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THE CHALLENGE OF PRODUCTION INSTABILITY IN AUSTRALIAN AGRICULTURE

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In 1930 Sir Keith Hancock expressed a conviction that the inhabitants of this continent would eventually adapt themselves to the uncertainties of their natural environment. "There are in Central Australia," he wrote, "frogs which have learned to store within themselves sufficient water to keep them alive through twelve or eighteen months of rainlessness. Men, by adapting themselves to their environment and modifying their environment to suit themselves, may achieve even greater marvels."[1]

Looking at the Australian scene in the year 1958, a year ushered in amid signs of serious drought conditions in many parts of the continent, and fears of worse to come, one cannot but be impressed by the extremely limited progress which we, as a people, have made in the intervening years in coming to terms with the most insidious and pervasive characteristic of our climate—its variability.[2] If we accept Toynbee's dictum that the degree of command over its physical environment possessed by any society at any given stage in its history can be measured by the state of its technique,[3] then we must conclude that we have progressed relatively little since the first settlement.[4]

Moreover, the years since 1930 have seen an unprecedented encroachment of government on agricultural affairs. In this movement the major problem of production instability has been left virtually untouched. Particularly is this true in an economic context. Indeed, the effect of governmental intervention in agriculture, as I shall shortly show, has frequently been to make the effects of production instability on the individual farmer worse.

This enigma of public policy is all the more perplexing, given that

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[1] W. K. Hancock, *Australia* (London: Benn, 1930), p. 20. The intriguing details of these more adaptable Australians may be found in Baldwin Spencer, *Wanderings in Wild Australia* (London: Macmillan and Co., 1928), pp. 44-46, and H. C. Andrewartha and L. C. Birch, *The Distribution and Abundance of Animals* (Chicago: University of Chicago Press, 1954), p. 224.

[2] It has been shown that, over the greater part of the continent, the rainfall variability exceeds the world mean variability for any given amount of rainfall. See S. M. Wadham and G. L. Wood, *Land Utilisation in Australia* (Second Edition) (Melbourne: Melbourne University Press, 1950), pp. 45-46.

[3] Arnold J. Toynbee, *A Study of History*, Vol. IV (London: Oxford University Press, 1939), p. 40.

[4] My assessment of the progress which Australians have made in adjusting to their environment differs markedly from that of some other observers. For instance, Hartley Grattan in his book *Introducing Australia* (New York, John Day, 1942) says (p. 6), "To me it is part of the fascination of Australia that the Australians have been able to make so much out of their difficult continent . . . If you are interested in how men adapt themselves to hard environments then Australia will interest you".

See also F. W. Eggleston, "The Australian Nation" in George Caiger (ed.), *The Australian Way of Life* (London: William Heinemann Ltd., 1953), p. 3.

one would normally expect that there would be considerable social pressure towards the achievement of institutions appropriate to the physical environment. Students of national character have found, not unexpectedly, that the physical and social environment moulds individual and public action in particular ways. There is the evidence from several parts of the world suggesting that a difficult and uncertain environment often tends to produce social ferment with which is associated an extraordinary degree of individual initiative and ingenuity, combined with social inventiveness, and disregard for tradition. This is, for instance, one manifestation of the so-called frontier thesis in historical thought.[5] Other writers, like Portus, feel that the vicissitudes experienced at the hand of fickle Nature have given rise in this country to a demand for and ready acceptance of government intervention for all kinds of assistance to isolated settlers.[6] As Hancock says, the settlers "look to the Government to help them because they have nowhere else to look".[7] In the light of both these tendencies, the failure of Australians to produce a positive policy towards one of their major national problems is all the more perplexing.

ATTITUDES TO PRODUCTION VARIABILITY

This failure of Australian agricultural policy to come to grips with the problem of production variability must be explicable, in part at least, in terms of social attitudes. It might be useful, therefore, to try to categorise some prevailing attitudes to this important feature of the Australian scene. I believe it is possible to distinguish five distinct approaches. I propose to enumerate these and illustrate the way the underlying beliefs and values affect the ultimate form of public policy.[8]

(1) Failure to Recognise Variability as a Problem

First, we may recognise the state of total or partial blindness. This might be used to describe the situation where the actor fails to recognise production variability as a problem and therefore sees no cause to take any action to counter it or to take account of it in public programmes directed principally to other ends.[9] Such blindness may be of three kinds. It may be genuine, but is more often either temporary or intentional. We might refer to the latter as the "ostrich" type.

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[5] E.g., see F. J. Turner, *The Frontier in American History* (New York: Henry Holt and Co., 1920), and Fred Alexander, *Moving Frontiers* (Melbourne: Melbourne University Press, 1948). Despite his doubt about the general applicability of the "frontier thesis" in Australian history, Alexander agrees (p. 34) that the qualities mentioned are manifest in the Australian scene. See T. Saloutos and J. D. Hicks, *Agricultural Discontent in the Middle West, 1900-1939* (Madison: University of Wisconsin Press, 1951), for a description of social movements arising in Northern Great Plains of the United States, and S. M. Lipset, *Agrarian Socialism* (Berkeley: University of California Press, 1950), for comparable developments in the prairie states of Canada. Some Australian parallel may be found in the somewhat radical policies advocated by the Wheatgrowers' Union in N.S.W. at certain stages in its history.

[6] G. V. Portus, "Americans and Australians", *The Australian Quarterly,* Vol. 14, No. 2 (June 1942), p. 35.

[7] W. K. Hancock, *Australia,* op. cit., p. 70.

[8] My concern in this section is with attitudes as they affect public action. There is an obvious parallel in the framework of individual action. I am assuming, for the time being, that the mitigation of the effects of production variability is an appropriate field for governmental intervention. This assumption is examined in some detail later.

[9] I am using the non-specific term "actor" in the sense it is used by Talcott Parsons. (See his *Structure of Social Action* (New York: McGraw Hill, 1937), pp. 43-51.) In a policy context it refers to any agency of government having legislative or executive power.

The state of temporary blindness to the possibility of adverse seasons is particularly likely to strike individuals and government agencies following a run of good seasons. It happens to all of us at one time or another, and the decade of good seasons from 1946 to 1956 was apt to make people particularly prone to this affliction. For instance, if you read Dr. Williams' book on agricultural policy written early last year you will not find production instability listed as one of the structural characteristics of the local environment, affecting the form of Australian agricultural policy.[10] Drought is mentioned merely as a kind of marginal and unsolved technical issue towards the end of the book. It is not that Williams is oblivious to this problem.[11] It is just another case of a temporary blind spot induced by a prolonged sequence of favourable seasons.

Another type of temporary blindness is that induced by "dazzle glare". This results when a bright light, such as the headlamps of an approaching car, make it impossible to detect other objects in the same vicinity, however important they may be. In the same way, in public policy it is possible to lose the sense of proportion and neglect matters which, in saner moments, would be considered important.

Thus, amid the panic in Canberra associated with the wool price boom of 1950-51, the principle of averaging primary producers' incomes for income-tax assessment purposes was jettisoned in the case of incomes exceeding £4,000 per annum. This was a principle originally introduced in 1922 to mitigate some of the untoward effects of production variability as regards primary producers' tax commitments. It is a principle which has been widely lauded as a progressive policy in areas of uncertain rainfall.[12] Yet it was made unavailable to a section of farm income-earners, apparently permanently, mainly because price variability loomed large at one particular point in time, and the loss in revenue to the Treasury, through the operation of the principle, appeared to be reaching sizeable proportions.[13]

It is difficult to fathom how anyone could be oblivious to the instability of Australian agricultural production, but when one looks at some of the other pieces of legislation on the statute books, one feels that our legislators must have been blinded in some way or other when these particular Acts were passed. I would refer in particular to the wheat stabilisation legislation which has now been operative for some ten years. This legislation, which is stated to be designed to stabilise farmers' incomes, is concerned solely with price stability and leaves the

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[10] D. B. Williams, *Economic and Technical Problems of Australia's Rural Industries* (Melbourne: Melbourne University Press, 1957).

[11] E.g., D. B. Williams, "Risk Elements in Farming", *Quarterly Review of Agricultural Economics,* Vol. VI, No. 3 (July 1953), pp. 101-5.

[12] E.g., see E. Lloyd Barber, "Modifying the Federal Income Tax to Promote Greater Stability of Farm Income", *Journal of Farm Economics,* Vol. XXX, No. 2 (May 1948), pp. 331-9, and E. Lloyd Barber and Philip J. Thair, "Institutional Methods of Meeting Weather Uncertainty in the Great Plains", *ibid.,* Vol. XXXII, No. 3 (August 1950), pp. 401 *et seq.*

[13] Commonwealth of Australia, *Parliamentary Debates,* Vol. 214 (1941), pp. 530-2.

This phenomenon of losing perspective can be induced not only by the conjuncture of events, but also by preoccupation with particular ideas. Thus, given the seriousness of the 1943-45 drought, it is difficult to explain satisfactorily the overwhelming concern of agricultural policy immediately after World War II with problems of price instability to the neglect of problems of production instability without taking cognisance of the tremendous influence of Keynesian thought on the official thinking of the time.

second major source of income instability, yield variability, completely aside. Yet this is legislation applying to an industry where production variability is most marked.

As a result of the blindness to which I have referred, the programme designed to mitigate price instability may actually worsen the effect of production instability on wheat growers' incomes. This is not the place for a full-scale review of stabilisation policy, but I might cite three examples of what I am referring to.[14]

In a period when the export price of wheat exceeds the home consumption price (which has been true of most of the period the scheme has operated), the effect of the relevant part of the Wheat Stabilisation Act is to cause the pooled return to growers to be lower in a year of a short crop than in a year of a normal or bumper crop. In short, the lower the yield, the lower the pool price.[15] If, as is extremely likely in the nature of the case, more than the normal quantity of the crop is used domestically in a year of a short crop (as a result of increased livestock feeding), the pool price is forced still lower.[16]

In the second place, the provision in the current legislation for a fixed stabilisation (excise) tax means that this tax is relatively more onerous on wheat growers the smaller the size of their crop. Thirdly, the "revolving fund principle" combined with the desire for speedy turnover of the fund, tends to cause the stabilisation part of the scheme to operate more inequitably for farmers in areas of greater yield variability than for those in areas where yields are less variable.

Some may be prepared to argue that the existence of legislation of this kind on the statute book is not indicative of some form of blindness. It may be, for instance, that legislators feel powerless to do anything to mitigate production uncertainty (an attitude to which I shall allude in a moment) and therefore confine themselves to aspects of income variability which they feel are amenable to social control. However, this would not apply to the averaging principle in income taxation and, in any case, I would submit that when a policy measure actually worsens the effect of production variability on farm incomes, some form of blindness is involved.[17]

(2) Passivity

For the second attitude to the problem of production variability I would suggest the term "passive". It implies that while the actor now

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[14] For a fuller discussion see Keith O. Campbell, "Economic Aspects of Agricultural Stabilisation Schemes", *The Journal of the Australian Institute of Agricultural Science*, Vol. 16, No. 4 (December 1950), pp. 144-153.

[15] It is clear, of course, that the opposite might occur were the home consumption price greater than the export price. My general observation is based on what has happened to date and what, in my opinion, is likely to be the state of affairs in the future. I cannot see the Australian Government supporting the domestic wheat price at a level higher than export parity for any extended period.

[16] One side effect of the inclusion of feed wheat within the ambit of the home consumption price clause is to weaken the coarse grain industries, which could substantially assist the pastoral economy to withstand drought.

[17] Another explanation why we have this kind of legislation is the long-standing but naive belief that we can deal with agricultural policy in piece-meal fashion rather than as an integrated whole. The so-called "commodity approach", in which side effects of particular commodity policies tend to be overlooked, is the more usual manifestation of this weakness. We have yet to grasp fully the idea of weighing, and effecting compromises between, conflicting policy goals, e.g. between efficiency and stability or between price stability and production stability.

recognises production instability as a problem, he still takes no action against it. The reaction may be either one of two types: (a) the fatalistic type or (b) the Micawber type.

Fatalism suggests that the actor regards seasonal variability as an "act of God" against which any action by mere mortals is futile. I can do no better in defining this attitude in public policy than quote Machiavelli:

> It is not unknown to me how many men have had, and still have, the opinion that the affairs of the world are in such wise governed by fortune and by God that men with their wisdom cannot direct them and that no one can even help them; and because of this they would have us believe that it is not necessary to labour much in affairs, but to let chance govern them.[18]

The futility with which an agent regards possible action in a case like this could be born of despair, in the sense that any action taken would have such an insignificant effect in relation to the magnitude of the problem, that it would not be worthwhile. On occasion, the limitation could even be one of finance in that the cost of effective action is so great that the fatalistic approach is the only one to adopt. This would seem to be true of our attitude to flood control in this country (to use an alternative illustration) though it is probably more often than not based on an intuitive judgment rather than the results of any objective assessment of possible costs.

In the second type of passivity, the "Micawber" type, the unpredictability of the environment gives rise to extreme optimism—the belief that "something will turn up". The belief that there is a high probability that there is a favourable change in the weather just around the corner which will end all his difficulties, prompts the actor to take no steps to combat the problem. He is therefore just as passive as the fatalist.

The easy optimism of the Australian (with which is often coupled his propensity to gamble) has frequently been noted by observers of the national scene. They invariably attribute this quality to the risks and uncertainties of the physical environment in which he lives. "Prophecy," it has been observed, "is an ever-fashionable profession and in Australia its besetting weakness is excessive optimism."[19] This easy optimism at the national, as well as the individual, level predisposes us to take no action against our uncertain environment.[20] Any

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[18] N. Machiavelli, *The Prince* (Everyman's Library edition) (London: J. M. Dent, 1908), p. 197. After illustrating this attitude by reference to floods, Machiavelli continues:

". . . though its nature be such, it does not follow therefore that men, when the weather becomes fair shall not make provision, both with defences and barriers, in such a manner that, rising again, the waters may pass away by canal, and their force be neither so unrestrained nor so dangerous."

[19] W. K. Hancock, *op. cit.*, p. 28; see also the remarks attributed to Professor A. K. Stout in the *Sydney Morning Herald*, 26th October, 1957, and Thomas Wood, *Cobbers* (London, Oxford University Press, 1934), pp. 135-6.

[20] It might be argued that public inaction regarding the drought problem could be the most economic policy in the light of statistical probability, as indeed is sometimes argued in justification of the individual farmer's failure to conserve fodder. However, I believe such a rationalisation could not be sustained at the national level except in a very narrow and superficial sense, namely, that such a course of action would minimise the call on Treasury funds in the short run. If the full implications of the drought problem were examined, I do not think that support for such a view could be adduced.

Alternatively, the refusal of governments to deal with certain aspects of the problem of production instability could arise from a fundamental belief that these aspects are not appropriate spheres of governmental activity. However, the steps which Australian governments have already taken towards mitigating the effects of drought suggest that any reluctance to extend their activities in this field does not spring from any deep philosophical conviction about the appropriate limits of governmental intervention.

action that is ultimately taken through political necessity tends to be *ad hoc* and of the nature of emergency relief rather than part of an overall programme aimed at the permanent mitigation of the problem of recurrent drought.

Our proneness to wishful thinking not only induces us to remain passive in the matter of drought mitigation, but it has led many people to place undue faith on the ability of some recent technological developments, such as the pasture revolution and myxomatosis, to reduce the magnitude of the drought problem. I say "undue" faith because the Australian countryside has not been subjected to any serious or prolonged test since these developments took place. Assertions of this kind therefore are based largely on optimism rather than demonstrable proof.

(3) The Technological Approach

This leads me to my third class of attitude: what I have called the technological approach. This is the belief that the drought problem is overwhelmingly a technical rather than a social or economic problem. Mitigation of production instability in this view is a problem for the scientist and engineer rather than the legislature, except in the sense that funds to the engineer or scientist have occasionally to be voted.

To illustrate this attitude I quote the remarks of the Minister for Commerce in his second reading speech introducing the Wheat Stabilisation Act in 1948:

> No man, and no body of men, can guard our growers against the trials and tribulations faced by all farmers in growing their crops. Farming risks with wheat are especially great. They cannot be avoided, but they can be decreased, and our scientists have done great work for wheat-growers in giving them improved varieties of wheat. New wheats, with improved methods of farming, have done much to minimize avoidable risks. We cannot control the seasons, which are the principal factor deciding the size of the crop from year to year.[21]

As is implied in this statement, the attack on the problem may take either of two forms: (a) the achievement of greater adaptability of plants and animals by introduction or breeding or (b) modification of the environment. The environment may be modified in several ways. Irrigation is one of the older and more familiar methods of taking care of the problem of an inadequate or poorly distributed rainfall. Adaptation of farm practices involving specific tillage methods and fallowing is another form. More recently, we have seen substantial progress made in actual weather modification. Spectacular though rain-making experiments have been, we would be foolish to place too much reliance on the potentialities of this technique, especially if it diverts attention from alternative measures. After all, production instability will be still with us as a major problem whatever success the rainmakers ultimately achieve. As Professor Elkin pointed out recently, the rainmakers have not progressed much beyond the stone-age medicine men of Arnhem Land, who refuse to begin the appropriate rain-making ceremonies unless there are the right kind of clouds in the right aspect.

(4) Assuming the Problem Away

A fourth approach to production instability in agricultural policy is

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[21] Commonwealth of Australia, *Parliamentary Debates,* Vol. 198 (1948), p. 1450.

what might be called the sleight-of-hand approach. In this case, production variability is accepted as a genuine problem of policy, but the problem is made to vanish away magically by some "averaging" or "normalising" technique. There is talk of normal yields or normal seasons when, in fact, the only norm is variability.

The classic example of this type of thinking is perhaps to be found in our lands legislation. The Western Lands Office in New South Wales is charged with the responsibility of administering land tenure in an area of country where the average annual rainfall is generally less than 15 inches and its average variability greater than 30 per cent. In defining appropriate property sizes, the authorising legislation, following traditional Australian practice, uses the concept of the "home maintenance area". This is defined as "an area which when used for the purpose for which it is reasonably fitted would be sufficient for the maintenance in average seasons and circumstances of an average family".[22] Using this administrative concept, questions, for instance, of farm size in relation to asset accumulation, as a protection against production uncertainty, can scarcely arise.[23]

Another example of the technique of assuming away instability problems by averaging, or assuming static, yields is to be found in the wheat stabilisation scheme to which I referred earlier. In determining the unit cost of production of wheat as a basis for the declaration of the home consumption price, a constant yield which bears no relation to the yield in the particular season is employed. This means that the calculated cost more often than not has no relation to actual costs in a particular season.[24] By publishing to the world at large a comparatively stable unit cost figure as between years of fluctuating yields, when in fact unit costs are far from steady, the government is apt to fool the public (and perhaps even itself) into believing that the problem of income instability in agriculture is being taken care of. This technique of price fixing also deprives the farmer of any compensatory movement

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[22] N.S.W. Parliament, *Western Lands (Amendment) Act*, 1949. Part of the explanation as to why we have definitions like that of the home maintenance area on the statute books may be the pressure to conform to legal tradition. Statutes dealing with dynamic situations involving unpredictable contingencies probably present inherent difficulties to the parliamentary draughtsman. As Professor Friedman says: "In so far as the object of law is to establish order, it emphasises the need for stability and certainty. On the whole, legal theories and lawyers are inclined to stress stability rather than change." (W. Friedman, *Legal Theory* (Third Edition) (London: Stevens and Sons Ltd., 1953), p. 469.)

[23] It is pertinent to note that the Royal Commission whose enquiry formed the backdrop for the original Western Lands Act (1901) had no delusions about the Western Division. They reported of this country "of almost invariably low rainfall and inevitably recurring drought": ". . . drought is the predominant characteristic of the west, and not merely an enemy to be occasionally encountered. Fewer mistakes will be made in future, and there will be less of shattered hope, if everyone concerned with the pastoral industry in our Western Division bears constantly in mind that the weather history of the next twenty or thirty years will in all human probability be very much like unto the history of the last twenty or thirty years."

N.S.W. Parliament, *Report of Royal Commission to Enquire into the Condition of the Crown Tenants, Western Division of New South Wales* (Sydney, Government Printer, 1901), Part I, p. vi.

[24] For some estimates of fluctuations in the actual costs of wheat production, see D. B. Williams, "Risk Elements in Farming", *op. cit.* p. 103. Using Dr. Williams' data, it is possible to isolate the effect of yield on unit costs. The actual costs of production of wheat per bushel in successive years from 1943-44 to 1952-53, given Williams' assumptions, are 3s.10d., 8s.2d., 6s.4d., 9s.6d., 6s.5d., 6s.0d., 5s.2d., 5s.5d., 4s.11d., 4s.1d., 5s.7d.

of prices that may occur in adverse or bountiful seasons in the absence of administered prices.[25]

(5) The Probability Approach

The fifth way of viewing production instability we might refer to as the probability approach. Here the problem of production instability is recognised for what it is, a problem necessitating the techniques and concepts of statistical probability for its effective solution. Sometimes the statistical concepts may be somewhat crude, but the essence of the method is there—decisions are made in the knowledge that the magnitude of some of the variables is uncertain, though in some degree the risk is measurable. Perhaps the best example here is the calculation of the minimum monetary reserves (London funds) which the Australian economy must maintain overseas as a safeguard against adverse seasons. Just what degree of refinement lies behind such calculations I do not know, but one may assume that the Government in deciding, say, to relax import restrictions, takes some sort of calculated risk.

PRODUCTION INSTABILITY IN A CONSTITUTIONAL CONTEXT

One characteristic of events which are in the category of acts of God is that they present particular difficulty as regards defining individual and public responsibilities thereto — the Almighty being ultimately responsible, it is difficult to determine clearly the relative obligations of ordinary mortals. Individual farmers and graziers afflicted by drought or other natural hazards often feel that society should take collective action to assist them.[26] Governments for their part sometimes take the view, at least so far as direct assistance is concerned, that production variability is part of the hazards of rural production and not ordinarily an appropriate object of social action. This attitude probably arises in part from the difficulty or costliness of taking action. A government cannot protect a primary industry from drought as easily as it can protect a secondary industry from foreign competition.

An ill-defined division of responsibility towards natural hazards is also prone to arise between the constituent governments of a federal system and could even produce a situation where the central and regional governments each looks to the other to take the initiative.[27]

Clarification of the respective constitutional responsibilities of the Commonwealth and the States towards the consequences of production instability in agriculture is basic to any discussion of public policy regarding this problem in the Australian scene. Such clarification is

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[25] My remarks here should not be interpreted to mean that actual unit costs unadjusted for yield could be used for price-fixing purposes. There are also, of course, other implications of the practice of averaging yields (e.g. with respect to productivity) which are not under discussion here. The late Sir Frederick Eggleston rendered yeoman service in periodically bringing to public attention some of the inequities inherent in the yield assumption in cost of production surveys. E.g. *The Age* (Melbourne), July 17, 1953.

[26] As pointed out earlier, some observers see in this the genesis of a movement in favour of collectivism in other spheres of national life.

[27] One could treat this as a third type of passive attitude, wherein the actor recognises production instability as a problem, but takes no action because he regards it as somebody else's responsibility. This might be labelled passivity of the "buck-passing" type.

made necessary partly because, in contrast to the position in other federal systems like the United States and Canada, considerable cloudiness still surrounds the division of powers over agricultural matters in Australia. But in addition some of the issues involved in this problem are such that, even though they may be discussed by the Australian Agricultural Council, they often transcend the terms of reference of that co-ordinating body and cannot be finally resolved by it.

In most of the ensuing discussion I shall be concerned with direct measures designed to mitigate the effects of production uncertainty on the Australian economy. Since "shortage and uncertainty of rainfall are likely to remain the most important handicaps from which Australian agriculture will suffer",[29] it follows that almost all legislative and administrative acts affecting the land and its people should take cognisance of this fact. The earlier parts of this paper contain some illustrations of what has happened through neglect of this important point. The pervasive effect of climate extends, indeed, beyond rural legislation and might be expected to manifest itself in such fields as transport policy and local government. As the Commonwealth Grants Commission once succinctly put it: "Drought is not abnormal in Australia and the economy of any State is, or should be, organised to meet such a contingency."[30] These broader ramifications of production instability, important though they be, are not under discussion in the present context.

EXISTING LEGISLATIVE AND ADMINISTRATIVE PROVISIONS

Historically speaking, governmental measures concerned specifically with the problem of climatic variability in this country have fallen into five distinct categories: (1) resource development and more particularly irrigation, (2) management of overseas monetary reserves, (3) scientific research, (4) emergency credit and (5) emergency relief. In the first case, irrigation, the constitutional position is clear-cut—the States are responsible—though the form and extent of their activities are influenced, in large measure, by decisions of the Loan Council. Commonwealth Government initiative on the Snowy River Scheme has had its effects in the state sphere, but detailed responsibility for the acquisition of suitable land and the reticulation of water resides with the States affected.

The second of the measures listed, the administration of the country's overseas reserves, is noteworthy because it represents practically the only significant case where official action is taken in anticipation of drought.[31] The possibility of recurrent drought is of course only one of the contingencies which bear on decisions as to minimum reserves and the extent of foreign exchange and trade restrictions, but it is an important one in Australia. Management of these reserves has not always been the joint responsibility of the Commonwealth Treasury,

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[29] Commonwealth of Australia, *Report of Committee of Enquiry into Australian Universities* (Canberra, Government Printer, 1957), p. 14.

[30] Commonwealth Grants Commission, *Fourth Report* (1937) (Canberra, Government Printer, 1937), p. 90.

[31] Another case would be the provision in the current Dairy Industry Assistance Act that the price guarantee for butter cover 120 per cent. of normal requirements for domestic consumption.

the Commonwealth Bank and more lately the Department of Trade. Before the advent of the voluntary exchange mobilisation agreement of 1930 and the subsequent compulsory mobilisation measures, associated with World War II and the increasing maturity of the Central Bank, this was one of the roles of the trading banks. It is arguable to what extent the London funds of the trading banks were managed with a view to providing some cushion against adverse trends in output and prices as between different years. The basic purpose of these reserves was to take care of the strong intra-seasonal variations in money flows which are characteristic of the Australian economy.[32] Though there was some recognition of the role of London funds as "drought reserves", it is probably fair to say that the trading banks in those days were not strongly motivated by any national responsibility and that they had no conscious policy as regards drought contingencies.[33] In the past twenty years, management of the overseas funds has been fully accepted as a function of the Commonwealth Government and its instrumentalities.

In the case of the third line of attack, research, responsibilities are shared between the Commonwealth and the States. The share of research undertaken by the Commonwealth Scientific and Industrial Research Organisation (C.S.I.R.O.) has probably increased in recent years, partly as a result of initiative of its executive, partly as a result of the Commonwealth-State financial situation. The C.S.I.R.O.'s interests do extend beyond specifically agricultural matters and comprehend studies in such fields as water evaporation and rainmaking. The State Departments of Agriculture for their part have probably done more work in the past on the introduction and breeding of drought-resistant varieties of crop plants than the C.S.I.R.O. In short, the division of responsibility in research is fluid and indeterminate. However, research is not a field which has been or is ever likely to be seriously inhibited by constitutional restraints.

Unlike the foregoing forms of governmental activity which are the subject of continuing attention, the fourth and fifth types are largely *ad hoc* in nature. The fourth form of assistance, provision of emergency credit to necessitous farmers afflicted by drought, is unambiguously a State function. In New South Wales it has a long history dating back to the establishment of an Advances to Settlers Board in 1899 to help farmers through the adverse season then being experienced. Such loans now represent a small part of the overall rural credit facilities available, but it is of interest to note that it was provision for drought relief that first called the New South Wales Government to embark on publicly-sponsored rural credit. In New South Wales, at least, provision of emergency credit by the Rural Bank is for the most part contingent upon a prior declaration by the State Treasury that the conditions are such as to justify such assistance.[34]

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[32] See H. W. Arndt, *The Australian Trading Banks* (Melbourne: Cheshire, 1957), p. 112.

[33] The first serious attempt to study the problem of variability of rural output in relation to London funds was undertaken by the present Secretary of the Commonwealth Treasury. See Roland Wilson, "London Funds and the Australian Economy", *Economic Record* Vol. XI Supplement (1935), pp. 110-121.

[34] Concessional credit is of course also available for fodder conservation in its various forms, but I believe it is wrong to regard such activities primarily as drought mitigation measures.

The fifth type of assistance, the provision of monetary grants for emergency relief in extreme droughts, is an activity shared by the Commonwealth and the States. Federal payments, which are always made to the States for ultimate distribution, come in the category of special grants-in-aid made on such terms and conditions as the Commonwealth cares to impose.[35] The requirement almost invariably is that such grants be matched by the State. The assistance may be dispensed in different ways, varying from special bounties to wheat farmers in general to aid to specific persons adversely affected. The States in addition regularly provide forms of emergency relief (e.g. concessional freight rates for starving stock) which are not matched by Commonwealth contribution. The extent of Commonwealth intervention is uncertain, to say the least.

To illustrate how imprecise are the relative obligations of the States and the Commonwealth in this area, I would refer to the accepted statement of Commonwealth policy on drought relief. It will be noted that responsibility appears to be a matter of degree both in respect of geographic extent and financial commitment.

> Assistance to primary producers is a function of the States and is not one in which the Commonwealth normally intervenes or should intervene. In cases, however, where the assistance necessary is beyond the financial capacity of the States concerned, and where the conditions involve widespread distress, the Commonwealth takes some share in providing the requisite funds. . . . Seasonal fluctuations are usual in all branches of farming and they must be met by the farmer as a normal risk. Over very large areas of Australia the seasonal variations are pronounced because bad seasons are frequent. That, however, is one of the risks which the grower must meet himself and no government could justify a policy of meeting normal seasonal risks by payments from public funds. Next, there are seasonal losses greater than normal, the meeting of which is beyond the farmer's means, but it is within the capacity of the State to assist in compensating for them. These occur fairly often, but irregularly. In these cases, the growers' needs can be met by temporary financial assistance. The States have provided organizations for making advances to farmers which are well established and well known. Commonwealth assistance is not needed in these cases as the States have the capacity to take appropriate action. Sometimes, however, seasonal losses of such a degree occur that Commonwealth aid is needed.[36]

The picture which seems to emerge from all this is that, apart from initiating some irrigation schemes and fostering scientific research, Australians, in 175 years of settlement, have devised no clear permanent plan for meeting the recurring problem of drought, save to provide emergency relief, if the drought is severe enough. The initiation of aid, the extent of the aid, and the division of financial obligations are left for *ad hoc* decision on each occasion. The advent of Federation seems to have had no effect but to cloud responsibilities. I venture to suggest this is a most unsatisfactory situation which should not be allowed to persist in an economy as advanced as our own.

THE RELATION OF PRODUCTION INSTABILITY TO NATIONAL POLICY OBJECTIVES

The allocation of responsibility between the Commonwealth and the States for any additional measures aimed at mitigating the effects of production instability in agriculture depends ultimately upon how such

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[35] On occasions the Commonwealth Grants Commission has recommended extra grants to the claimant States on account of the existence of drought conditions. E.g. Commonwealth Grants Commission, *op cit.*, pp. 89-91. The Commonwealth Government has also made grants to the States on its own initiative when drought conditions have adversely affected their financial position.

[36] Commonwealth of Australia, *Parliamentary Debates*, Vol. 192 (1947), pp. 2925-6.

activity is viewed in relation to the accepted objectives and functions of government.

At base, the question to be determined is whether there is any justification for further extension of government action—whether, in fact, the government should not maintain the extreme view that "seasonal fluctuations . . . must be met by the farmer as a normal risk" and provide no additional assistance. Whether this point of view is put forward on the basis of genuine belief, of tradition, of inertia, or of lack of know-how I cannot tell, but the fact remains it has been put forward in the Federal Parliament by Government spokesmen. I would submit that such a view is quite untenable in this day and age. I say this not because I believe that farmers need more paternalism or that farmers "should be assisted to meet normal seasonal risks by payments from public funds".[37] As a matter of fact, many of the measures that might be adopted to handle the problem simply involve helping the farmers to help themselves.

My assertion is based rather upon a conviction that efforts to control production instability are an important part of any programme aimed at maintaining national economic stability in a country such as Australia. Looking at the policy of non-intervention in this light, one finds it is wholly inconsistent with well-established objectives of economic policy—objectives which have been accepted by the Commonwealth Government for nigh on twenty years. Repeatedly during that period, Government spokesmen have stated that as a corollary to the object of maintaining the stability of the economy, one of the key objectives of national policy in the agricultural sphere was to promote stability of farmers' incomes. Such assertions are to be found in the 1945 White Paper on full employment,[38] in the Chifley Government's document on post-war agricultural policy,[39] and in numerous parliamentary statements about particular legislative measures since that time.

It is true that in these documents the entire discussion of income stability proceeds in terms of the necessity of stabilising agricultural prices. The amazing thing is that the first two documents listed were being written while one of the four major droughts of this century was at its height and yet they make no mention of the problem of output variability in relation to farm income.[40] It may be that there is a genuine belief that price instability far outweighs production instability as a contributor to the instability of farm incomes. It would, therefore, be desirable to have a look at the statistical record before proceeding further.

It is difficult to get wholly satisfactory statistical data to demonstrate the relative importance of variations in prices and output in Australian agriculture. Tables I and II do show the degree of variability revealed by the Statisticians' rural quantity and price indexes over a 44-year

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[37] *Ibid.*

[38] Commonwealth of Australia, *Full Employment in Australia* (Canberra, Government Printer, 1945), p. 8.

[39] Commonwealth of Australia, *A Rural Policy for Post-War Australia* (Canberra, Government Printer, 1946).

[40] The problem of production instability is broached only once in the document *A Rural Policy for Post-War Australia.* That is where the advantages of irrigation in ensuring continuity of supply are mentioned. The section of the report dealing with income stability deals exclusively with price stabilisation measures.

period. They reveal that over that period the fluctuations in prices were greater than the fluctuations in output except in the case of crops, where the reverse position held.[41] The average year-to-year variation of aggregate output is 7.0 per cent. and the variation of the aggregate price index 12.0 per cent.[42]

Aggregating commodities for the purpose of calculations such as these reduces the magnitude of the variation.[43] Moreover, use of national statistics tends to reduce output variability as compared to price variability because of compensating output movements in different parts of the continent. In other words, it is highly probable that the twin scourges of production and price instability are of more nearly equal importance to the individual farmer than the figures quoted would suggest. Whatever the exact statistical position, it is clear enough that production variability, rather than being dismissed and forgotten, should be tackled as vigorously as, if not more vigorously than, we have tried to control agricultural price fluctuations, if governments are genuine in their acceptance of the promotion of stability of farm income as a major objective of economic policy. The reason why so much legislative and administrative attention has been concentrated upon agricultural price stabilisation probably lies in public attitudes such as those enumerated earlier in this paper.[44]

Since it is widely accepted in this country that fluctuations in farm income have profound repercussions on national income and, perhaps more vitally, on the balance of payments,[45] there seems little reason in labouring the point here. I have shown that production instability is probably as important as price instability in initiating income fluctuations. The same argument applies whatever the source of the instability.

A few crude estimates have been made of the effect of drought on the national economy. For instance, Franklin has suggested that if we had been able to prevent the loss in the sheep population that occurred between 1944 and 1946 our cumulative wool cheques over

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[41] From some points of view, it might be better to look at the situation at the end of the war, that is, before the long run of good seasons, before various domestic price stabilisation schemes were put into effect and before the 1951 wool price boom appeared. The relevant figures are shown in Tables I and II. The net effect of doing this, as might be expected, is generally to reduce the measures of price variability and increase the measures of production variability.

[42] It has to be borne in mind in interpreting these figures that some of the output changes represent genuine supply responses and productivity changes and are not solely fluctuations due to weather.

[43] For the 44-year period the average variation in wheat output was 36.2 per cent. and that in wheat prices 19.7 per cent. The corresponding figures for the years up to 1945-46 were 40.5 per cent. and 22.3 per cent. respectively. The average variation in yield per acre for the 44-year period was 38.1 per cent. and for the 34-year period 43.2 per cent.

[44] There have been a few "prophets crying in the wilderness". For instance, J. G. Crawford in a paper prepared in 1945 did briefly suggest "subsidised crop insurance" as one of the measures necessary to promote farm income stability. See J. G. Crawford, "Agricultural Reconstruction: the General Setting", *Economic Papers* No. 4 (Sydney: Economic Society of Australia and New Zealand, 1945), p. 24.

For many years Sir Earle Page also has consistently advocated, both within the Federal Parliament and outside, that Australian governments should take action to mitigate the untoward effects of droughts and floods on the economy. For his recent observations, see Commonwealth of Australia, *Parliamentary Debates*, Vol. H. of R.16 (1957), pp. 603-5 and *ibid.* Vol. H. of R.19 (1958), pp. 88-92.

[45] E.g. see *Full Employment in Australia, op. cit.*

TABLE I

Frequency Distribution of Year-to-Year Variation in Agricultural Output—Australia—1911-12 to 1955-56

Percentage Change in Production from Preceding Year		Agricultural	Pastoral	Dairying	All Farming
+51 and more		2			
+46 to +50		1			
+41 to +45		3			
+36 to +40		0			
+31 to +35		0			
+26 to +30		1			
+21 to +25		3		2	1
+16 to +20		2	3	3	3
+11 to +15		1	3	1	3
+6 to +10		6	10	8	9
0 to ± 5		4	22	26	20
—6 to —10		7	1	4	6
—11 to —15		4	3		1
—16 to —20		5	2		1
—21 to —25		3			
—26 to —30		0			
—31 to —35		0			
—36 to —40		1			
—41 to —45		0			
—46 to —50		0			
—51 and less		1			
Average Percentage Variation	1911-12 to 1955-56	24.2	7.2	6.1	7.0
	1911-12 to 1945-46	27.3	7.4	6.6	7.2

Source: Commonwealth Bureau of Census and Statistics, *Production Bulletin.*

the succeeding ten years could well have been £600 million higher.[46] Even though the basis of this estimate is open to challenge, it does give some appreciation of the order of the losses involved. The statistics which are coming forward concerning production and trade in the present financial year, when the drought was not as serious as some previous ones, are indication enough that this is a problem of no mean proportions.[47]

If the problem of production instability in agriculture is approached under the broader rubric of national economic stabilisation, responsibility for implementation of appropriate counter measures appears to rest squarely upon the Commonwealth Government.

[46] M. C. Franklin, Presidential Address, *Proceedings of the Australian Society of Animal Production,* Vol. I (1956), p. 12.

[47] E.g. The Minister for Primary Industry reported to the Australian Agricultural Council at its meeting on 13th February that the estimated farm income for 1957-58 was £370m., as against £510m. for 1956-57. Some of the decline, of course, was due to price falls.

TABLE II

Frequency Distribution of Year-to-Year Variation in Agricultural Prices—Australia—1911-12 to 1955-56

Percentage Change in Price from Preceding Year		Agricultural	Pastoral	Dairying	All Farming
+51 and more		1	1		1
+46 to +50		1	1		0
+41 to +45		0	1		0
+36 to +40		1	1		0
+31 to +35		0	2		2
+26 to +30		0	3	2	0
+21 to +25		2	1	3	2
+16 to +20		5	4	3	5
+11 to +15		6	3	4	3
+6 to +10		3	2	9	8
0 to ± 5		11	12	17	12
—6 to —10		5	3	1	7
—11 to —15		6	4	3	1
—16 to —20		0	2	1	1
—21 to —25		1	2	0	1
—26 to —30		1	1	0	1
—31 to —35		1	0	1	
—36 to —40			1		
—41 to —45					
—46 to —50					
—51 and less					
Average Percentage Variation	1911-12 to 1955-56	13.8	17.7	9.6	12.0
	1911-12 to 1945-46	14.1	14.2	9.1	10.5

Source: Commonwealth Bureau of Census and Statistics, *Production Bulletin.*

Even if production variability in the rural industries did not loom so large in the national economic picture, there would still be a strong case for governmental measures to reduce the effect of the vagaries of climate on individual producers.[48] Such a case would rest largely on grounds of economic efficiency—that the farmer could produce more efficiently if some of his production uncertainty were reduced. Such a policy would also assist farmers' developmental plans by facilitating more satisfactory credit arrangements and removing inhibitions to investment.[49] However, as Johnson has pointed out, some difficulty is

[48] In the United States, for instance, agricultural production in the aggregate is relatively stable. See T. W. Schultz, "The Economic Stability of American Agriculture", *Journal of Farm Economics,* Vol. XXIX, No. 4 (November 1947), p. 812.

[49] This is not inconsistent with the hypothesis I advanced at the meeting of this Society last year that if farm incomes are unstable, a higher rate of farm investment may result over time than if the same income were received at a more steady rate. See also S. Caine, "Instability of Primary Product Prices: A Protest and a Proposal", *Economic Journal,* Vol. LXIV, No. 255 (September 1954), p. 612.

associated with any attempt to give such a goal specific content, because some variations in output are due to personal and other causes which are limited in their consequences.[50] In short, complete stability of individual farmers' incomes is impossible to achieve in practice. However, this limitation in no way weakens the case for governmental intervention designed to reduce instability.

If it were necessary to approach the objective of stabilising farm income from this more specifically agricultural standpoint, it might be argued that it would become a job for the state governments in the Australian constitutional context. Leaving aside the stern realities of Commonwealth-State financial relationships, any attempt to approach this problem state by state would be likely to encounter considerable difficulties because of the necessity to plan action and spread risks on a national basis. But such considerations need not detain us, when the monetary and fiscal implications of production instability are so clear-cut.

Emergency "rescue operations" in the form of direct grants to drought-afflicted farmers should in my view be regarded as social security measures. They are not part of agricultural policy in any strict sense of the word. Such measures should perhaps be maintained as a backstop until such time as rather more positive programmes are got under way.

POSSIBLE MEASURES TO REDUCE PRODUCTION INSTABILITY AND ITS EFFECTS

If it be granted that measures to promote production stability in agriculture should have a high priority in Australian agricultural policy, the next question is what form these measures should take. In the present paper, I can do little more than list what I consider are some of the more important possibilities. To devise and adapt detailed schemes to the requirements of the Australian economic and political environment calls for "social engineering" of a high order.

(1) Research

First, one would presume that physical research on the various problems associated with production variability will be continued if not intensified. This should include further work on plant introduction and plant breeding, on rotational and general cultural practices, on drought feeding, as well as more basic studies of the reactions of animals under stress. Intensified research on alternative methods of storing fodder and on alternative types of fodder suitable for storage are clearly necessary.

Many of these matters have economic implications, and therefore it is vital that they be associated with parallel studies on the economic side or be planned initially with that end in view. The assembly of data which would enable farmers to formulate their production decisions in terms of measurable risks is very much needed.[51] To

[50] D. G. Johnson, *Forward Prices for Agriculture* (Chicago: University of Chicago Press, 1947), p. 30.

[51] I refer here to the tables setting forth chances of achieving crops of differing sizes, given various levels of rainfall before planting which are now available for parts of the United States. See "Strategy for Drought", *Fortune*, April 1957, p. 163. Moule in Queensland has assembled some data of a similar nature which are indispensable to intelligent decisions on drought feeding. See G. R. Moule, "Hand-feeding of Sheep in Drought Time", *Queensland Agricultural Journal*, Vol. 68 (1949), pp. 234 *et seq.*, and Queensland Department of Agriculture and Stock, *Drought Cost Comparator*.

ensure that problems of drought and its effects receive adequate attention, particularly in the light of the increasing amount of commodity-oriented research, it might be desirable to set up a special committee (say, one of the technical committees of the Standing Committee) whose sole function would be to stimulate research on problems in this area.

Needless to say, enlightened extension advice on drought mitigation is also vitally necessary. Whatever success attends government action, a substantial degree of risk and uncertainty will always confront the individual farmer. Many farmers need advice on how to "play percentages".

(2) Irrigation

The second long-standing line of attack on the drought problem has been irrigation. In late years, I believe irrigation has come to be regarded primarily as a form of resource development rather than as a form of drought insurance, though, of course, it is both. It needs to be recognised that resource development and technological development are alternative means of achieving increased agricultural production. From a national viewpoint, a rational decision on the relative emphasis to be given to each would depend on some assessment of the economic and social costs of obtaining greater output by these alternative routes. The difficulty is that while the results of irrigation development are more predictable, the scope and potentialities of technical advance are much greater. Even if, as seems likely, cost and efficiency considerations would suggest major emphasis on research activities, irrigation development would still assume an important supplementary role in providing insurance against production uncertainty.

If this is the primary role of irrigation, there is a strong case for some change in the traditional emphasis in irrigation development. There has already been some shift towards the development of farms with limited irrigation rights and the provision of stock and domestic water supply schemes. But this needs to be carried further. We need to encourage spatial diversification of farms.[52] This has been a feature of the pastoral industry for a long time. Its newest manifestation is the development of small irrigated farms on the Western rivers often a hundred miles from the home properties, distance being no great obstacle with modern transport. This pattern of settlement has special merit in the drier districts, where storage of fodder has proved to be physically impossible. To implement such a scheme may require radical changes in plans for irrigation farms and perhaps some modification in the administration of land tenure legislation. It needs to be supplemented by inducements to farmers with access to water to install irrigation equipment.

(3) Storage of Fodder

Given a predominantly range livestock economy in association with a cropping system, where production instability is notoriously high, the commonsense thing to do is to store fodder for adverse seasons. One

[52] This need not necessarily involve irrigated farms.

does not have to go back to the Bible or to the writings of Confucius to see the merits of having an "ever-normal granary".[53]

Immediately one mentions fodder conservation, the first reaction is to say this should be the farmer's responsibility. Many farmers do make adequate provision for storage of fodder. But there are several good reasons why it may not be economic for every farmer to store fodder, despite, in some cases, the existence of concessional credit schemes to encourage him to do so.[54] For instance, it may be physically impossible to maintain stored fodder in good condition. Secondly, the farmer may find it more economic to invest his limited capital in avenues of investment other than feed storage. Or thirdly, his property may be in an area where the climatic risk is so great that it is uneconomic to feed starving stock at any time. In short, this may well be a case where specific action is not economic to the individual, but is economic to the state.[55]

In the circumstances, the establishment of fodder reserves under government sponsorship is essential. The amount of fodder which would need to be stored would be determined by the specific objectives. Presumably a minimum objective would be to prevent the loss of breeding stock in a two or three year drought. Indications are that the costs would not be prohibitive, particularly in the light of the gains to be obtained.[56] Costs would normally be recouped from the eventual users of the fodder.[57]

It is vital to the success of any fodder storage proposal (especially if it includes wheat) that the feed reserve operations be kept completely separate from ordinary marketing operations. This is particularly necessary where two-price schemes for cereals are in vogue.[58] Grain producers, and the general public, tend to become alarmed about possible surpluses, immediately stocks in Australia grow to dimensions which are still far short of the desirable minimum contingency reserves for drought.

(4) Reserves of Storable Products

There also is some case for this country carrying stocks of non-perishable commodities to even up the flow of exports. Australia's

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[53] See Russell Lord, *The Wallaces of Iowa* (Boston: Houghton Mifflin Co., 1947), pp. 233-4, for a description of the genesis of Henry Wallace's concept of the "ever-normal granary".

[54] The N.S.W. Government instituted such a scheme in 1945 through the Rural Bank of N.S.W., but the demand for such credit was extremely limited.

[55] Cf. Bunce's discussion of a similar situation in respect of soil conservation (A. C. Bunce, *Economics of Soil Conservation* (Iowa: Iowa State College Press, 1942), pp. 97-128).

[56] McIntyre has estimated that to store an additional 100 million bushels of wheat would involve initial capital costs of the order of £50 million, and annual charges of £5 million. See A. J. McIntyre, "What are our Fodder Reserves?", *The Living Earth*, Vol. 3, No. 2 (Summer 1957), p. 40.

[57] A decision as to a truly equitable distribution of the costs of stored fodder between livestock feeders, feed producers and the government is not easy. For instance, quarantine regulations complicate matters. The economically rational procedure would probably be not to store fodder, but to import it from surplus areas abroad when it is needed. In so far as domestic storage is instituted and domestic feed producers get higher returns, as a result of adherence to quarantine regulations, there might be some case for the feed users not bearing the full costs.

[58] Recent protests by the Chairman of the Australian Wheat Board that it is not the Board's duty to provide contingency reserves of wheat for either men or beasts have considerable force. See the Wheat Board's press statements of October 28 and November 6, 1957.

strong support for, and recurrent resort to, Article X of the International Wheat Agreement, which provides for the adjustment of quotas in years of short crop, is a measure of the immaturity of our plans to handle production instability. At the same time, public opinion, our incredibly limited storage capacity and our peculiar form of producer-controlled marketing make any alteration in existing procedure rather impracticable in the short run.

From the standpoint of the economy at large, the policy of maintaining some reserves in the London balances is an alternative to a policy of trying to even up the flow of exports and may in fact be cheaper in the long run. But the effect of such a policy on the incomes of farmers and upon other economic variables that are related to farm spending, may be very different.

(5) Reserve Production Capacity

As I have pointed out earlier, the policy of transferring stock between areas, differentially affected by drought, has long been a feature of Australian agriculture. Motor transportation has widened the possibilities in this regard. Improvement of transport facilities and stock routes would assist stock movement in dry times.

Within the past few years, Sherman Johnson of the United States Department of Agriculture has been suggesting that his idea of maintaining a "national contingency reserve" of land resources which could be drawn upon to permit a quick increase of output in periods of national emergency might well be extended to cover drought situations.[59] The nature of the weather systems in this country probably limits the usefulness of such a plan here, but we might plan to encourage conservative stocking and cropping in normal times so that extra carrying capacity could be utilised, or extra crop production could be obtained, in areas not afflicted in time of drought.

(6) Crop Insurance and Other Forms of Insurance

Another important possible sphere of social action is the provision of facilities for crop insurance. Such a scheme makes it possible for the farmer to substitute regular annual premium costs for irregular and unpredictable losses. Though private insurance companies are generally loth to underwrite such insurance, and it is therefore typically government-sponsored, there is no reason why a scheme of this kind should not be self-liquidating. Considerable research is necessary as a background to the introduction of specific insurance. Experience suggests that it is preferable to insure crops on the basis of average district yields rather than on individual farmers' yields.[60] In pastoral areas, it would be possible, as an alternative, to insure for a certain amount of moisture.

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[59] Sherman E. Johnson, "Agriculture's Advancing Productivity", *Proceedings of the National Farm Institute* (Des Moines, Iowa) (1956). Johnson argues that farmers cannot be expected to pay the entire cost of reserve capacity that provides for the unpredictable needs of the entire population.

[60] See H. G. Halcrow, "Actuarial Structures for Crop Insurance", *Journal of Farm Economics*, Vol. XXI, No. 3 (August 1949), pp. 418-443.

(7) More Realistic Farm Sizes

As suggested earlier, the present administrative techniques employed to determine the adequacy of property sizes in areas of uncertain rainfall leave much to be desired. We should aim to build up farms in these areas to a size sufficient to enable the operators to accumulate assets which will enable them to survive recurrent droughts.

(8) Drought Credit

From a strictly economic point of view, there is no reason why a farmer should save before a drought for that eventuality. Consequently there is always likely to be some increase in the demand for credit accommodation in a drought. To provide additional accommodation at such times to some degree runs counter to traditional Australian banking practice, in that a fall in overseas earnings tends to foster a contraction of advances, in the absence of Central Bank intervention. It seems desirable that such extra accommodation should be provided automatically and not be subject to *ad hoc* authorisation by the Treasury, as is largely true of the concessional credit available in New South Wales. Of course, this may turn out to be another area of rural credit where "you can lead a farmer to the credit trough but you can't make him drink". But if some of the other measures I have listed were implemented, reluctance to borrow in a drought emergency may diminish.

(9) Measures to Promote Farm Income Stabilisation

Institutional arrangements of various types to promote income stability in areas of variable rainfall should be encouraged. To some extent traditionally fixed-cost items, such as debt repayments, can be made more flexible by relating them to the size of the income flow. Something can also be done in the field of income taxation. Though, admittedly, the averaging principle has some disadvantages, we should not abandon attempts to devise ways of meeting the special tax problems of the farmer afflicted with a fluctuating income.[61] On the price side, there is some case for relating administered prices to the size of the crop in a particular year.[62] But the administrative and constitutional difficulties inherent in such a scheme probably remove it from the sphere of political practicability.

The foregoing suggestions, like the rest of the paper, have been directed primarily to the possibility of group action. The individual farmer can do a great deal himself to counter production uncertainty, by diversification, by holding monetary and feed reserves, and by maintaining flexibility. There will still be plenty of uncertainty for the individual farmer to handle, no matter what public policy measures are introduced. The most that government can do in this area is to reduce the uncertainties to the limit of human skill. That leaves plenty of scope for public action in Australia.

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[61] See Commonwealth of Australia, Royal Commission on Taxation, *Third Report* (Canberra: Government Printer, 1934), pp. 109-111; D. W. Burch, "Averaging Farm Incomes for Income Tax Purposes", *Agricultural Economics Research,* Vol. III, No. 1 (January 1951), pp. 18-22; and E. Lloyd Barber, *op. cit.*

[62] Cf. D. G. Johnson, *op. cit.,* pp. 224-42.

How to reduce the adverse economic and social effects of year-to-year variations in yields represents one of the major unsolved problems confronting Australian agriculture. This is one of those problems the answers to which must be worked out in terms of our own physical and cultural environment. Here is a challenge calling for ingenuity and creativeness in research.

At the beginning of this paper I referred to Toynbee's observation that the state of its techniques is a measure of the degree of command possessed by a society over its physical environment. If we fail to accept the challenge once again presented by the recent drought, we may continue in our complacency or our fatalism as the case may be, secure in the knowledge that, on Toynbee's analysis, failure to gain command over the physical environment was not a cause of the breakdown of the great civilisations of the past.[63] Whether or not this will be true of our own society, the fact remains that we could, by individual and public action, infinitely strengthen the structure of the Australian economy by bringing the effects of this largely uncontrollable element of our environment reasonably under rein.

[63] Arnold J. Toynbee, *op. cit.*, p. 56.