120 million was spent during 1983–84.

**Table 3.** Expenditures in Australian States under Natural Disaster Relief Arrangements, by Type of Disaster, 1970–71 to 1983–84 (A\$ thousands) (NDRA, 1984)

|                       | Drought         |          |            |                 |                   |          |                    | Total   |
|-----------------------|-----------------|----------|------------|-----------------|-------------------|----------|--------------------|---------|
|                       | New South Wales | Victoria | Queensland | South Australia | Western Australia | Tasmania | Northern Territory |         |
| 1970–71               | 3,239           | —        | 15,623     | —               | —                 | 596      | —                  | 19,458  |
| 1971–72               | 458             | —        | 3,143      | —               | —                 | —        | —                  | 3,601   |
| 1972–73               | —               | —        | —          | —               | —                 | —        | —                  | —       |
| 1973–74               | 987             | —        | —          | —               | —                 | —        | —                  | 987     |
| 1974–75               | 160             | —        | —          | —               | —                 | —        | —                  | 160     |
| 1975–76               | —               | —        | —          | —               | —                 | —        | —                  | —       |
| 1976–77               | 1,120           | 1,626    | —          | —               | 3,023             | —        | —                  | 5,769   |
| 1977–78               | 2,620           | 1,228    | 2,785      | 13,580          | 17,999            | —        | —                  | 38,212  |
| 1978–79               | 3,013           | 1,422    | 5,165      | 9,257           | 8,070             | —        | —                  | 26,927  |
| 1979–80               | —               | —        | 2,208      | 2,225           | 12,560            | —        | —                  | 16,993  |
| 1980–81               | 66,810          | —        | 22,768     | —               | 20,142            | —        | —                  | 109,720 |
| 1981–82               | 31,018          | —        | 9,608      | —               | 5,081             | 295      | —                  | 46,002  |
| 1982–83               | 53,645          | 34,976   | 51,982     | 27,380          | 12,653            | 1,282    | —                  | 181,738 |
| 1983–84<br>(estimate) | 21,500          | 8,100    | 63,300     | 4,600           | 22,100            | 1,900    | —                  | 121,500 |
| Total                 | 184,570         | 47,172   | 176,582    | 57,042          | 101,628           | 4,073    | —                  | 571,067 |

Loans to primary producers and freight subsidies were the most popular measures administered between 1982 and 1984. Almost A\$200 million was provided in loans to primary producers and just under A\$75 million was expended on freight subsidies. State expenditures on all other natural disasters included under the NDRA were somewhat less than that spent on drought, almost A\$480 million. Queensland, New South Wales, and Victoria together were responsible for the largest proportion of these state expenditures.

Federal expenditures for drought aid under the NDRA arrangements during the period from 1970–71 to 1982–83 are shown in table 4. During this period, payments to the states were just under A\$370 million, or about A\$200 million less than the total state expenditures. The largest share of the assistance was provided to Queensland and New South Wales. Other natural disasters attracted federal expenditures totaling about A\$315 million. Queensland and New South Wales were again recipients of the largest amounts.

**Table 4.** Commonwealth of Australia Payments under Natural Disaster Relief Arrangements, Estimated by Type of Disaster, 1970–71 to 1983–84 (A\$ thousands) (NDRA, 1984)

|                       | Drought         |          |             |                 |                   |           |                    | Total   |
|-----------------------|-----------------|----------|-------------|-----------------|-------------------|-----------|--------------------|---------|
|                       | New South Wales | Victoria | Queens-land | South Australia | Western Australia | Tas-mania | Northern Territory |         |
| 1970–71               | 450             | —        | 13,632      | —               | —                 | 16        | —                  | 14,098  |
| 1971–72               | —               | —        | 1,502       | —               | —                 | —         | —                  | 1,502   |
| 1972–73               | —               | —        | 46          | —               | —                 | —         | —                  | 46      |
| 1973–74               | 38              | —        | —           | —               | —                 | —         | —                  | 38      |
| 1974–75               | 114             | —        | —           | —               | —                 | —         | —                  | 114     |
| 1975–76               | —               | —        | —           | —               | —                 | —         | —                  | —       |
| 1976–77               | 779             | 716      | —           | —               | 2,134             | —         | —                  | 3,629   |
| 1977–78               | 1,458           | 339      | 3,091       | 12,350          | 15,269            | —         | —                  | 32,567  |
| 1978–79               | 743             | 173      | 2,942       | 5,430           | 6,036             | —         | —                  | 15,324  |
| 1979–80               | —               | -229     | 1,224       | -270            | 6,922             | —         | —                  | 7,647   |
| 1980–81               | 42,447          | —        | 14,780      | -737            | 13,523            | —         | —                  | 70,013  |
| 1981–82               | 14,554          | —        | 5,162       | —               | 2,239             | 267       | —                  | 22,222  |
| 1982–83               | 32,557          | 22,695   | 37,297      | 18,368          | 7,731             | —         | —                  | 118,648 |
| 1983–84<br>(estimate) | 11,800          | 4,600    | 45,300      | 4,300           | 15,300            | 600       | —                  | 81,900  |
| Total                 | 104,940         | 28,354   | 124,976     | 39,441          | 69,154            | 883       | —                  | 367,748 |

In addition to the cost sharing measures described earlier, two federal drought assistance schemes were available during the 1982–83 drought. These included the Drought Relief Fodder Subsidy Scheme and the Drought Relief Interest Subsidy Scheme (National Drought Consultative Committee, 1984). The Fodder Subsidy Scheme provided a payment to drought-declared primary producers to help defray the cost of fodder for sheep and cattle. The administrative costs of this program were covered by the states. The amount of the subsidy was based on 50 percent of the price of feed wheat and the nutritive value of the fodder relative to wheat. The subsidy was payable on fodder purchased after September 1, 1982. This program was terminated on June 30, 1983. Fodder purchased after this date was not eligible for the subsidy. However, under the NDRA arrangements with the states, primary producers were allowed up to six months to submit claims after the June 30 termination date. Expenditures by the Commonwealth under this program were about A\$104 million during 1982–83 and A\$18 million through February of 1984.

The Drought Relief Interest Subsidy Scheme provided payments to eligible primary producers to cover all interest payments exceeding 12 percent per year. These payments applied to loans taken out for primary production on or before August 31, 1982, and for carry-on purposes after that date. The states were responsible for receiving and verifying claims under this program. To be eligible, producers had to have been drought declared and could not have available financial assets in excess of 12 percent of the total farm debt. This program was terminated on December 31, 1983, but producers were given 12 months to submit claims from the date their drought declaration was revoked or from the date of the termination of the scheme, whichever came first. Expenditures for the program, not

including administrative costs, were about A\$3 million in 1982–83 and A\$23 million through February of 1984.

#### *Evaluation of the 1982–83 Drought Response*

The Livestock and Grain Producers Association (LGPA) of New South Wales has strongly commended the state and federal governments of Australia “for their positive and cost effective drought assistance measures which so greatly contributed to the preservation of the national livestock base over recent years to enable a more rapid post-drought recovery” (Anonymous, 1983). However, the Working Group for the Standing Committee of the Australian Agricultural Council (1983) concluded, “With the exception of concessional finance and information, existing policy measures, including those introduced during the current (1982–83) drought, do not perform well in achieving the objectives of drought policy which it considered important. In summary, the nearly \$300 million of expenditures was not cost effective.”

These contrasting views of the cost effectiveness of recent drought measures in Australia reflect the controversy that currently exists over state and federal involvement in drought aid. Several other studies have been completed (National Farm Federation, 1983; South Australian Department of Agriculture, 1983; Stott, 1983) and others are in progress (Minister for Primary Industry, 1984; Australian Academies of Science Joint Study, 1984) to try to resolve this issue. At stake is the future role that government will play in attempting to alleviate or mitigate the hardship caused by drought and, possibly, other natural disasters as well.

LGPA based its conclusions concerning recent assistance measures on the achievement of what it considers to be the first priority of drought aid in Australia—the preservation of the national sheep and cattle herd. Through the preservation of these resources, farm and nonfarm income was able to recover more quickly than after previous episodes of severe drought. A substantial proportion of the national livestock herd had perished during the droughts of 1902–04 and 1944–46. In both cases it had taken about seven years for stock numbers to rebuild to predrought levels. The costs of lost production and underutilized pasture resources to the national economy were substantial. LGPA estimated that had government not intervened in 1982–83, 15 to 20 million sheep would have been slaughtered. As a result, post-drought recovery would have been delayed, at a cost to the national economy of A\$500 million over a five-year period (Anonymous, 1983).

Each of the relief measures utilized during the recent drought was evaluated by the Working Group for the Standing Committee of the Australian Agricultural Council (1983) in terms of their accordance with the objectives of drought policy as identified in their report. Each measure was evaluated in terms of its positive, negative, or neutral effect in relation to these objectives (table 5). This table shows that carry-on loans and information were judged to be the two existing policy measures that had a predominantly positive, or in some cases neutral, effect. Concessional loans are preferred because they address economic hardship faced by individual applicants during drought in an equitable and efficient manner without having a negative effect on the adoption of appropriate drought mitiga-

tion practices. A report by Stott (1983) for the Department of Agriculture in Victoria disagrees with this assessment, suggesting that carry-on loans are welfare measures and are actually inequitable, since they were available only to a select group of farmers.

**Table 5.** Effects of Existing Australian Drought Policy Measures: Summary Table (Australian Agricultural Council, 1983)

| Existing Policy Measures  | Minimize Economic Hardship | Minimize Distortions in Resource Allocation |              | Not Discourage Drought Mitigation | Reduce Land Degradation | Minimize Stock Distress (or Loss) | Maintain National Herd | Consistency with Rural Adjustment | Equity | Admin. Costs | Regional Multiplier |
|---------------------------|----------------------------|---|--------------|-----------------------------------|-------------------------|-----------------------------------|------------------------|-----------------------------------|--------|--------------|---------------------|
|                           |                            | Intra Sector                                | Inter Sector |                                   |                         |                                   |                        |                                   |        |              |                     |
| Carry-On Loans            | ++                         | N   | -            | N                                 | N                       | N                                 | N                      | +                                 | +      | -            | ++                  |
| Freight Rebates           |                            |   |              |                                   |                         |                                   |                        |                                   |        |              |                     |
| - fodder                  | N                          | -   | -            | -                                 | -                       | +                                 | +                      | N                                 | -      | -            | N                   |
| - water                   | N                          | -   | -            | -                                 | -                       | +                                 | +                      | N                                 | -      | -            | +                   |
| - stock                   | N                          | -   | -            | -                                 | +                       | +                                 | +                      | N                                 | -      | -            | N                   |
| Stock Slaughter Subsidies | N                          | -   | -            | N                                 | +                       | +                                 | -                      | N                                 | -      | -            | +                   |
| Fodder Subsidy Scheme     | N                          | -   | -            | -                                 | -                       | +                                 | +                      | N                                 | -      | -            | +                   |
| Interest Subsidy Scheme   | N                          | -   | -            | -                                 | N                       | N                                 | N                      | N                                 | -      | -            | +                   |
| Taxation Concessions      | -                          | -   | -            | +                                 | -                       | +                                 | +                      | N                                 | -      | N            | N                   |
| Information               | +                          | N   | -            | +                                 | +                       | +                                 | +                      | +                                 | N      | -            | N                   |
| Do Nothing                | N                          | N   | N            | N                                 | N                       | N                                 | N                      | N                                 | N      | N            | N                   |

**Note:** N = Neutral effect; + = Positive effect, - = Negative effect.

The Working Group considered information to be especially valuable for providing producers with a reliable way to evaluate alternative drought mitigation strategies and for reducing land degradation problems associated with maintaining stock on the land during drought. Existing measures with the most negative impact were judged to be freight rebates, especially for fodder and water; the fodder and interest subsidy schemes; taxation concessions; and stock slaughter subsidies.

All existing policy measures were believed to have a negative or neutral effect on the adoption of appropriate drought mitigation measures, except information and taxation concessions. For precisely this reason, studies of 1982-83 drought response generally conclude that the effect of future drought will be more severe if current policies are continued. The relationships between drought policy and the adoption or lack of adoption of suitable drought tactics requires further investigation.

The Interest Rate Subsidy scheme introduced by the Commonwealth government in 1982 was viewed as a welfare measure and inequitable. The scheme was inequitable because it was intended only for producers with cash flow problems, which excluded at least 30 percent of producers. Producers with the greatest level of indebtedness received the benefits. This program also discouraged the adoption of drought mitigation measures.

A recent study by Purtill, et al. (1983), provides insight into producers' knowledge of government drought assistance measures. The survey, conducted in November 1982, indicated that the producer's general awareness of measures ranged from 65 percent in Western Australia, where no drought was occurring, to 100 percent in the Northern Territory. Among the eastern states most affected by severe drought, this percentage was 80–90. Knowledge of specific measures was much lower. For example, the fodder purchase subsidy, one of the most popular measures during the recent drought, was known to only 56 percent of the producers in New South Wales and other eastern states.

Two conclusions can be drawn about producer awareness of specific drought assistance measures. First, information about assistance measures was not disseminated to producers in a very effective manner by government officials. This conclusion is at least partially true. However, a second conclusion is that many producers' "need to know" was relatively low at the time of the survey. A high percentage of respondents did indicate a general knowledge of available measures. The survey indicated that more specific information would be sought when there was a greater need. Also, two specific federal measures (the Fodder and Interest Rate Subsidy Schemes) were recent and there may not have been adequate time for this information to reach potential recipients.

### Drought Policy Comparisons

United States and Australian drought policy is compared in table 6. The principal policy features are grouped into three categories: organization, response, and evaluation.

| Features                                  | United States                                     | Australia                                     |
|---|---|---|
| <i>Organization</i>                       |   |   |
| National drought plan                     | None  | Study in progress                             |
| State drought plans                       | In selected states                                | Through NDRA agreements                       |
| National drought early warning system     | Joint USDA/NOAA Weather Facility                  | Bureau of Meteorology                         |
| Agricultural impact assessment techniques | Available, but generally unreliable               | Not available                                 |
| Responsibility for drought declaration    | Federal   | State   |
| Geographic unit of designation            | County  | Unit varies between states                    |
| Declaration procedures                    | Standard for all states, varies by program/agency | Varies between states; standard within states |

|  |  |   |
|--|--|---|
| <i>Response</i>  |  |   |
| State fiscal responsibility for assistance measures                    | Negligible, if any                                   | Defined by NDRA agreements up to base amounts, varies by state        |
| State administrative responsibility for assistance measures            | No responsibility for federal measures               | Defined by NDRA agreements and by federal measures                    |
| Eligibility requirements and provisions of drought assistance measures | Standard within programs for all designated counties | Varies by state for NDRA core measures, standard for federal programs |
| National crop insurance program  | All-risk federal program                             | Rainfall insurance feasibility study in progress                      |
| <i>Evaluation</i>  |  |   |
| Post-drought documentation and evaluation of procedures and measures   | No routine evaluation by government                  | Routine evaluation by federal and state governments                   |

*Organizational* features are planning activities that provide timely and reliable assessments, such as a drought early warning system, and procedures for a coordinated and efficient response, such as drought declaration. These characteristics would be the foundation of a national drought plan. Only a few states in the United States have drought plans (Wilhite and Wood, 1985). State drought plans exist only in a loose form in Australia under the NDRA agreements.

*Response* features refer to assistance measures and associated administrative procedures that are in place to assist individual citizens or businesses experiencing economic and physical hardship because of drought. Numerous assistance measures are available in the United States but few are intended specifically for drought. For the most part, relief arrangements in Australia are included under the NDRA agreements. An all-risk crop insurance program has been evolving in the United States since 1939 (Federal Crop Insurance Corporation, 1980). The Australian Bureau of Agricultural Economics is currently studying the feasibility of a rainfall insurance scheme. Hail and flood insurance is provided by commercial insurance companies in some areas.

Evaluation of organizational procedures and drought assistance measures in the post-drought recovery period is the third category of drought policy features. Governments in Australia have been more conscientious in their evaluation of recent drought response efforts. In the United States, government does not routinely evaluate the performance of response-related procedures or drought assistance measures. An evaluation of the 1976–77 drought response activities was made by the General Accounting Office (1979) at the request of the chairman of the Subcommittee on Environment, Energy, and Natural Resources, the late Congressman Leo J. Ryan. Wilhite, et al. (1984), evaluated governmental response to the mid-1970s drought under sponsorship of the National Science Foundation. These were the first systematic evaluations of federal drought response efforts in the United States.

## **Drought Policy Recommendations**

For government in the United States to improve significantly its drought assessment and response capability, progress must be made in four key areas. The Australian experiences suggest that similar needs exist within their drought assessment and response system.

First, reliable and timely informational products (advisories, reports, management recommendations) and information dissemination plans must be developed. This has also been suggested as a high priority in Australia. For example, few can question the significance of more reliable and timely information about appropriate drought management strategies. Such information could reduce drought impact as well as the need for government assistance. Campbell (1973) has argued that Australian farmers have not exploited the available management strategies to their fullest. Government or the private sector should provide information to producers not only about the relative costs and benefits of alternative management strategies but also about the probability of droughts of various duration and intensity. Government must also inform potential recipients more effectively about the availability and provisions of drought assistance measures.

Second, impact assessment techniques must be improved. In the case of agriculture, usually the first economic sector to experience hardships from drought, new tools must be developed to provide decision makers in government and business with the types of information necessary to identify the onset and termination of drought and to better understand the severity of drought and its likely impact. These tools would be used by government to identify periods of abnormal risk and to trigger various assistance measures.

Third, designation procedures in the United States 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 consistently to all affected states, counties, and localities.

In Australia, the declaration of drought areas is a state responsibility, and procedures differ considerably between states. It may not be feasible to standardize procedures between the states because of the large precipitation gradients that exist over much of the country. In the United States, drought declaration decisions are a federal responsibility, considered at a state's request. Declaration procedures vary between agencies and, at times, between programs and within agencies. Drought policies with respect to revocation of declarations must be better defined in both countries and take into account the lingering effects of drought.

Finally, assistance measures must be developed in advance of drought, i.e., a proactive approach, to avoid the delays in program formulation and congressional approval such as occurred in the United States during the mid-1970s. Programs should be administered by a single agency through the mechanism of an interagency committee in which federal agencies with responsibility in drought assessment and response are represented. Representatives of the affected states and/or regions should be included in the membership of this committee. Assistance measures must address the specific problems associated with drought.

Another question deserving considerable attention in the discussion of national drought policy is the degree of fiscal and administrative responsibility that states should have in

support of assistance measures. The Australian approach of cost-sharing these programs has been quite successful and may be applicable in the United States. Such an approach would allow states to have greater fiscal and administrative control over assistance measures. These measures could also be tailored to reflect the unique water supply problems and specific drought-related impacts of each state.

More attention should be directed to the development of assistance measures that encourage producers to incorporate appropriate levels of risk management in individual farm plans. Recipients of drought aid would benefit from knowing, in advance, what types of assistance will, and will not, be provided. Generally, Australians prefer assistance in the form of loans because recipients retain the flexibility to use the money in a way that best suits their farming situation; that is, farm management decisions remain with the farmer. Loans also have an important secondary effect: farmers can continue to spend at relatively normal levels and the economy of neighboring communities is not disturbed substantially. Equity requires that loans be made available to all. The Australian government has concluded that feed reserves and freight subsidies for water and feed can discourage the adoption of appropriate risk management techniques. These measures promote soil degradation by keeping livestock on the land during periods when the vegetation is severely stressed.

### **Summary and Conclusions**

The purpose of this paper is to compare drought policy in Australia and the United States and to offer recommendations for policy change in the United States. Four critical needs were identified: (1) reliable and timely informational products and dissemination plans that provide producers with better information about drought, alternative management strategies, and assistance measures available; (2) improved impact assessment techniques, especially in the agricultural sector, for use by government to identify periods of abnormal 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 are equitable, consistent, and predictable. These measures must not discriminate against good farm managers. Although aimed at governments in the United States, most of these recommendations will be applicable to drought policy in other countries as well.

Governments in the United States have responded to drought by crisis management rather than risk management. This approach has been grossly ineffective. Several recent studies have addressed the issue of drought policy, or lack of it, in the United States and have concluded that we should now move toward drought planning with the aim of improving its efficiency. The development of a national drought plan is proposed as an effective way of implementing these recommendations in the United States. In Australia, two national drought committees are considering the benefits of a national drought policy that would be the basis for a plan.

An appropriate question to ask at this point is, should we have a plan for dealing with the impact of drought? To answer that question, let us pose another question. Have previous approaches been successful? This question can be answered in terms of the drought

policy objectives raised earlier in this paper. The first objective was to determine whether the current approach, or policy, encourages the adoption of appropriate and efficient management practices to ensure against abnormal risk. It would appear that it does not. In fact, current policy often discourages wise risk management decisions by producers. For example, tax incentives encourage the plowup of marginal land. When drought occurs, farmers often receive assistance for the losses of yield where such losses were inevitable.

The second objective was to determine whether drought policy in the United States is equitable, consistent, and predictable. Previous studies have shown that it has not been so. In fact, the opposite has characterized most drought response efforts. A national drought plan would help to rectify this situation by focusing attention on the policy objectives and on efficient means to achieve them.

The third objective was to assess whether the current approach recognizes the importance of protecting our natural and agricultural resource base. The current approach appears to recognize the need, but assistance measures are often implemented in such an ineffective and untimely manner that this objective is not realized. A national drought plan would promote greater recognition and preservation of the natural resource base.

A national drought plan could encourage states to take a more active role in planning for drought. In fact, drought planning should be coordinated between the states and federal government. In the past, most states have played a passive role, relying almost exclusively on federal government to come to the assistance of residents of the drought-affected area. Although federal government has accepted this role, improving government response to drought requires a cooperative effort. States must develop their own organizational plan for collecting, analyzing, and disseminating information on drought conditions. Cost-sharing of drought assistance measures should be pursued as a means of involving state government in drought assistance.

**Acknowledgments** – The author wishes to express his gratitude to the many Australian government officials who shared their time, thoughts, and information about drought impact and policy. Thanks also to representatives of the National Farm Federation and the New South Wales Livestock and Grain Producers Association for discussing their views of national drought policy. Special thanks to Reginald French of the South Australian Department of Agriculture and R. L. Heathcote of Flinders University of South Australia for their assistance in organizing a most fruitful visit and their hospitality during my stay. The author also wishes to thank Professors Norman J. Rosenberg and William L. Powers of the University of Nebraska; Millard W. Hall, Florida State University; and R. L. Heathcote, Flinders University, for their critical review of this paper. This material is based upon work supported by the National Science Foundation under Grant ATM-8313356.

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