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# Coping with Exceptional Droughts in Australia

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## The National Drought Policy

The objectives of Australia's National Drought Policy (NDP), agreed to by Commonwealth (national), state, and territory ministers in 1992, are to:

- encourage primary producers and other sections of rural Australia to adopt self-reliant approaches to managing the risks stemming from climatic variability;
- maintain and protect Australia's agricultural and environmental resource base during periods of extreme climate stress; and
- ensure early recovery of agricultural and rural industries consistent with long-term sustainable levels.

Under the NDP, Australian farmers are expected to assume greater responsibility for managing the risks arising from climatic variability. This requires integrating financial and business management with production and resource management to ensure that the financial and physical resources of farm businesses are used efficiently. Details of the NDP and its implementation are described in previous issues of *Drought Network News* (White, 1992 and 1993; White et al., 1993a).

Since the signing of the National Drought Policy Statement in 1992, the states and territories have moved to implement the range of measures spelled out in the NDP (White, 1993) by:

- implementing the National Property Management Planning Campaign, with emphasis on education in effective risk management, sustainable agriculture, and drought preparedness;
- phasing out transaction-based subsidies, particularly freight subsidies for the transport of fodder, water, and livestock provided by state and territory governments;
- providing financial assistance through the Rural Adjustment Scheme (RAS) to farmers exposed to exceptional drought circumstances; and
- undertaking drought-related research and development, with emphasis on drought prediction, monitoring, and management.

## The 1991–95 Drought

Severe rainfall deficiencies have been present over much of Queensland and northern New South Wales since 1991. Serious rainfall deficiencies have also

been experienced in eastern Tasmania and South Australia. Since autumn 1994, drought conditions have extended across much of Australia, resulting in widespread crop failure. The drought reduced the total Australian winter crop production (including wheat, barley, oats, and legumes) by about 50% from the 1993–94 total. The wheat crop in the eastern states was most severely affected. The gross value of rural production is estimated to be down 10% in 1994–95 as a result of the drought (Tulpulé, 1995).

Because of the severe drought conditions prevailing in much of Australia in 1994, all of the states and the Northern Territory made submissions to the Commonwealth Minister for Primary Industries and Energy to have large areas declared as experiencing drought exceptional circumstances.

Consistent with the overall thrust of the National Drought Policy, support under the exceptional circumstances provisions of the RAS is only triggered when the Minister of Primary Industries and Energy determines that existing drought conditions are beyond those that could be expected to be factored into normal risk management practices.

Declaration of exceptional drought circumstances releases funding in affected areas for interest rate subsidies of up to 100% of existing and new loans for farm businesses considered to have prospects of profitability in the long term. Family income support is also provided through drought relief payments. These payments are subject to an incomes and off-farm assets test. Additional assistance is also available to assist people to leave the land when their properties are no longer financially viable.

## Criteria for Exceptional Droughts

Declaration of drought exceptional circumstances is based on "science-driven" assessment processes involving independent advice from the Rural Adjustment Scheme Advisory Council (RASAC). Final decisions are made by the Commonwealth cabinet. RASAC comprises eight members, including representatives from the Commonwealth, the states, and the National Farmers Federation (NFF) as well as members with expert qualifications in the areas of economics, financial administration, banking, sustainable agriculture, farm management or training.

In October 1994, the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ, comprising Commonwealth and state and territory ministers for agriculture and resources management) agreed on six core criteria for drought exceptional circumstances. These core

criteria are meteorological conditions, agronomic and livestock conditions, water supplies, environmental impacts, farm income levels, and scale of the event. Assessment of these criteria are subject to a meteorological threshold assessment. Where it can be established that an exceptional meteorological event has occurred, consideration is then given to the other criteria.

The Minister for Primary Industries and Energy refers applications from state and territory governments for exceptional circumstances declarations to RASAC for evaluation. RASAC seeks analytical inputs from the Bureau of Resource Sciences (BRS), the Australian Bureau of Agricultural & Resource Economics (ABARE), and community and relevant interest groups. The process of determining which areas are experiencing exceptional circumstances therefore requires consideration of agricultural, environmental, and socioeconomic issues. Australian agriculture extends from the tropical north, with its summer monsoon rains, to the temperate south, where winter rainfall dominates; and from the high rainfall coastal margins to the arid and semiarid center, which accounts for most of the continent. The mean annual rainfall and its variability differ considerably across the continent (see Figures 1 and 2 in White et al., 1993a). Within these climatic extremes exists a wide range of farming systems, dominated by extensive grazing and cropping.

## Measuring the Criteria

Consistent with the National Drought Policy, ARMCANZ has described drought exceptional circumstances as a rare and severe event. In determining the six core criteria for assessment of whether an event satisfies this description, ARMCANZ agreed that assessment of the remaining criteria would be conditional on requests for support after first satisfying the meteorological condition criterion.

## Meteorological Condition

Consistent with the overall approach, requests for support are required to establish that the meteorological conditions in question constitute a "rare and severe event." For this purpose, it must be established that the meteorological conditions constitute a 1 in 20- to 25-year event and are of greater than 12 months duration. When differences between different geographical locations and agronomic systems are taken into account, cognizance must be taken of whether effective rainfall has been experienced. Typical growing seasons must therefore be determined. For example, if pasture growth is commonly maximized in autumn or fall (March to May in Australia) and spring (August to October), then the rainfall deciles for these months are considered. If winter growth is considered critical, then the rainfall deciles for March to October are considered. Rainfall over a 12-month period is used where rainfall at any time of year can lead to effective growth.

The following procedure is used to determine which areas of Australia meet the meteorological threshold. First, consultation occurs between officials representing the Commonwealth and state or territory governments until

they have agreed on the relevant meteorological sites and critical growing seasons for the major agricultural enterprises. Complete historical rainfall records (extending over at least 70 and generally more than 100 years) for each site are then obtained from the Bureau of Meteorology. The data are analyzed to determine whether the lack of rainfall over the agreed-on growing seasons represents a 1 in 20- to 25-year event. Tables are developed for each area, setting out the number and frequency of similar low rainfall events, the duration of the current event, and whether the current event qualifies (or when this qualification is likely to occur). Other rainfall information (e.g., cumulative rainfall anomalies and 3-year moving averages) is also used to help put the current rainfall event in perspective.

### **Agronomic and Stock Condition**

Different approaches have been used in different parts of Australia to assess this criterion. The Queensland Department of Primary Industries (QDPI), through its Drought Research Group, has made extensive use of soil moisture and vegetation growth models (tested against field and remotely sensed data) and Geographic Information Systems to determine the extent and severity of drought (Bryceson et al., 1993; and Brook and Carter, 1994). Although similar models have been developed and tested in other parts of Australia (White et al., 1993b), not all states have been willing to use them. A water balance model was used in Western Australia to estimate the length of the growing season.

Extensive farm surveys were carried out in New South Wales, South Australia, and most recently in Victoria to assess the impact of drought. Farmers were asked questions about pasture cover, supplementary feed reserves, stock sales, and intended sales should the drought continue.

Other information used included remote sensing information (NOAA/NDVI) to estimate when grasslands and crops dried off and the spatial extent of the drought. Data from the Australian Bureau of Statistics were used to assess land use and to put current crop yields and stocking rates in context with historical data.

### **Environmental Condition, Water, and Scale of the Event**

Vegetation cover is important to maintain the natural resource base. This can be estimated using remote sensing, pasture and crop models, and farm survey data. It is important to identify soil types that are naturally vulnerable to erosion. It is also important to ensure that financial assistance does not reward poor management (e.g., through overstocking).

Stock water information and farmer reliance on dams or artesian water was determined mainly from farm surveys. The scale of the event was also recorded, giving an indication of how far feed or stock needed to be

transported and the availability of off-farm agistment. As the drought spread and intensified in 1994, farmers in southeastern Australia who had earlier donated truckloads and trainloads of fodder to farmers in Queensland very quickly found themselves short of feed.

### **Net Farm Income**

Every year, ABARE surveys a sample of about 1,800 broadacre and dairy industry properties across Australia for production and financial statistics. RASAC used this information to provide the financial profile of farms in areas being assessed for exceptional circumstances. The aim was to ensure that the general economic circumstances of farms in these areas were “severe” enough to warrant assistance under these measures. In most instances the data indicated that farm incomes were well below longer-term averages.

### **Overall Assessment**

RASAC members consider the above information, visit drought-affected areas, assess submissions from affected parties and relevant interest groups, and, where necessary, seek independent expert advice. RASAC then presents its recommendations to the Minister for Primary Industries and Energy, who has the responsibility, after consulting the cabinet, for declaring whether or not a particular area is experiencing exceptional circumstances.

### **Next Steps**

When the National Drought Policy was agreed to in 1992, no one envisaged that the drought that had prevailed in Queensland and northern New South Wales had at least another three years to run. Implementation of the NDP during such a severe drought has therefore been difficult for both governments and individual citizens.

Research is now being undertaken by BRS, ABARE, and other research institutions to develop regionally sensitive scientific and economic indicators for each of the core criteria so that objective and consistent declarations across Australia can be assured. Simulation models will complement field data in improving the determination of effective rainfall and growing seasons. This research should also clarify the extent to which managers of individual enterprises will be able to and should be expected to prepare themselves for future droughts.

CSIRO is setting up a multidivisional research program to address many aspects of climate variability and the implications for the rural sector. A major concern is the extent to which global climate change will affect climate variability and the incidence of future Australian droughts.

### **References/Further Reading**

- Brook, K. D.; and J. O. Carter. 1994. Integrating satellite data and pasture growth models to produce feed deficit and land degradation alerts. *Agricultural Systems and Information Technology* 6(2):54–56, 38–40. Bureau of Resource Sciences, Canberra.
- Bryceson, K. P.; K. D. Brook; and D. H. White. 1993. Integration of spatial data and temporal models to improve drought preparedness, monitoring and management. In American Society of Agricultural Engineers. *Applications of Advanced Information Technologies: Effective Management of Natural Resources*; pp. 158–66. Proceedings of the 18–19 June 1993 Conference, Spokane, Washington.
- Clewett, J. F.; N. M. Clarkson; D. T. Owens; and D. G. Abrecht. 1994. *Australian Rainman: Rainfall Information for Better Management*. Queensland Department of Primary Industries, Brisbane.
- Tulpulé, V. 1995. The impact of the 1994–95 drought on the Australian economy. *ABARE Conference Paper* 95.10, Australian Bureau of Agriculture and Resource Economics, Canberra.
- White, D. H. 1992. Australia: Toward a new drought policy. *Drought Network News*, Vol. 4, No. 2 (June):5–7.
- White, D. H. 1993. Implementing Australia’s National Drought Policy. *Drought Network News*, Vol. 5, No. 3 (October):8–10.
- White, D. H.; D. Collins; and S. M. Howden. 1993a. Drought in Australia: Prediction, monitoring, management, and policy. In D. A. Wilhite, ed. *Drought Assessment, Management, and Planning: Theory and Case Studies*; pp. 213–36. Kluwer Academic Publishers, Dordrecht, The Netherlands.
- White, D. H.; S. M. Howden; and H. A. Nix. 1993b. Modelling agricultural and pastoral systems. In A. J. Jakeman, M. B. Beck, and M. J. McAleer, eds. *Modelling Change in Environmental Systems*; pp. 263–88. John Wiley & Sons Ltd., New York.