Abstract

Exceptional Circumstances: Exploring Some New Definitions and Approaches

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Under the National Drought Policy launched in 1992, drought was to be regarded as a normal feature of the operating environment for Australian farmers with an increased emphasis on improved drought preparation and self-reliance. Assistance provisions in the case of 'exceptional' droughts were to remain in place however. Several commentators have questioned the need to single out drought risk for government intervention on the grounds of resource misallocation and that this approach is inconsistent with the 'total' risk management approach now widely advocated by advisers.

In this paper, the results of a whole-farm stochastic budgeting analysis on a NSW and WA farming system are reported. The objective is to provide a perspective on drought as one of several causes of poor financial performance. Results indicate that while drought events lasting several production cycles are a significant contributor to poor performance, they are not exclusively so. Combinations of other factors can be equally significant, lending support to the notion of a whole-farm approach to risk management.

Perhaps it is time to review the basis for the application of exceptional circumstances in farming. A case can be mounted for support in 'business threatening' situations, but it should be approached from a whole-farm perspective with limits on access to support.

Key words: Exceptional circumstances, drought, risk management.

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Exceptional Circumstances: Exploring Some New Definitions and Approaches

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1. Background

In August 1992, the then Minister for Primary Industries and Energy, Mr Simon Crean, announced a new National Drought Policy, agreed between the Commonwealth, State and Territory Ministers for Agriculture. This followed extensive review by the Drought Policy Review Task Force, set up in April 1989 to identify policy options for government in establishing national drought policy (Drought Policy Review Task Force 1990).

The broad thrust of the new policy was a phasing out of transport and fodder subsidies during drought, and an emphasis on self-reliance and better drought preparedness by farmers. The philosophy of this new direction is that climatic variability is a normal feature of the operating environment for Australian agriculture and is just one of many risk factors to be dealt with by farmers (Crean 1992). The policy did, however, provide for government assistance in cases of 'exceptional' drought.

The objectives to be achieved by the new policy include:

- encouraging Australian primary producers to adopt self-reliant approaches to managing climatic variability;
- maintaining and protecting Australia's agricultural and environmental resource base during periods of extreme climate stress; and
- ensuring early recovery of agricultural and rural industries, consistent with long-term sustainable levels of production.

This policy change was in line with the recommendations of the Task Force. It was also consistent with many of the views of economic analysts who had generally argued that drought was one element of risk that had to be managed along with all other risks. To the extent that drought was singled out for special treatment in policy resulted in resource misallocation such as too much investment of resources to farming drought prone areas relative to less drought prone areas, and too little attention being paid to managing drought risk relative to other risk where there was less policy intervention and the equity of a special policy for agriculture relative to other industries exposed to similar risks but without such assistance measures (Freebairn 1994, Kraft and Piggott 1989, Simmons 1993).

The new policy included three other elements. First, State Governments were able to continue to offer drought assistance in the form of drought subsidies for the movement of

fodder, water and stock. The change meant that the states would not receive any Commonwealth assistance for these subsidies. Since the change, the Eastern Australian states have provided this form of subsidy during drought in the early 1990s.
Second, under the Rural Adjustment Scheme (RAS) additional assistance to farmers could be provided under the 'exceptional circumstances' provisions. These guidelines include defined situations of drought which indicate regions where farmers are eligible to apply for assistance under RAS. That assistance is mainly in the form of subsidies on interest paid on borrowings, to farmers who meet the eligibility criteria for support, essentially that the farm business can be viable in the medium term.

Third, there has been some further refinement of the range of taxation arrangements for drought affected farmers including some adjustments to the provisions encouraging farmers to establish cash reserves as part of their preparedness for drought and other risks.

In summary, the changes to drought policy have been part of the general evolution of farm support policy seeking new ways of encouraging better farm management in general and risk management in particular. Those changes can be evaluated both through experience gained in drought and through analysis of how the policies are likely to impact on farm financial outcomes. The work reported here is part of that evolution which should also provide information to farmers on how best to develop their own risk management strategies. It builds on work from a LWRRDC/RIRDC funded project on the analysis of the farm financial impacts of alternative drought management strategies.

Not all commentators agree with the changes (see Johnson 1992). Further, the policies were not analysed in the way this work allows during their formulation. At that stage the models and methods were still being developed although Farrell (1977) had indicated that rural farm models might be especially useful for this purpose. It is also likely that insufficient time was allowed for farmers to adapt their business structures and strategies to the change in policy. This became apparent as the policy change almost coincided with the beginning of perhaps the worst drought this century in North Eastern Australia.

In this work, the financial and risk implications of alternative drought preparedness strategies are investigated against the background of the 'total risk' faced by farmers. The analysis is based on selected regional studies using a whole-farm model which includes analysis of risk and a full financial specification including the current taxation provisions. All of the analyses have been carried out in consultation with a reference group of local farmers and their advisers.

In section 2 of this paper, the concept of exceptional circumstances is explained and questions are posed about the desirability of the policy. Section 3 provides some background on the RISKFARM model which was the analytical tool used in the study. Modelling results are presented in section 4 to demonstrate the impact of key risks on two farming systems. In section 5 some alternative methods of assessing exceptional circumstance arrangements for farm businesses are suggested.

2. Exceptional circumstances and risk management

Under government current policy, 'exceptional circumstances' assistance has been available to farmers under conditions of severe drought, flood or wool price reduction. With reference to severe drought, once an area has been officially declared to be experiencing 'exceptional drought', the forms of assistance available include:

- Drought relief payments of up to $14,000 per year for basic farm family needs (subject to the same eligibility tests as the Jobsearch allowance).

- Interest subsidies on new or existing loans up to a maximum of $100,000 per year and $300,000 over five years.

- Austudy financial assistance for full-time students over 16, exempt from the normal asset and income tests (NSW Agriculture 1995).

The assessment of conditions upon which exceptional drought declarations are made include:

- Meteorological conditions.

- Agronomic and livestock conditions.

- Environmental and natural resource conditions.

- Scale of the drought.

- Effects on farm income (NSW Agriculture 1995).

A fundamental question arising from the exceptional circumstances concept and which relates to risk management in general is 'why target only certain forms of farm risk such as drought'? This question has been discussed before (e.g. Kraft and Piggott 1989, Simmons 1993), and leads into the territory of considering risk management in a holistic manner and the concept of a farm risk profile which identifies key risks in the farming system as a step toward formulating the most cost-effective risk management strategy.

Moreover, it is not simply the catastrophic 'one-off' events which require attention, but the possibility of a coincidence of events, such as occurred in 1995 when drought, frosts, mice and locusts all affected crop production in Northern NSW in the one season. Although this was probably a rare occurrence, it is more likely that low prices and poor seasons will occur together causing similar results.

The non-uniqueness of climate variability - of which drought is one state - in terms of it simply being one of many contributors to the risk profile of farm businesses, raises several policy issues related to the provision of rural assistance.

- The rural assistance regime in Australia currently provides direct financial support in the event of poor climatic conditions but not for adverse events in all other areas of risk. If assistance is provided to manage climate uncertainty then why not the other sources of risk also? And, if not for the others, why for climate uncertainty? There is no obvious rationale for this inconsistency in government policy.

- Even if drought can be shown to be the major risk facing primary producers, special provisions for assistance when it occurs must be open to question. Such provisions do not reduce the risk, but merely alter who bears the risk and its costs (this was also raised by Simmons 1993). In fact, the overall cost of risk borne by the community is increased by such schemes, due to efficiency loses in the economy as a whole in raising taxation revenues to subsidise farmers. In any case the results reported in this work reveal that drought - or, more strictly, climate variability - is only one of many sources of risk to farmers. Further investigation is required to determine its contribution to total risk relative to the contributions of other sources of risk.

- Despite political rhetoric regarding its impermanence, the now long-term existence of publicly-funded drought assistance has engendered high expectations amongst farmers about its on-going availability. This raises the issue of the magnitude of the disincentive this assistance may have provided to the development and implementation of private climate risk management options. That is, access to the assistance regime may have been the resort of farmers who would otherwise have adopted private management strategies to cope with more extreme climatic events. Moreover, assistance of this form may give rise to inequitable outcomes in that those who have born the cost of taking action on a private basis and are hence more self-reliant in adverse circumstances, may not qualify for equivalent assistance to that accessed by less independent farmers.

- Fundamentally, it would seem to be preferable to avoid forms of intervention that impact directly on the risk environment of farm businesses and hence have the potential to reduce risk management activity on a private basis and hence to interfere with the process of development of market-based, risk management products. Efficient markets will also provide any necessary premiums for risky activities through higher returns and adjustment of asset values. As advocated by commentators such as Milham and Davenport (1995), a more appropriate approach may be to limit public financial assistance to addressing the welfare needs of farm families rather than attempting to (partially) address the cause of the problem. Given that the operating environment of farmers is changing with the removal of regulatory protection, it may however be appropriate to provide temporary, adjustment assistance in the form of education and training in risk management.

There appear to be a number of inconsistencies between a holistic view of risk management, and the technical event focus which applies to the current exceptional circumstances provisions. The 'lines on maps' approach of declaring areas which warrant

assistance may appear inequitable to farmers who have made a genuine investment in drought preparedness or who happen to be on the 'wrong side of the line'. Moreover, as the results of this work demonstrate, there are events other than those covered by exceptional drought which produce very unfavourable financial outcomes, are beyond the farm managers control, and may threaten the survival of otherwise viable farm businesses.

3. Using the RISKFARM model to examine sources of farm risk

Farrell (1977) has made the point that much policy-oriented research is partial in nature in that it does not estimate the full impacts of policy instruments. Moreover, such research may not account for differential impacts among regions. The approach taken in this work was to adapt the generic whole-farm stochastic budgeting model, RISKFARM, to capture the essential elements of several different farming systems in NSW and WA.

Whole-farm stochastic budgeting involves developing a model that mimics the operation of the business and can simulate financial performance while taking account of the uncertainty inherent in many aspects of the farm business. Applied stochastic budgeting for a farm business thus requires an analytical tool that encompasses financial analysis and enables an assessment of how the level of returns and risk are influenced by alternative production and finance strategies. An appropriate model for this purpose is a computerised simulation model with the capacity to utilise probabilistic information - RISKFARM is a model of this nature which combines the @RISK software with a spreadsheet.

The stochastic variables in the general version of RISKFARM include commodity prices, crop and wool yields, livestock weaning and mortality rates, farm costs, and investment and loan interest rates. The modified regional versions of RISKFARM developed during the course of the Drought Strategies Project also include a probabilistic climate variable to which yield outcomes are correlated. This index was based on historical rainfall data available through the AUSTRALIAN RAINMAN software (Clewett *et al.* 1994).

Common drought management responses elicited from local farmer consensus groups were then added to the model. Thus, uncertainty in farm production and commodity and financial markets can be accounted for in some detail. In addition to assessing the performance of alternative drought preparedness strategies, this also provided the scope for examining the relative importance of climatic risk on farm financial performance, as opposed to other sources of risk.

In terms of an holistic approach to examining risk, the RISKFARM model does not include many of the more personal risk elements such as legal and social risk. Rather, the focus is on risk factors which are generic to most farming systems, but with the capacity for the specification to be modified to reflect the nature of the specific farming system under investigation.

The interactions between risk variables are also difficult to mimic in a model such as RISKFARM. The estimation of the parameters of the probability distributions for the stochastic variables and their correlations is partially empirically based and partially based on elicited subjective expectations. Costs and interest rates are related to macro-level variables - the ABARE index of commodity prices received and the top prime rate on overdrafts – through regression equations. These equations are then used in conjunction with user estimates of future movements in these variables to produce probabilistic estimates.

Yield parameters for both livestock and cropping activities are correlated through the climate indexes added to the regional models. In general, yields and prices were not correlated, though there were some exceptions (e.g. in the central west of NSW, wheat prices and yields were correlated to reflect the fact that low yields associated with low rainfall tend to produce high protein grains which attract higher prices).

While undertaking this work and in discussing it with others, it is apparent that in developing appropriate risk profiles, the correlations among many variables is a critical issue. Much more work is needed to develop low cost ways of determining these correlations for local areas. For the present, those outlined above have passed a form of reasonableness test based on analysis of data and the opinions of the farm focus groups.

A final feature of the RISKFARM model is its detailed treatment of farm taxation issues. Basic income tax, provisional tax, the Medicare levy, income averaging, income equalisation deposits/farm management bonds (IED/FMBs) and livestock election provisions during forced sale are all captured in the modelling framework. In addition to physical drought management responses, this allowed an investigation of the impact of taxation instruments as a method for dealing with climatic (and other forms) of uncertainty (see Thompson *et al.* 1996)

The focus of the work reported here relates to the events which produce poor farm financial performance and could be regarded as conditions where 'exceptional circumstance' intervention may be necessary. This is done in the context of a broader consideration of the risk factors impacting upon farm performance.

The following analysis is not necessarily ideal for the task in hand. The model as developed is for medium-term strategy assessment over a four year period. It would be better to be able to simulate over much longer terms in a recursive fashion. More farming systems could be evaluated. There is potential for the development of 'risk profiles' for various farming systems and regions in a general context of benchmarking. RISKFARM could be used for that purpose but there would need to be further development of the model and analytical structure required to do that. If that were done, then it would be suitable as an element in the discussion of the issues raised in this paper.

4. Some modelling results

The structure of the regional RISKFARM models allows individual model iteration data (each iteration being a five year time frame consisting of one deterministic year and four stochastic years) to be extracted. Consequently, the frequency with which uncertain model variables take on particular values can be analysed and related to the financial performance of the farm business. This provides an indication of how the key risks modelled in the system affect financial performance.

In Table 1, the impact of 'drought events' on a mixed sheep/beef Northern Tablelands farming system are presented. In this context, a 'drought event' in any one year consists of a period of minimal rainfall (below 30mm per month), which lasts two months or more. The model is structured such that as the length of the dry spell increases from two months to beyond six months duration, progressive destocking and supplementary feeding take place.

Table 1. Impact of drought on farm financial performance - Northern Tablelands

Net Cash Position ranking	Incidence of total drought events in NCP ranking (%)	Incidence of drought events (%)				
		0 drought events in 4 years	1 drought events in 4 years	2 drought events in 4 years	3 drought events in 4 years	Drought events requiring heavy de-stocking[a]
Column No. (1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
0 - 5%	10.1	2.4	7.4	11.1	50.0	19.1
5 - 10%	6.8	3.9	6.6	5.6	0.0	14.6
10 - 15%	8.0	3.0	6.3	11.1	0.0	8.8
15 - 20%	6.8	3.6	6.3	7.4	0.0	9.0
20 - 25%	4.6	5.4	4.2	5.6	0.0	3.4
25 - 30%	5.8	4.5	5.3	7.0	0.0	5.6
30 - 35%	7.3	3.3	7.3	5.6	25.0	7.9
35 - 40%	3.4	6.0	3.4	3.7	0.0	3.4
40 - 45%	4.3	5.4	4.9	3.7	0.0	5.6
45 - 50%	3.7	5.7	4.9	1.9	0.0	7.9
50 - 55%	6.4	3.6	6.8	7.4	0.0	3.4
55 - 60%	4.0	5.7	4.4	3.7	0.0	5.6
60 - 65%	3.7	6.3	3.2	5.6	0.0	2.2
65 - 70%	3.4	6.3	3.4	3.7	0.0	3.4
70 - 75%	2.1	6.9	3.4	0.0	0.0	3.4
75 - 80%	4.3	5.7	3.9	5.6	0.0	2.2
80 - 85%	5.0	4.8	4.9	5.6	25.0	2.2
85 - 90%	4.3	5.5	4.9	3.7	0.0	2.2
90 - 95%	3.4	5.9	5.3	0.0	0.0	1.1
95 - 100%	2.8	6.6	3.4	1.9	0.0	1.1
Totals	**100**	**100**	**100**	**100**	**100**	**100**

a. These are drought events where the entire wether flock and part of the breeding flock are sold, the remaining sheep being fed.

Table 1 should be interpreted as follows. The row labelled '0 - 5%' shows the incidence of various drought events for the worst 5 per cent of Net Cash Position (NCP) results. NCP is the accumulated cash surplus or deficit in the bank following five years of farm operation. It is a reflection of total farm income less all farm costs including variable and overhead, financial, personal and taxation costs.

Looking along this row, the column (2) shows that 10.1 per cent of all drought events (i.e. of any length) occurred in the worst 5 per cent of NCP outcomes. Column (3) shows that for all the model runs where there were no drought events over the four year period, 2.4 per cent of those model runs resulted in an NCP ranking in the worst 5 per cent of outcomes. Similarly, in column (6) of Table 1, for all of the model runs where three of the four years contained a drought event, 50 per cent of those resulted in an NCP outcome in the worst ranking (0-5%). Column (7) shows the incidence of at least one severe drought event in the four year timeframe.

Some interesting features emerge from this analysis. Although there is some correlation between the occurrence of drought and net cash performance, poor financial outcomes are still experienced in the absence of drought (column (3) of Table 1). This indicates that other risk factors are having a significant impact on the system. Moreover, an analysis of the severity of the drought events represented in the model indicates that poor financial performance is more closely associated with the presence of one or more longer drought events during the model timeframe, than the incidence of less severe events. This is largely a result of heavy destocking, which takes several years to recover from.

It is also notable that a good financial performance ranking is attainable with two drought years, column (5) and in one instance, an 80-85% NCP ranking was achieved with three drought events in four years. However, three drought events took place just four times over 60' model runs and there were no instances where four consecutive drought years occurred.

A similar analysis was performed for a mixed sheep/cropping system in the Merredin region of WA (Table 2). This table should be interpreted in the same manner as Table 1, however the definition of season type was different from that for the Northern Tablelands model, since nine discrete season types related to the timing and amount of rainfall have been used based on information from the MUDAS model (Kingwell *et al.* 1991).

In this case, the correlation between season type and financial performance was also evident, but as only one of the nine season types was severe enough to be regarded as a drought event, a run of poor season types where the pattern of rainfall was unfavourable for higher levels of cropping and pasture growth was also strongly related to poor financial outcomes. In 66 per cent of the worst ranked NCP performances, there was at least one season type 9 drought event over the four year model period. In addition, three or four poor seasons in a row usually caused the NCP to fall into the lower rankings.

There were no instances in the worst 20 per cent of NCP results where no poor seasons occurred, however performance could fall to this level with just one poor season again indicating that other risk factors in the system are important. Financial performance at Merredin appears to be closely linked to season type, a reflection of the large component of total farm income derived from cropping relative to livestock. Crop areas sown, yields and input costs are responsive to a range of season types at Merredin. In contrast, wool yields and livestock numbers in the Northern Tablelands only change dramatically under drought type conditions.

Table 2. Impact of season type on farm financial performance - Merredin

Net Cash Position ranking	Incidence of total poor seasons[a] in NCP ranking (%)	Incidence of poor season length (%)				
		0 poor seasons in 4 years	1 poor season in 4 years	2 poor seasons in 4 years	3 poor seasons in 4 years	4 poor seasons in 4 years
Column No. (1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
0 - 5%	8.7	0.0	0.0	0.0	6.2	50.0
5 - 10%	7.9	0.0	0.0	0.8	9.9	30.0
10 - 15%	7.2	0.0	0.8	0.8	13.6	12.5
15 - 20%	6.3	0.0	0.8	4.0	10.5	5.0
20 - 25%	6.1	0.0	0.8	4.4	10.5	2.5
25 - 30%	5.9	0.0	0.0	6.0	9.3	0.0
30 - 35%	5.9	0.0	0.8	5.2	9.9	0.0
35 - 40%	5.6	0.0	1.6	6.0	8.0	0.0
40 - 45%	5.5	0.0	0.8	7.2	6.8	0.0
45 - 50%	4.7	0.0	5.6	6.4	4.3	0.0
50 - 55%	4.9	0.0	3.2	8.0	3.7	0.0
55 - 60%	4.6	0.0	4.8	8.0	2.5	0.0
60 - 65%	4.5	0.0	4.0	9.2	1.2	0.0
65 - 70%	4.3	0.0	5.6	8.4	1.2	0.0
70 - 75%	3.7	8.7	8.7	6.0	1.2	0.0
75 - 80%	3.6	0.0	11.1	6.4	0.0	0.0
80 - 85%	3.5	8.7	10.3	5.2	1.2	0.0
85 - 90%	2.8	13.0	15.1	3.2	0.0	0.0
90 - 95%	2.4	30.4	11.9	3.2	0.0	0.0
95 - 100%	1.9	39.1	14.3	1.2	0.0	0.0
Totals	**100**	**100**	**100**	**100**	**100**	**100**

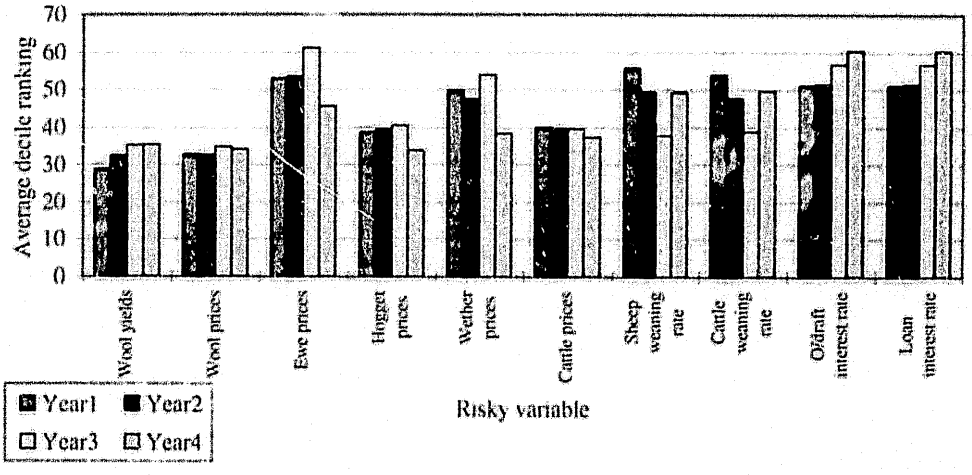
a. In the Merredin version of RISKFARM, the climate index is classified into 9 discrete season types, based on probability information from the MUDAS model (Kingwell *et al.* 1991). Only one of those season types, season 9 can be regarded as a drought.

Figure 1 provides an insight into the factors other than drought which may cause very poor net cash performance in the Northern Tablelands system. In Figure 1, the worst 5 per cent of net cash outcomes have been isolated, and the performance of key risky variables analysed in terms of where (on average) they rank for each of the four stochastic model years. In this analysis, the chance of a drought occurring has been eliminated from the simulation, to gauge the importance of other risk factors.

A low decile ranking indicates below average performance which for most variables leads to poor financial outcomes. The exception is interest rates, where a below average result is desirable. From Figure 1, it appears that wool yields and prices were always below the 40 percentile and often around the 30 percentile. Hogget and cattle prices also ranked consistently below the 40 percentile. In terms of farm income, wool is the major contributor, followed by cattle sales and their low decile rankings in the worst 5 per cent of financial outcomes indicates that they are key contributors to poor financial performance.

The other risky variables tended to be closer to their mean values around the 50 percentile. This again emphasises the point that risks other than drought are important. Indeed, even in the absence of drought, the worst 5 per cent of five year NCP performances averaged -$248 400 while where there was also the chance of drought events occurring, this figure declined to -$292 800. This result indicates that circumstances other than drought can be business threatening and therefore may warrant consideration as exceptional events.

Figure 1. *Factors contributing to poor net cash performance - Northern Tablelands*



The results for the Merredin and Northern Tablelands farming systems indicate the following:

- Circumstances other than prolonged drought may have severe financial impacts.
- There are considerable differences in the risk profiles, the relative importance of risk elements and their impact on farm financial outcomes among regions. Further, the worst outcomes are likely to be combinations of unfavourable events rather that being due to a single cause.

- The differences make it extremely difficult if not impossible to develop some equitable definition of exceptional circumstances based on physical attributes. This point has been made previously by Goucher (1989) and Smith (1989) and it is apparent in this drought work (Thompson *et al.* 1996). It confirms many of the operational difficulties that have been noted in relation to the recent drought.

- If the thrust of policy is to assist businesses that are threatened (as distinct from other objectives such as maintaining the environment and production capacity) then it is clear that a holistic approach to the policy should be taken which allows for all of the sources of risk and the possibility that they may occur in any number of combinations and sequences.

- There is a possibility that with some refinement and careful restructuring of the RISKFARM model, it would be possible to develop risk profiles for a range of farming systems taking into account those that are associated with the farming system (other personal, social and legal risks being left aside for the moment). These could begin to form the basis of a set of risk benchmarks which are likely to be valuable for many in the finance sector and for better informing the land market.

5. Exceptional Circumstances

These comments are offered in the general context of the evolution of disaster relief arrangements. They are preliminary in nature, recognising that there is usually a long lead time in developing new arrangements. In particular, the comments are made to address the issues of the less than holistic approach to the assessments, the arbitrariness of defining geographic boundaries for eligibility and the potential to develop better application/assessment procedures.

There seems to be general agreement about the need to improve the access of farmers, and indeed any self-employed people, to the range of welfare provisions to assist those in need. There is much less agreement on whether assistance should be provided at times to businesses in trouble. Where the problems arise from poor business management, or from situations where management could be reasonably expected to take some precautionary action, it seems that there is no real case for assistance.

However, there are likely to be some circumstances where assistance might be justified as it is a threat to the continued existence of a business or businesses. This could be the result of any of the following situations.

- A combination of relatively unlikely events occurring in a short period of time. Even though each of the events might individually be able to be protected against in a reasonable and cost effective way, the combination may not be. Although our simulations using RISKFARM are not ideal, what is apparent is that most of the worst outcomes for farms are the result of a number of causes occurring simultaneously or in a sequence that have a cumulative effect on the business. As an example, the past

season has seen some farmers experience drought, frost damage, and mice damage all in one season.

- The severity of an event may be a factor that is threatening. This brings the distinction between events that can be prepared for, say a drought that impacts on production in up to two production cycles relative to conditions that affect up to six successive production cycles as has occurred in some areas in recent years.

- The events may impact on a particular locality in a way that is likely to threaten the fabric of the local economy. This is often a feature of rural economies where there is a high degree of specialisation in particular industries (often agriculture) relative to urban economies. Thus, the impact will be widely spread across businesses in the local area. In some respects, that might be more of a 'money or cash-flow drought' in that local area, that is not replaced adequately by compensating financial flows (for an example based on the Gwydir Valley, see Powell 1995).

- A related case is where a business(es) is a key element in that local economy structure. If that business fails, there are likely to be significant effects 'external' to that business. Instances along these lines in the past have been associated with agricultural processing plants which service large numbers of producers, and similar examples exist with major manufacturing operations in urban areas where assistance has been provided under various 'industry plans'.

Within the farm context, it would appear to be possible to develop an alternative approach to providing assistance. The characteristics of the approach could involve the following:

- That it is based on a whole farm financial performance analysis.

- That it is not specific to any particular defined event but allows for combinations of events. Those events would be of the type generic to the industry rather than those of a personal or social type (death, divorce or due to other non-industry misfortunes arising from gambling or from changes to the law or from changing social preferences).

- That the case for assistance has to be made by the farmer - it is up to the farmer to argue that the situation is not due to factors that could reasonably have been managed in the normal course of the business.

- A set of guidelines, or benchmarks would need to be established against which the application would need to be prepared. The guidelines might include information on yields, market prices, financial structure and risk management strategies and decisions.

- The above would be requirements additional to those currently employed under the RAS such as a plan for recovery which demonstrates how the assistance would fit into

that plan, that the business would return to profitability and could service both personal and financial commitments.

- The form of assistance could also be based on the current measures used within the RAS program, namely, subsidies on finance, but might also include the assistance in building skills and management capacity.

To provide for the program, governments would have the possibility of regulating the frequency of events that will be serviced by the program (see Goucher 1989). For example, exceptional circumstances might be defined as those that occur no more frequently than (say) one in twenty, or thirty (this variable could be subject to adjustment by policy makers). The government would make provisions for the program by setting aside an estimated amount each year for this purpose and surpluses/deficits would be carried forward.

Any applicant would only be able to obtain such assistance once in twenty years. This will create a number of issues to be resolved related to the prevention of its exploitation through changes in ownership and business structures.

Consideration would need to be given to the scope of the activities covered by the program. For example, for somebody with off-farm investments, the program may be defined to relate only to the farming activities independent of any off-farm investments. This issue would need to be considered in the context that it not act as a disincentive to the development of more robust business structures through various types of off-farm activities.

An issue of perhaps more importance is the extent to which assistance might be available under these guidelines to non-farm rural (and even urban) businesses. There is evidence that exceptional event effects extend across most areas of business (see Kraft and Piggott 1989) - a point recognised in NSW where some modest assistance was made available to assist non-farm businesses plan their way through and out of the drought. Some anecdotal evidence also suggests that farmers often have more drought management options available to them than many non-farm businesses. Clearly, there is a basis for extending this type of assistance across all industries and that should be explored further.

6. Conclusion

The issues raised in this paper arise from work related to the investigation of the range of strategies that are available to farmers that will allow them to cope better with climate variability. Although the focus was climate variability, the work has been undertaken in a whole farm context where all risks related to farming operations are considered.

As a sideline through the recent drought were a number of concerns (mostly raised previously) about drought assistance and the way it is handled, especially the exceptional circumstances provisions. It became obvious that the single event, physical definitions

employed were not consistent with current thinking about a whole farm approach to risk management, nor was it likely to lead to equitable or efficient definitions of eligibility given the diversity of farming systems and risk profiles.

That prompted us to consider what pointers were provided by our research that may contribute to discussion of these policy issues. While we acknowledge that there are many who do not believe that assistance should go any further than welfare assistance, the fact remains that there has been various forms of industry assistance, both agricultural and non-agricultural, in variously defined 'exceptional circumstances'. We happen to believe that the structure of rural economies and financing policies will occasionally mean that those regions will 'fall into a hole' where some additional assistance is likely to have high payoffs in keeping the productive fabric of those economies together. Further, events of this magnitude may only occur about once every twenty years.

Our modelling, while not exactly suited to the task, has been able to provide some insights into the nature of those rare events and their effects. It provides some expectation that further modelling might fulfil the promise (noted by Farrell 1977) of being useful in the development and planning of new or modified policies. Some suggestions have been made in relation to the operation of exceptional circumstances provisions. It might also assist in the operation of risk and land markets through the development of benchmark 'risk profiles'.

There would appear to be much more work to do, especially in the development of some refinements to the approach to exceptional circumstances and in developing risk profiles as suggested in this paper. Maybe the outcome will be another step in the continuous process of policy refinement and our understanding of risk.

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the Nam Pong river in Khon Kaen province in Northeastern Thailand. First, an accidental leakage of a molasses tank of a sugar factory in 1992 led to the death of the fish population in the river, and made the water unsuitable for human consumption for months. In 1993, effluents including organic and inorganic pollutants such as dioxin from a pulp and paper factory were discharged into a freshwater pond and have affected the local communities who use this pond. The public outcry, especially from the affected communities, led to the closure of the factory for 36 days.

Unlike water allocation, the command-and-control rules regarding water quality are quite clear. However, the manpower available for monitoring water quality and effluent discharge is limited, and enforcement of the regulations is haphazard at best. Overcoming these obstacles will require more participation from the public. Recent changes in the law allow private groups such as NGOs to take legal action against polluters. As the demand for cleaner water rises, there will be stronger demand for enforcement of regulations from the general public, especially if the government is responsive to such participation.

4. WATER PRICING IN THAILAND

In the rainy season, there is no water shortage and allocation of water is rarely a problem. In the dry season when the stock of water is down, open and free access to water accentuates the allocation problem. In Thailand, those who are closer to the water resources can generally draw as much water as required even from the irrigation system. Although the existing State Irrigation Act allows for the pricing of the irrigation water, the fixed ceiling price of 0.50 baht (approximately 2 US cents) per cubic meter is considerably below the cost of operating the system. Water supplied to farmers is free of charge. The RID collects only a small sum of fees from a handful of large users amounting to about 10 million baht (approx. US$ 400,000).

Underpriced water undoubtedly leads to inefficient use. Water tends to be overly used to substitute other relatively highly priced inputs such as land improvement and soil conservation, leading to water logging, salinization and alkalization. According to the Food and Agriculture Organization, about 50 percent of irrigated lands in developing countries are affected from salinization, alkalization and water logging (cited in Panayotou 1993, pp. 11). For industries and urban consumers, cheap water induces overuse, which unduly raises the cost of wastewater treatment.

Water pollution from the discharge of residential and industrial effluent into public waterways is an example of the "externality" type of market failure. In this situation, the economic activities of polluters affect other individuals who derive no benefits from those activities. Moreover, if the number of polluters is large, it is increasingly difficult and costly for individuals to identify the culprits and estimate the degree of damage created by each polluter. Therefore, the incentives for the affected to unilaterally guard their interest decrease while the costs of organization of the affected parties increase.

When the market fails to function efficiently, there is a role for the State to play. The State may intervene by way of direct regulation, for example, by requiring polluters to set up treatment facilities and observe effluent standards. It can use economic instruments