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DROUGHT ASSISTANCE POLICY*

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Droughts are a feature of the Australian agricultural scene. Most farmers develop successful strategies to grapple with drought. The purchased fodder and interest rate subsidies used in the 1982-83 drought are analysed. As partial input subsidies, they had serious flaws in meeting goals of efficiency, equity and welfare support. Alternative policies to provide incentives for rational private decision making and to provide direct welfare support are discussed and advocated as a preferable approach to future droughts.

Introduction

Droughts are an inevitable and recurring feature of Australian agriculture. Although the ability to forecast the time of arrival and duration of particular drought episodes is limited, droughts will continue to occur. Most farmers and other rural businessmen are aware of fluctuating seasonal (and market) conditions and make their own contingency strategies. These strategies result in marked falls in production and incomes in the rural sector and some transfer effects on the rest of the economy (see Lovett 1973 and Anderson 1979 for an overview of these effects, Purtil et al. and Campbell, Crowley and Demura 1983 for discussion of the 1982-83 drought). Most farmers balance the good and bad times and maintain both their ability to continue production and their household living standards until normal seasonal conditions return. However, some do not make adequate provision for the stock, income and cash flow losses caused by drought. Selected reports of the ravages and hardships of drought are irresistible headline material in the media. Sympathy flows from the public, and governments agree readily to provide subsidies from public funds for drought assistance.¹

Government subsidies for drought relief represent substantial transfers of resources to the rural sector. From 1973-74 through 1981-82, the Federal Government provided \$152.2m in drought assistance for natural disaster relief (IAC 1983b, p. 32), and between \$50m and \$100m was provided from state treasuries.² Additional funds were provided in taxation

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¹ During the 1982-83 drought the Federal Government itself ran advertisements justifying the need for drought assistance (e.g. *The Sun*, Thursday, February 3, 1983, p. 27).

² The figures for the states are estimated as follows: the minimum figure represents the \$3 from federal sources for each \$1 from state sources under the NDRA; the upper figure includes an estimate of the base amounts paid by the states before becoming eligible for federal assistance.

incentives, unemployment benefits and public works programs. Payments for drought relief in 1982-83 are estimated to have exceeded \$165m (Standing Committee on Agriculture Working Group 1983; Campbell et al. 1983).³ The 1982-83 subsidy was one of the largest subsidies to the rural sector (other measures are recorded in IAC 1983a). They represented over eight per cent of the estimated net value of rural production of \$2014m (BAE 1983). The broad objectives of drought assistance include welfare support and maintaining resources in the rural sector.

The way in which the subsidies are provided is of interest. Under complementary federal and state legislation, the Natural Disaster Relief Arrangements (NDRA) support a broad framework of core measures of assistance and for sharing of the subsidy costs. The core measures include concessional loans to farmers unable to obtain funds from commercial sources, freight subsidies and subsidies for livestock slaughter. In practice, the package of subsidies available varies from one drought to another and often between states for any one drought.

Drought assistance provided for the 1982-83 drought illustrates the position (see IAC 1983b and Standing Committee on Agriculture Working Group 1983). The level of availability of carry-on loans and the rates of freight subsidies were modified in August 1982 and, throughout the drought period, lack of details on the conditions of eligibility resulted in confusion in the minds of many farmers and, one imagines, also some administrators. In September 1982, new assistance measures in the form of purchased fodder and interest rate subsidies were announced and even in June 1983 there was indecision as to the duration of these assistance measures. Other forms of assistance included subsidies for water transport, for agistment of livestock, for water bores and, in some states, for the disposal of helpless and unsaleable stock.

A review and assessment of drought assistance policy is given in this paper. The fodder subsidy and interest rate subsidy schemes used in 1982-83 are discussed in the next section.⁴ Alternative policy initiatives advanced by economists to assist private decision making are then discussed. In the final section, an efficient and equitable alternative drought policy is proposed.

Drought Policy 1982-83

In terms of dollars spent, the most important forms of drought aid provided in the 1982-83 drought were the subsidies on purchased fodder and on debt interest. The effects of the subsidies on the allocation of resources and as a means of providing welfare support are analysed in this section. As background, the effects of the subsidies on prices, quantities and income are assessed.

³ The figure includes an estimate of the annual subsidy involved with carry-on loans and not the carry-on loan figure. Using the interest rate on overdrafts over \$100 000 of 16 per cent and the concessional interest rate of 4 per cent (and many were not required to meet interest for the first year or two) the subsidy element in the \$125m of carry-on loans was estimated at \$15m. Similar subsidies will be involved in future years.

⁴ In many respects the critical assessment made in this paper are similar to those in IAC (1983b) and Standing Committee on Agriculture Working Group (1983) and they build on commentaries on policy toward previous droughts by other economists including Campbell (1973), McIntyre (1973), Musgrave and Lesuer (1973) and Bates (1976).

Fodder subsidy

Two measures reduced the cost of purchased fodder to feed livestock in drought-declared areas. First, a 50 per cent subsidy was payable on fodder purchased for the maintenance of sheep and cattle to a limit of 80 cents per sheep per month and \$8 per cattle beast per month. The subsidy did not apply to fodder produced and used on the farm, or to fodder purchased prior to the drought. Second, a 75 per cent subsidy was paid on the transport cost of purchased fodder. The principal objectives of the subsidies were to induce farmers to feed more animals rather than have them slaughtered or allowed to die and to speed the recovery of the livestock industries after the drought; the schemes also were seen as providing some income support and meeting humanitarian goals.

The first round effect of the fodder subsidy was to shift out the demand curve of the recipient farmers for fodder; the demand curve of non-assisted farmers and the supply curve remained unchanged. Fodder is demanded for normal production as well as for drought maintenance. Results from studies of the intensive livestock industries indicate that feed prices, typically measured by grain prices, have a significant effect on quantity produced and, by implication, fodder demand (see for example, Kennedy et al. 1976 for broilers, Richardson and O'Connor 1978 for pigs, and Buffier and Freebairn 1975 for fed beef). Farm management studies of drought feeding strategies by Anderson and Hardaker (1973) and Officer and Dillon (1965) show that the demand for fodder for drought feeding is sensitive to fodder prices. Bain (1973) and BAE (1976), using econometric models of the aggregate demand for fodders obtained results which are consistent with the hypothesis that the demand for fodder as an aggregate, and the demands for individual fodders, are price responsive, and that the different fodders are imperfect substitutes for each other. Unfortunately, precise estimates of the price elasticities are unavailable.

Consider next the fodder supply functions. The supply function for wheat for fodder can be regarded as perfectly elastic at about the export price. In practice the Australian Wheat Board attempts to meet all feed wheat demands by diverting grain from stocks and export sales. Domestic feed wheat sales amount to less than ten per cent of total wheat sales. Over one-half of coarse grains are exported. Despite the existence of state marketing boards, Bain (1973) described the coarse grains markets as highly competitive, and it is reasonable to argue that the supply of coarse grains for domestic livestock feeding is highly elastic at the export price. For example, Bain (1973) estimated the partial correlation coefficients for domestic and export prices for barley and oats to be greater than 0.8. On the other hand, hay is an internationally non-traded good with few alternative uses to livestock feed and whose supply elasticity is very low in the short run because of production restraints.

Further evidence on the nature of the supply and demand for fodders is summarised in Table 1. The low correlation of feed wheat and other fodder prices supports Bain's (1973) contention that wheat has a specialised market and serves as a relatively high-priced reserve source of feed in drought. While the prices of coarse grains and hay are highly correlated they are far from perfectly correlated. This is more evident from monthly data. Prices of hay and, to a lesser extent, coarse grains have

TABLE 1
Some Characteristics of Market Outcomes for Australian Fodders^a

| Item | Feed wheat | Barley | Oats | Sorghum | Hay |
|---|------------|--------|------|---------|-------------------|
| Quantity used for feed, average 1977-78 through 1980-81 ('000t) | 826 | 479 | 801 | 392 | n.a. ^b |
| Average price, 1977-78 through 1980-81 (\$/t) | 127 | 111 | 91 | 103 | n.a. |
| Correlations of deflated ^c prices, 1956-57 to 1979-80 | | | | | |
| wheat | 1.00 | | | | |
| barley | 0.26 | 1.00 | | | |
| oats | -0.4 | 0.64 | 1.00 | | |
| sorghum | 0.39 | 0.75 | 0.19 | 1.00 | |
| hay | 0.33 | 0.45 | 0.22 | 0.59 | 1.00 |
| Coefficient of variation of deflated ^c prices, 1956-57 through 1979-80 (%) | 10.8 | 13.8 | 17.3 | 18.1 | 19.9 |

^a Data from BAE, *Coarse Grains Situation, Quarterly Review of Rural Economy*, and *Index of Prices Received and Paid*.

^b n.a. denotes not available.

^c Prices are deflated by BAE index of prices received by farmers.

been more variable than feed wheat prices. Based on observed price movements, there is a reasonable degree of independence of the prices of the different fodders and they are regarded as imperfect substitutes.

With this background, the effect of the fodder subsidies is as follows. Wheat prices will remain unchanged, feed sales will increase at the expense of export sales and stocks, and wheat will become relatively more important in total fodder sales. The increased demand for coarse grains will be absorbed mostly as a diversion of export sales and a relatively small price increase. With hay, the principal effect will be a higher price and very little increase in quantity. Based on a crude interpretation of the available data, these changes did occur in 1982-83.⁵

The effect of the fodder subsidies on the numbers and prices of livestock is now discussed. Farmers were encouraged to retain more sheep and cattle on their farms and to increase the feeding rate. But, as noted above, fodder costs did not fall by the full extent of the subsidy and not all farmers availed themselves of it. In addition, the decision to feed animals was influenced positively by the expected price of animals at the end of the drought. If, as is argued by Munro and Fisher (1982), farmers' expectations were, in part, rational expectations, then the subsidies, by encouraging the retention of animals, reduced farmers' expected end-of-drought prices and, hence, the incentive to feed animals.

⁵ Using BAE (1984) data, feed wheat sales increased from 854 kt in 1981-82 to 1490 kt in 1982-83. In the case of coarse grains, although total production fell by 44 per cent between 1981-82 and 1982-83, domestic feed sales fell by only 24 per cent and the share of domestic feed sales in total disappearance increased from 39 per cent to 50 per cent. The Standing Committee on Agriculture Working Group (1983, p. 26) noted, it '... was not able to ascertain the extent to which fodder prices rose as a result of the subsidy, but it believes it was significant'. All these figures should be interpreted with caution because not all other things were constant between the comparison years.

This and other second-round effects modified, but did not eliminate, the initial effect of the fodder subsidies to increase the number of sheep and cattle retained on farms and to increase the productivity of the national flock and herd.⁶

At the aggregate industry level there were changes in livestock and livestock product prices resulting from the fodder subsidies. Increased wool production resulted in a lower price than would otherwise have been the case. The price fall was proportionately less than the output increase because of the elastic demand. Meat supply fell in the early part of the drought as animals were diverted from slaughter, but in the latter part of the drought and post-drought periods the sale of retained animals resulted in increased meat supplies compared to a state of no fodder subsidies. These meat supply changes had proportionately smaller reverse effects on prices because domestic prices are closely tied to export prices and the export demands for Australian beef, mutton and lamb are elastic.

Many sheep and cattle producers were disadvantaged by the effects of the subsidies on purchased fodder on livestock prices. Farmers who used their own fodder reserves, either home produced or previously purchased, those who stocked conservatively, those who allowed their animals to die and those who sold some of their stock did not receive the subsidy. As many as one-half of the drought-affected farmers did not receive direct benefits from the fodder subsidy in 1982-83.⁷ They, and producers in non-drought areas were, however, affected by the commodity price changes. The effects were adverse for wool producers, for those selling animals in the post-drought period, and those selling meat products in the latter part of the drought and the post-drought periods. Indirect benefits were given to those selling livestock in the early part of the drought and buying at the end of the drought. Because of high price elasticities of demand for meat, these indirect price effects are unlikely to have been very large.

Intensive livestock producers and dairy farmers also were adversely affected. First, the fodder subsidies resulted in higher costs of purchased fodder. Second, in the case of the meats, the lower (higher) prices of the red meats adversely (favourably) affected the final product demand for pig meat and chicken. Almost certainly the output price effects had less influence on incomes than the fodder price effects.

In summary, the fodder subsidies resulted in a mixed pattern of gainers and losers. No more than one-half of the drought affected sheep and cattle producers received the subsidy. Some of the subsidy was gain-

⁶ One referee suggested that a comparison of recent figures on livestock numbers would cast some light on the magnitude of the effects. Since a large number of factors such as relative product prices and seasonal conditions affect livestock inventory decisions as well as fodder costs and subsidies, a simple comparison of figures would not be informative.

⁷ Taking the aggregate Australian picture and data from a BAE survey of the AAGIS, Purtil et al. (1983) estimated that 62 per cent of farmers were drought affected and that 30 per cent either had used or intended to use the purchased-fodder subsidies. In the case of Victoria where the drought affected most of the state, the Rural Finance Commission had spent about \$23m on the fodder subsidy by May 1983. At 40 cents per sheep per month the subsidy outlay amounted to 57.5m sheep months of subsidy. This may be compared with an inventory of 25.5m sheep and 3.4m beef cattle. Combining these figures implies that the subsidy would apply to all animals for about one month, yet the drought had been declared over most of the state for at least six months.

ed by fodder producers and carriers and some went to overseas consumers of livestock products. Adverse price changes resulted in losses to sheep and cattle producers in non-drought areas, farmers in drought areas who used alternative strategies, such as feeding their own fodder or conservative stocking rates, and intensive livestock producers. While the subsidies increased the incentive to increase the number of animals on some farms, the aggregate industry increase was smaller because of modifying price effects.

Interest rate subsidy

Two forms of subsidy on the cost of borrowed credit were available in 1982-83 to farmers in drought declared areas: concessional carry-on loans and a debt interest subsidy. Farmers assessed to have both viable prospects over the longer term and to be unable to obtain funds from normal commercial sources were eligible for special carry-on loans.⁸ The loans had a maximum interest rate of four per cent per annum, the possibility of interest and principal repayment holidays and a maximum duration of seven years. A new initiative provided a subsidy on debt interest above 12 per cent per annum. At the time, the bank overdraft rate for loans under \$100 000 was 14.5 per cent, with higher rates being charged by finance companies. The subsidy was generally available to all farmers. The objectives of these measures included assisting farmers to service their debt, helping maintain the rural capital stock and releasing funds from debt servicing and repayment for household consumption.

An assessment of the debt position, who received the interest subsidies, and of the effects of these subsidies on asset ownership and prices requires some background data on farm balance sheets. At 30 June 1982, the gross institutional indebtedness of the farming sector was \$4353m (Reserve Bank of Australia). This represents about nine per cent of the estimated value of land, vehicles and machinery, and livestock assets on farms (ABS), and can be compared with '... interest-bearing assets of farm businesses estimated to have totalled around \$3300m at June 1981' (Balderstone et al. 1982, p. 53). In practice, farmers drew on their financial reserves and increased their institutional debt as part of a survival strategy. Data analysed for the 1982-83 drought by Purtill et al. (1983), and for the 1960s droughts by McIntyre (1973) and Bates (1976), show that the increased debt burden was not as dramatic as the fall in farm receipts and income. Evidence submitted to the Standing Committee on Agriculture Working Group (1983, pp. 2 and 6) and its own conclusions contended that the commercial financial sector was able to accommodate the increased demand for credit by farmers during the 1982-83 drought. McIntyre (1973) reached similar conclusions for the 1960s droughts. In short, the aggregate or average farm picture is one of high equity levels and financial reserves, a strong base to support borrowing, and success in obtaining institutional credit for carry-on purposes during a drought.

The aggregate picture hides the diversity of asset positions of individual farmers. A detailed analysis of BAE survey data for 1978-79 by

⁸ There were differences in the schemes between states in regard to maximum levels of carry-on loans (see IAC 1983b, and Standing Committee on Agriculture Working Group 1983) and in the criteria and procedures used to determine 'long-term viability' and 'unable to obtain funds from normal commercial sources'. In general, few people have been disturbed by the apparent contradiction of these two terms.

Adams and Minnis (1982)⁹ found that 29 per cent of all farmers had a zero gross debt position and 52 per cent had debts of less than \$10 000. Small farmers had a more favourable debt position: of those farmers with assets of less than \$150 000 nearly 38 per cent were debt free compared to 33 per cent for farmers with assets of \$150 000 to \$300 000 and 17 per cent for farmers with assets exceeding \$300 000. Of the small farmers, only five per cent had debts exceeding \$40 000, while 30 per cent of large farmers had debts exceeding \$60 000. In an analysis of sheep farmers over the period 1957-58 through 1975-76, Cornell and Kerridge (1980, p. 2) found that '... net cash incomes of indebted farmers were greater than those of debt free farms, although the difference was not large'. The general pattern of these figures should apply to the 1982-83 drought year, although absolute debt levels would have been higher. They indicate that the interest subsidies were of benefit to less than one-half of the farm population and that larger farmers with a more-than-proportionate share of the debt burden, and with at least comparable income flows, were the principal beneficiaries.

It has been argued by some people, including the Standing Committee on Agriculture Working Group (1983), that the provision of additional carry-on finance is justified by perceived failures in the rural credit market. Many regulations interfere with the operation of the credit market (see, for example, BAE 1972 and 1977; Standen 1978 and 1982; and Campbell et al. 1981). Special government institutions provide about one-half of the total rural institutional debt. To a large extent, the supply of this credit is controlled by regulation, much of it comes at concessional interest rates, and non-price rationing criteria are used to allocate the funds. Interest rate regulations affect trading bank lending, particularly via the maximum rate on small (less than \$100 000) overdrafts and bank funds are allocated on criteria in addition to interest rates such as equity, personal rapport with the manager and past deposit history (Valentine 1973; Standen 1978; Ockwell and Batterham 1980). Obviously the banks met a portion, and probably a large portion, of the additional farmer requests for carry-on finance in the 1982-83 drought. A similar situation seemed to exist in the 1960s (McIntyre 1973; Standen 1978; and Standing Committee on Agriculture Working Group 1983). However, because of the non-price rationing, it is likely that some farmers were not able to obtain all they had sought at the regulated below-market small overdraft interest rate. But farmers were free to seek funds from other components of the credit market, including pastoral and finance companies and trade credit. Because of farmers' small share in the Australian credit market, it is arguable that the supply of credit to farmers from these sources was highly elastic at market rates of interest. In this context, most of the claims of inadequate credit for carry-on during the 1982-83 drought refer to an inability to obtain funds at concessional interest rates from traditional lenders and not an inability to obtain funds from other sources at market rates. A similar more general argument is made by the BAE (1977).

The concessional carry-on finance was available only to a sub-set of 1982-83 drought affected farmers and the subsidy was discriminatory in

⁹ The authors note that 1978-79 was an atypical year in that the net value of rural production was double that of the previous year, but that the pattern of assets and liabilities was similar to that of the preceding three years.

several ways. A farmer assessed as being unable to obtain funds from normal commercial sources, and to have viable prospects over the long term, obtained a carry-on loan at four per cent interest. At the same time, a neighbour able to obtain funds from, for example, a trading bank overdraft paid up to 14.5 per cent. Farmers assessed not to have long-term viable prospects were denied the concessional loan. Inevitably, subjectivity was involved in making the assessments. The eligibility criteria were not directly tied to perceive cases of market failure. Further, the market failure argument does not support the need for the subsidy on the carry-on loans.

The effects of the interest subsidies on market prices and quantities were as follows. Farmers receiving the subsidy had an improved cash flow position and it lowered the cost of credit to them. It gave them a greater ability to hold on to their farm assets. In aggregate the subsidies were reflected in an increased demand for farm resources generally. Part of the extra demand went to inputs with a high elasticity of supply (e.g. general supplies, fuel and labour). For these items, the price changes would have been small. Another part of the extra demand went to commodities such as land, livestock and hay with low elasticities of supply. For these commodities, part of the subsidy led to higher prices. The higher prices applied to all farmers with sellers reaping windfall capital gains (and buyers losses) as a result of the interest subsidies.

In summary, the interest subsidies were of direct benefit to only a subset of drought affected farmers and the subsidies resulted in price changes affecting both the assisted and the non-assisted farmers.

Drought subsidies and efficiency

The purchased fodder and interest subsidies paid to farmers in the 1982-83 drought were input subsidies available to some, but not all, farmers. They changed the allocation of resources between the rural sector and the rest of the economy, between different activities and farmers within the rural sector, and they influenced farmers' choices of future drought strategies.

At the aggregate rural industry level the drought subsidies, like any subsidy, enhanced the attraction of keeping resources in, or adding new resources to, the industry. However, there are several arguments to counter the need for such assistance on account of a drought (for more detail see Freebairn 1978). While a drought causes a temporary fall in returns to agricultural resources, the fall, of itself, does not necessarily lead to a misallocation of society's resources. Given longer-term prospects of a return to normal seasonal conditions, and the low opportunity value of the resources to other industries, most quasi-fixed resources stayed in the industry. There were transfers of land and livestock, but most of these were intra-industry transfers and not losses to the industry. A large part of the fodder and interest rate subsidies paid in the 1982-83 drought found its way into higher fodder, land and livestock prices than would have been the case without the subsidies. While the drought may have affected adversely longer-term industry expectations in the minds of some decision makers, and caught some entrepreneurs who had gambled against, or even ignored, the possibility of drought, others with sufficient foresight accepted the opportunity for acquiring additional resources at

bargain prices. Based on land price data series reported by Powell (1974) and Bruyn (1981), previous droughts had a very small effect, if any, on land prices. In the 1982-83 drought the majority of farmers received no direct drought assistance and they, in conjunction with the commercial capital markets, were able to maintain the rural capital stock and reasonable household consumption levels.

The argument that drought assistance is justified on resource efficiency grounds because variations in seasonal conditions are a source of uncertainty and farmers are risk averse is doubtful, particularly in the case of the 1982-83 measures. As argued in more detail by the IAC (1978), the proposition ignores the reality that there is uncertainty with activities in other sectors and, within the agricultural sector, there is uncertainty from other natural hazards and from market forces. At best, the argument is one for assistance on a broad commodity basis via a pre-announced contingency arrangement. By contrast, the 1982-83 subsidies were partial input subsidies to a sub-set of drought affected farmers and several of the measures (fodder and debt interest subsidies) were proclaimed as one-off subsidies after the commencement of the drought.

Harris et al. (1974) and others have argued that drought assistance to the relatively efficient extensive cropping and grazing industries is worthy of support on second-best or 'tariff compension' grounds to balance the high levels of assistance granted to some other parts of the economy. On the criteria of political palatability, drought (and other perceived crises) assistance has advantages over tariff reductions and continuing general commodity price support for the efficient rural industries. But, as Lloyd (1975), Warr (1978) and others show, it is difficult to be sure that compensating assistance will improve the allocation of society's resources. This is particularly so with the 1982-83 measures which were characterised by partial input subsidies and *ad hoc* assistance.

A number of resource allocation distortions were caused by the fodder and interest rate subsidies. As input subsidies they influenced adversely the choice of production techniques. The fodder subsidy favoured the feeding of animals relative to alternative strategies of a conservative stocking rate, animal sales and animal deaths. Interest rate subsidies favoured production processes using long-lived capital assets relative to labour and materials. The fodder subsidy resulted in less export grain sales and more lower-social-value domestic feed sales. By placing an effective ceiling on the cost of borrowed credit, the debt interest subsidy reduced the incentive for borrowers to find the lowest-cost finance. Also, it encouraged lenders to substitute higher interest charges for less expenditure on loan assessment and management advice. For the reasons discussed above, it is unlikely that the social marginal value of the additional resources drawn to the agricultural sector as a result of the 1982-83 subsidies exceeded their opportunity returns elsewhere in the economy.

An important resource misallocation effect of the 1982-83 drought assistance measures was the intra-industry allocative effects of the selective input subsidies. The fodder subsidies assisted those who bought fodder, but not those who produced their own or used an alternative strategy. Yet many farms were similar in all respects except this. Further, the indirect effects of the subsidy on higher fodder prices was detrimental to users of fodder for normal production purposes, including the intensive livestock industries, and to users in non-drought declared areas.

Others were adversely affected by induced product price changes. There is no support for the hypothesis that resources used by heavily-indebted farmers (less than one-third of the population) required more encouragement than resources used by debt-free farmers on market failure, second-best or other efficiency grounds as happened with the debt interest subsidy. Even if it is granted that some, but certainly not all, recipients of the concessional interest carry-on loans were the victims of capital market failures (itself a debatable point), the interest rate subsidy available to recipients distorted the allocation of resources within the agricultural sector. On resource efficiency grounds, the 1982-83 fodder and interest subsidies went to an arbitrary set of farmers and not to all farmers, and they resulted in additional burdens for some farmers.

Both the fodder and the interest subsidies provided incentives for farmers to lessen their efforts to cope with future droughts from their own resources. They discouraged the conservation of fodder, use of conservative stocking rates and building-up financial reserves because these strategies received no subsidies. By contrast, the strategies of no fodder conservation, heavy stocking rates and free spending during good times, coupled with borrowing funds and buying fodder during droughts, are relatively more attractive because they permit higher returns during good times and they attract subsidies which lower costs during droughts. The effect of the subsidies would be greater with a consistent, pre-announced strategy assistance policy than with *ad hoc* policies of the 1982-83 type because of uncertainty about the form and magnitude of the subsidies. Even so, the reasonable assumption that some assistance will be forthcoming has the side effect of reducing the preparedness of individuals for inevitable future droughts.

Drought subsidies and welfare support

One motive for drought assistance has been the provision of an adequate income for people dependent on the rural sector for their livelihood. This represents an extension of the societal goal of providing all its members with at least a minimum income. Conceptually, drought should not create a welfare problem. Rational decisions to enter an industry, including agriculture, require that over the long term adequate returns be generated, on average, to meet satisfactory income levels including an allowance for the risks involved. Further, contingency arrangements would be made to accumulate funds from good seasons for use during drought periods. In practice most farmers cope successfully with their fluctuating incomes and this was shown to be the case in 1982-83. However, inevitably some individuals had insufficient funds for their household consumption needs.

Existing social security arrangements provided an income safety net for many families whose incomes were adversely affected by drought. Unemployment benefits schemes ensured a basic income for all employees. Unemployment benefits were available also to farmers. However, the need to maintain assets, such as livestock, in working condition and problems with interpretation of the regulations resulted in only a few farmers drawing on unemployment benefits in 1982-83.¹⁰ The

¹⁰ The IAC (1983b, p. 12) quotes figures supplied by the Department of Social Security that at 31 December 1982 there were only 84 primary producers in N.S.W. and 211 in Australia as a whole, receiving unemployment benefits.

rehabilitation and household support components of the Rural Adjustment Scheme were available to provide income support for farmers. In practice these measures of welfare support were used by very few farmers in the 1982-83 drought with only two applications for rehabilitation (one successful) and 30 for household support (28 successful) (BAE 1983, p. 120). As noted by Vincent (1976) and several contributors to the Commission of Inquiry into Poverty (1975), there are many conceptual and practical issues in providing welfare support to self-employed persons, including farmers. The present measures available to Australian farmers have not been used by many.

The 1982-83 drought assistance measures provided additional funds to the recipient farmers. In the case of the purchased-fodder and debt-interest subsidies, the amount of support was proportional to the amount of fodder bought and debt incurred, respectively. Less than one-half of livestock farmers received the fodder subsidy. While many of these farmers experienced a severe reduction of income, some were large operators with sizeable financial reserves. Given the debt structure of Australian farmers, the debt-interest subsidy was regressive because the large farmers with high incomes were more heavily indebted and received more subsidy than the small farmers.

Some of the recipients of the concessional interest rate carry-on loans were worthy of income support on social welfare grounds. But the measure missed at least two groups potentially in need of income support: those farmers assessed not to have long-term viable prospects and those who were able to obtain some credit from normal sources but who still confronted a temporary shortage of cash funds for household consumption. At the same time, some farmers with above poverty-line funds for household needs received subsidised finance. In general, neither the selection of farmers or the level of concessional credit provided under the scheme were based on the criteria of funds required for a minimum level of household consumption.

In summary, the interest rate and fodder subsidies paid in the 1982-83 drought were loosely, if at all, related to minimum household consumption needs and they were blunt and inefficient instruments for dispensing welfare support.

A Rational Drought Policy

Many economists have argued, as does the author, that droughts, of themselves, do not justify specific drought subsidies for resource-efficiency reasons and that welfare support is more directly and effectively achieved by direct income grants than by product and input subsidies. It is assumed that farmers are aware of fluctuating seasonal conditions and their effects, that they take a longer-term view when making investment decisions, and that they have contingency arrangements for coping with the falls in income and cash in the event of drought. In fact, the majority of Australian farmers do cope with droughts. A number of ways in which governments can facilitate private decision making in a world with droughts have been advocated over the years by economists and others.

A basic prerequisite for rational decision making is information about the probabilities of occurrence and duration of droughts and about the relative costs and benefits of alternative management strategies (e.g. Campbell 1973). Analyses of meteorological data by Gibbs and Maher

(1967) and others in the Bureau of Meteorology, and work by Thatcher and Lloyd (1975) and Toft and O'Hanlon (1979) on water balance models, provide guidelines for advice on the likelihood of different environmental conditions. More research seems desirable in these areas and on how the probabilities of drought conditions are influenced by alternative management strategies and local conditions. Examples of information about the techniques, costs and benefits of drought mitigation strategies such as alternative stocking rates, fodder reserves, cash reserves and animal sales are in Dillon and Lloyd (1962), Officer and Dillon (1965), Campbell (1966), Anderson and Hardaker (1973), Toft and O'Hanlon (1979) and numerous reports prepared by officers of the state Departments of Agriculture and Conservation. There remains scope for further model development, generalisation and extension, for tailoring advice to specific situations, and for updating advice to reflect changes in prices and technology. Because of the public good nature of many of these types of information, some government intervention is justified.

Governments can facilitate private decision making by adopting a consistently applied and widely known set of policies. They would specify the conditions under which a drought would be declared and the forms and levels of assistance (if any) that would be provided. *Ad hoc* reactions to each new drought by government adds to the uncertainty facing farmers and results in less effective farmer decisions.

An efficient capital market would ensure that farmers and others were able to balance the variability of income receipts with more stable requirements of funds for operating expenses, business investment and household consumption. With a freely competitive market, such as recommended by Campbell et al. (1981), there should be no problems in obtaining carry-on loans at market rates of interest during droughts and in obtaining loans with flexible repayment schedules. Current regulations affecting the capital markets provide only a necessary, and not a sufficient condition, for further government intervention at the time of droughts. There may be an argument for providing additional funds for carry-on loans, but only at market interest rates. Banks permit flexibility in the repayment of some loans, particularly overdraft loans, and these informal arrangements are preferred by many borrowers. However, it is arguable that current regulations have deterred the development of formal and explicit flexible repayment loans, such as those proposed by Baker (1974), the IAC (1978) and Kent and Lloyd (1983).

There have been a number of proposals for insurance schemes as an additional strategy for use by farmers to combat the effects of drought (and other causes of income fluctuations). Swerling (1959), Campbell and Glau (1970) and others have proposed income insurance schemes. Such schemes involve considerable administration costs and there are problems of moral hazard and adverse selection. A simple rainfall insurance scheme, such as that suggested by the IAC (1978), avoids these problems in the narrow context of droughts. One reason for the failure of these schemes to be developed by the private sector is general knowledge that governments will provide some assistance in the event of drought. Because of the wide coverage of some drought experiences, enormous pay-outs will occur in particular years. There may be a role for government assistance in establishing rainfall insurance schemes and for underwriting, but not subsidising schemes once they begin operation.

While the minimum income needs of employees are covered adequately, in terms of general society goals, by unemployment benefits, it is doubtful that similar satisfactory arrangements are available for self-employed persons. To date the Rural Adjustment Scheme has played a minor role in welfare support (Musgrave 1982). There is scope for further investigation of the Commission of Inquiry into Poverty (1975) proposals for annuity schemes, negative income tax schemes and other initiatives as efficient ways of providing minimum cash for immediate consumption by farm households.

Future Directions

Several criticisms can be made of the purchased-fodder and interest-rate subsidies used by government to assist the rural sector through the 1982-83 drought, and to the freight and adjustment subsidies. The subsidies were partial or selective input subsidies. Little, if any, justification on efficiency, equity or welfare support grounds could be found for diverting funds to one group of farmers, probably less than one-half of those effected by drought, and not to other farmers. In addition, it is likely that the subsidies will increase the severity of future droughts by lowering the incentive for farmers to adopt their own support strategies. The *ad hoc* nature of the policies added unnecessarily to the uncertainty facing private decision makers. Finally, the subsidies were blunt instruments for providing welfare support and some in genuine need received no assistance.

An alternative strategy for government assistance for drought would involve the government playing a facilitating role to private decision making and providing direct income grants for welfare support. Farmers are able to adopt many strategies to cope with drought including saving and borrowing funds, conservative stocking rates, conserved fodder and livestock sales. Most in fact do cope with fluctuating seasonal conditions without government assistance. Government can assist private decision making by providing information about seasonal conditions and decision options. It could remove distorting regulations in the capital market. If many of the current regulations of the capital market continue, there may be a case for government provision of additional finance for carry-on loans at market rates of interest and with flexible repayment schedules. Similarly, it could underwrite a rainfall insurance scheme at market rates of interest. Minimum income needs of employees are covered adequately by the unemployment benefits scheme. New initiatives are required to enable government to provide an income safety net for families dependent on self-employed persons for their income.

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