



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

RISK MANAGEMENT STRATEGIES BY AUSTRALIAN FARMERS

Nam Nguyen¹
Malcolm Wegener²
Iean Russell³
Donald Cameron⁴
David Coventry⁵
Ian Cooper⁶

ABSTRACT

Australian farmers operate in one of the most risky environment in the world. They have to cope with various sources of risk in their businesses. This paper reports results of two case studies undertaken to examine the issues of farming risks and risk management strategies in Australia.

The first case study found that climate variability, financial risk, marketing risk, and personal risk were regarded as the major sources of farming risk in the Upper Eyre Peninsula of South Australia. The main management strategies used by farmers included diversifying varieties, minimising tillage, minimising area of risky crops and maximising area of the least-risky crop, having high equity, having farm management deposits and other off-farm investments, and “leaving marketing to experts”.

The second case study revealed that climate variability was ranked as the most important source of farming risk in southwest Queensland. This was then followed by financial risks, government policy, and marketing risks. The main management strategies used were enterprise diversification (having predominantly cattle and farming cash crops), conserving moisture, using zero till planting, diversified sales (selling only part of the farm’s production at any one time), and having off-farm investments.

The paper then attempts to reconcile the two case studies by comparing the results with studies from the United States of America, Canada, Netherlands, and New Zealand.

Key words: risk, risk management, strategies, farmers, Australia

INTRODUCTION

The Chinese maxim says: ‘Plans are man’s, but the odds are God’s’. We live in a world of

¹Lecturer in the Faculty of Agricultural Economics and Rural Development at the National Economics University, Vietnam. He holds a Master degree from The University of Adelaide, and is currently a PhD student at The University of Queensland. Research interests are in decision making and risk management. (e-mail: n.nguyen@uq.edu.au)

²Ph.D., senior Lecturer in Agricultural Economics in the School of Natural and Rural Systems Management at The University of Queensland. His research experience covers farm management and production economics, mathematical programming, crop modelling, decision making under uncertainty, evaluation of research, impact assessment, sugar and dairy industries. (e-mail: wegener.malcolm@uq.edu.au)

³Lecturer in Resource Economics in the School of Natural and Rural Systems Management at The University of Queensland, Gatton. His research interests centre on aid delivery issues, participatory methods, action research and qualitative methodologies, farmers’ decision making and risk attitudes. (e-mail: irussell@uq.edu.au)

⁴Ph.D., research Postgraduate Co-ordinator and Senior Lecturer in Rural Management in the School of Natural & Rural Systems Management at The University of Queensland, Gatton. His research interests are focused on business management and decision making and the intrinsic and extrinsic factors that affect it. (e-mail: dcameron@uqg.uq.edu.au)

⁵Professor in the School of Earth and Environmental Sciences at The University of Adelaide, Roseworthy. His research interests focus on crop agronomy, sustainable agricultural systems, soil acidity, rhizobial ecology, resource use efficiency, and tillage systems. (e-mail: david.coventry@adelaide.edu.au)

⁶Senior Lecturer in Farm Management in the School of Earth and Environmental Sciences at The University of Adelaide, Roseworthy. Research interests include farm business management, use of computers in rural businesses, online rural education, and economic evaluation of on farm research projects. (e-mail: ian.cooper@adelaide.edu.au)



uncertainty. We always try to make our plans with great consideration and anticipation of all likely events happening. However, we still face risk regularly (Nguyen, 2002).

Eminent economist and Nobel Prize winner, Joseph Stiglitz, said: 'Risk is like love; we all know what it is, but we don't know how to define it'. Giles and Stansfield (1990) argued that agreeing on definitions of any subject could be a hair-splitting and time-consuming business. It usually requires compromises by everybody involved and often produces results that please nobody. Defining risk is no exception. In this paper, we adopt the simple definition used by Krause (1995) as risk being the estimated measure, or probability, of something happening.

Whatever the definition of risk might be, it is important to remember that risk is an inevitable part of life, and most certainly of farming life. Generations of Australian farmers have lived with risk since agriculture first began here in this continent. In fact, Australian farmers operate in one of the most risky environments in the world. They farm an island continent where the climatic inputs to production are variable and unreliable when compared to many of their competitors. For example, the 2002 drought, the worst in recorded history in Australia, has had a major impact on farmers and the wider Australian community. The drought is reported to have cut farm incomes by 58 percent in 2003-04 (Potter, 2003). In addition to climatic variability, up to 80 percent of some Australian agricultural products are destined for international markets (Clark & Brinkley, 2001), where prices fluctuate widely for a number of reasons. The variability and uncertainty associated with these two risks (climate variability and price fluctuations), in addition to other risks that farmers face (e.g. financial and institutional risks) establish the basic business environment in which Australian farmers form judgments, plan strategies, and position their businesses to capture the benefits of future scenarios.

There is an extensive literature on risk and risk management in general as well as in agriculture in particular. The strategies to manage price and marketing risks in agriculture have been spelled out in many recent publications, for example, Duncan et al. (1991), Cooke (1997), Williams and Schroder (1999), Meuwissen (2001), and Wilson and Wagner (2002). Similarly, strategies related to agricultural production risk management have been discussed in various publications, e.g. Gaynor (1998), Robinson (1999), Truscott and Egan (2000), Hancock et al. (2002), and Marra et al. (2003).

Nevertheless, little prior work has been done to examine the sources of risk, practical risk management strategies employed by farmers or their interests and attitudes towards risk management. Accordingly, the two case studies reported in this paper will seek firstly to determine the potential for farmers to manage the various risks affecting their farm management and secondly to formulate a plan of action to improve their risk management strategies. Thus sources of risk, current strategies, interests and attitudes of farmers towards risk management will be identified and investigated. Once these are better understood, the feasibility of a risk management improvement program for farmers will be determined.

The South Australia Case Study: Farming risks in the Upper Eyre Peninsula (UEP)

Eyre Peninsula has a long history as a significant contributor to the South Australian State's economy from its agricultural production, but it is also recognised as a region of high agricultural risk. Many publications have been written on agricultural risk and risk management in this region, e.g. Whetherby et al. (1983), Hughes et al. (1990), Coventry et al. (1998), and Black (2000). However, most of these publications were focused on one type of risk only (e.g., climatic risk, land degradation risk, financial risk). Therefore, the case study reported here was carried out to highlight ways that farmers manage the major types of risk in the Eyre Peninsula (especially farmers in the UEP, which has low and variable rainfall, difficult soils, and restricted cropping options).

The study involved a review of the major sources of farming risk (production, financial, marketing, policy, and personal risks) identified in the Cropping 2000 survey (undertaken by Jay Cummins, supported through PIRSA⁷ and a GRDC⁸ Research Fellowship). These data were used to gain an overview of UEP farmers' characteristics and their relation to risk management. The study then analysed risk management strategies which were applicable to farm businesses in the UEP. To add a "reality-check" to the analysis, a selective interview approach was undertaken to provide more specific information on risk management by UEP farmers.

One hundred and seventy five responses from farmers in the UEP were selected out of the Cropping 2000 survey responses and analysed. Although these data were still too general to provide much insight into individual risk management, the following observations were made with respect to risk management in the UEP:

- The young farmer group (those less than 40 years old) had a higher level of education compared with the medium-aged farmer group (those in the ages between 40 and 60 years) and old farmer group (those more than 60 years).
- These young and medium-aged groups were more innovative. They carried out practices related to risk management (such as gross margins planning and planned grain marketing) more often than the old group did.
- In terms of trying new technology, the old group was less risk-taking than the other two groups. For example, the old group agreed strongly that they would not try a new chemical until it was well proven in the district.
- Compared with the young and medium-aged groups, the older farmers were more likely to consider themselves as fairly conservative and traditional farmers.
- The young and medium-aged groups were more likely to plan ahead in farming, independent of weather conditions.
- The young group had slightly higher skills in computing and grain marketing. On average, the three groups had the same level of skill in farm business management.
- The low education group (those who had only completed primary school or part of secondary school), had been involved in farming and managing farm business for longer time than the medium education group (those who had completed secondary school, TAFE, or agricultural college) and high education group (those having tertiary or postgraduate level qualifications).
- The low and medium education groups regarded themselves as more conservative and traditional.
- The high education group were more likely to take risks in trying new technology such as new chemicals.
- Generally, the high education group had better skills in computing, grain marketing, and farm business management.
- Regardless of age or education respondents agreed to a large extent that marketing of the grain they produce is best left to the experts, such as the AWB⁸ Limited. They also agreed to some extent that the key to good farming lays in minimising costs.

To provide more specific information on these points, selective interviews were conducted with several UEP farmers. The objectives of the selective interview approach were as follows:

⁷ *Primary Industries and Resources South Australia*

⁸ *Grains Research and Development Corporation*

⁸ *Australian Wheat Board*



- to see how individual farmers define risk;
- to gain information from farmers about the sources of risk they face as listed in the literature;
- to find out whether the characteristics listed above reflect UEP farmers' attitudes to risk;
- to examine the practical strategies that farmers have been using to manage farming risks;

The interviews were undertaken at the farmers' houses (approximately one week after they received the documents). The main findings from these interviews are summarised in the following set of dot points:

- Climate variability (production risk) is often the first source of risk that respondents mention;
- Financial risk was seen by respondents as the "automatic follow-on" from production risk;
- Marketing risk and policy risk are very unpredictable, to the point that respondents often have no control over these risks;
- Personal risk, which is often ignored by farmers as one respondent commented, appears set to become a major concern in the UEP in the near future (especially the reduction in people continuing in rural areas and the need for farm succession planning);
- Practically, farmers have implemented many strategies to manage the risks they face. Diversifying varieties and practicing zero or minimum tillage are commonly used strategies to manage production risks. Moreover, farmers often plant minimal areas of risky crops (peas, canola, vetch) and maximise the area of less risky crop (wheat) to avoid the consequences.
- Having high equity and off-farm investments are the most frequently used strategies to manage financial risks. Other commonly used strategies include gross margins planning and investing in farm management deposits⁹.
- "Leaving it to experts" is the strategy most commonly used by farmers to manage marketing risk. Farmers shared a common perception that it is better for them to focus on improving yields (things they are good at) rather than staying in the office and studying forward prices, contracts (jobs that should be left to consultants). They also prefer keeping stock for high-priced times.

In summary, it was concluded from this study that farming risk is an accepted reality in the UEP. As farmers have a greater exposure to such risks than many other business people, the UEP farmers appear well advanced/adapted in their understanding of risk and its management. However, favourable seasons and/or improved farming technologies can tend to hide the ongoing requirements for prudent risk management.

The Queensland Case Study: Farming risks in southwest Queensland

This study aims to evaluate and improve risk management strategies for farmers in the southwest area of Queensland. The main objectives of the study are:

- to review the current trends in the theory and practice of risk management in general and in agriculture in particular;

⁹ *Farm Management Deposits are a cash flow management tool that complement other risk management options by allowing you to set aside pre-tax primary production income in profitable years to help balance your income between good and bad times.*

- to identify and review the sources of farming risk that southwest Queensland farmers have to face;
- to investigate the risk management strategies currently employed by southwest Queensland farmers as well as their interests in and attitudes towards risk management;
- to help farmers cope better with risk, make good decisions under risky conditions, and apply appropriate risk management strategies in their businesses.

The study is being undertaken as part of the research for a Doctor of Philosophy degree at The University of Queensland. The first year was used to review relevant literature and partly in fulfilling the first objective. In the second year, several preliminary interviews and focus groups discussions have been conducted and some results of these interviews and discussions, which in part fulfil the second and third objectives of the study, are briefly reported.

It was recognised during the literature review phase that the study needed to be discussed with experts in the field for refinement and constructive comments. Consequently, in June 2004, a series of face-to-face and email interviews were conducted with staff from two of the principal research and extension organisations in Australia, CSIRO and QDPI. These people had usually been working in risk management or related areas for many years. By and large, the preliminary interviews with experts did give some insights into the study direction as well as helping to refine the research questions. The experts interviewed shared a common understanding that very few formal ‘tools’ such as models, and information derived from modelling, was used by farmers to manage risks. Overall, it was concluded that the risk management strategies adopted by farmers were quite similar to those applied by most risk averse managers. Interviewed experts suggested the following risk management strategies were currently used by Queensland dryland farmers:

- Maintaining a high level of equity;
- Keeping overhead costs low;
- Reinvesting profits into farm businesses;
- Diversifying;
- Hedging bets with N fertiliser rates;
- Checking and testing an alternative farming systems;
- Long fallowing;
- Relying on high levels of technical competence.

Focus groups were selected as the next approach to use for the study because it has many advantages as a method of gathering qualitative data (Krueger & Casey, 2000; Berg, 2001; and Coutts, 2004). The main objectives of the focus group discussions in this study were to explore the research issues, identify what risks farmers face and learn how they deal with these problems, as well as assess farmers’ needs in regards to risk management tools and learn how these needs can be met.

Wolff et al. (1993) noted that the selection of group participants is typically purposive and based more on suitability or convenience rather than representativeness. In this study, however, the participants to be asked to participate in the focus groups were suggested by QDPI staff, and were relatively representative of farmers in the study area. Thus the information that was generated was generally useful to the wider population in ways suggested by Kennedy (1979).

Twenty two invitation letters were sent to potential participants and twenty of them agreed



to participate in the discussions. This high rate of response (20 out of 22) reflects both the nature of the farmers selected and their interest in the topic. Participants made up two group discussions which were conducted on the same day (18/2/2005). Each discussion lasted approximately two hours.

Generally, farmers' definitions of risk are not as long or as complicated as those used by scholars, e.g. Hardaker et al. (1997), Williams & Schroder (1999), and Just et al. (2003). In the discussions, there was a general agreement that risk is anything that threatens farm enterprises. 'Risk is something that would prevent you from gaining profit or profitable opportunities which you would expect to get'. All participants accepted the fact that farming is risky. 'You can't go into farming without risk. In other words, you can't be a no risk farmer'.

Like the colour in the spectrum, the range of business risk contains many shades and variations. Generally speaking, it may depend on the study objectives that scholars categorise sources of risk differently. Nonetheless, according to many scholars (e.g. Boehlje & Trede, 1977; Fleisher, 1990; Hardaker et al., 1997; and Kay & Edwards, 1999), the main sources of risk in farming include production, marketing, institutional, personal, and financial risks. These same sources of risk were mentioned by the participants; with many additional points raised about how climatic, personnel, business environment, and government policy changes affect the risks they face.

Participants were asked to select three sources of risk that they considered most important. Climatic variability was ranked as the most important source of risk in both discussion groups. This was followed by financial and government policy risks in the first group and government policy and marketing risks in the second group.

Farmers in this area were using different strategies to manage the types of risk that they have to face. Briefly, these strategies included:

- Enterprise selection - having predominantly cattle, with complementary farming of cash crops;
- Using different strategies to spread the risk;
- Not risking everything, risk something but not all;
- Concentrating on growing the crop rather than worrying about marketing it;
- Managing weather variability by conserving moisture and using zero till planting;
- Selling only part of farm production at any one time;
- Practising good business management methods;
- Having off-farm investments.

There was no discussion about how to manage the risk that government policy might change. This source of risk was claimed by participants as something "out of control". 'Government rules and regulations are risks because we are not able to do anything about it'. Others added, 'Once you could do whatever you wanted to do with your plot, but now you can't'.

In summary, the Queensland Case Study is an ongoing investigation into the large number of problems and potential answers to the question of appropriate risk management strategies for farmers in the area. The problem to be addressed is whether to develop something that might address part of the problem very well or whether to try doing something that tries to address the whole problem. However, the whole problem is extremely complex and it may be wise to break it down into parts and try to tackle one or two parts initially. There were several options raised as a result of these discussions that might be useful to develop:

- Designing a spreadsheet that makes use of information on cropping history, current soil moisture level, and other factors such as seasonal climate forecasts to assess crop planing options at various times of the year.
- Conducting a survey among a broader group of farmers to see whether the sort of things discussed in the focus groups reflect what the larger population is thinking.
- Evaluating and adapting products that are available such as the Risky Business program from Western Australia (Abadi, 2003) or tools derived from some of the crop-weather simulation models such as WhopperCropper (Cox et al., 2004) or Howwet (Freebairn et al., 2002).

Irrespective of how the next stage of the investigation evolves, the researchers are anxious to deliver something back to the farmers and ask them what they think about it, as a way of repaying the help and enthusiasm for the project that has already been displayed.

CONCLUSIONS

These two case studies were approached differently for specific reasons. However, both of them generally found that Australian farmers, especially those in marginal cropping areas, have to cope with various sources of risk. Climate variability was considered as the most important source of risk by farmers in both case studies. Other important sources of risk included financial, government policy, and marketing risks. The ranking of these risks was slightly different compared with the risk ranking by farmers in other countries, where climate variability is probably not as significant as a source of risk as it is in Australia. For example, price or marketing risks were perceived as the most important source of risk by a group of Dutch farmers (Meuwissen et al., 2001). Similarly, a nationwide survey in New Zealand (Martin, 1996) revealed that marketing risks were ranked as very important by all farmers. In America, crop price and yield variability were the top rated sources of risk by many farmers (Patrick & Musser, 1997; Knutson et al., 1998; Harwood et al., 1999; and Hall et al., 2003).

Australian farmers, like their peers worldwide, e.g. American farmers (Patrick et al., 1985; Jose & Valluru, 1997), Canadian farmers (AAFC., 1998), Dutch farmers (Meuwissen, 2001), and New Zealand farmers (Martin, 1996), use different strategies to manage the various sources of risk in their farming businesses. Such strategies include diversifying varieties, minimising tillage, maintaining high equity, having farm management deposits and off-farm investments, “leaving marketing to experts”, conserving moisture, selling only part of farm production at any one time, etc.

In conclusion, management of risk is an important activity for farmers worldwide. Different farmers confront different situations and their preferences toward risk have a major effect on decision-making in each given situation. The management task facing farmers is to choose a combination of strategies that best suits the unique conditions of their particular farms and personal circumstances.

ACKNOWLEDGEMENTS

The authors would like to thank Jay Cummins for his excellent advice and help in providing the survey data in South Australia and Katherine Snars for her assistance in conducting the focus groups in southwest Queensland. All of the farmers who participated in the case studies are acknowledged for being involved so willingly in the selective interviews and focused group discussions.

REFERENCES

Agriculture and Agri-Food Canada (AAFC). (1998). *Adapting to Change and Managing*



Risk: A Profile of Canadian Farmer Attitudes and Behaviour, [Online] Accessed: 3rd November, 2003, Available at:http://www.agr.gc.ca/spb/rad-dra/publications/adapt/adapt_e.pdf.

Abadi, A. (2003). 'Learning to Manage a Risky Business', The Australian Agricultural and Resource Economics Society, The Esplanade Hotel.

Berg, B. L. (2001). *Qualitative research methods for the social sciences*, Allyn & Bacon, MA, USA.

Black, I. D. (2000). Crop farming performance in the Upper Eyre region, SARDI, South Australia, Australia.

Boehlje, M. D. and Trede, L. D. (1977). 'Risk management in agriculture', *Journal of the American Society of Farm Managers and Rural Appraisers*, 41, pp 20-29.

Clark, A. and Brinkley, T. (2001). *Risk management: for climate, agriculture and policy*, Bureau of Rural Sciences, Canberra, Australia.

Cooke, P. (1997). A publication covering marketing of farm products and price risk management, Kondinin Group, WA, Australia.

Coutts, J. (2004). *Interviews and Focus Groups: How to make the most of talking with people when data collecting*, CRRI-Q, The University of Queensland, Gatton, QLD, Australia.

Coventry, D. R., Holloway, R. E. and Cummins, J. A. (1998). 'Farming fragile environments: Low rainfall and difficult soils in South Australia', *Proceedings of the 9th Australian Agronomy Conference*, Wagga Wagga, NSW, Australia.

Cox, H. W., Hammer, G., McLean, G. B. and King, C. (2004). 'National WhopperCrop - risk management discussion support software', 4th International Crop Science Congress, Brisbane, Qld, Australia.

Duncan, R., Holden, D., Hazell, P. and Pritchard, A. (1991). 'Commodity price risk management and financial markets', *Risk in agriculture: proceedings of the Tenth Agriculture Sector Symposium*, OQEH.

Fleisher, B. (1990). *Agricultural risk management*, Lynne Rienner Publishers Inc., Boulder, Colorado; USA.

Freebairn, D. M., Robinson, J. B. and Glanville, S. F. (2002). *Software Tools for Learning and Decision Support*, [Online] Accessed: 6th April, 2005, Available at: <http://www.apsru.gov.au/apsru/Projects/wfs/pdffiles/>.

Gaynor, H. (1998). 'Risk management on the farm', *National Agricultural and Resource Outlook Conference*, Canberra, Australia.

Giles, T. and Stansfield, M. (1990). *The Farmer as the Manager*, C.A.B International.

Hall, D. C., Knight, T. O., Coble, K. H., Baquet, A. E. and Patrick, G. F. (2003). 'Analysis of Beef Producers' Risk Management Perceptions and Desire for Further Risk Management Education', *Review of Agricultural Economics*, 25, pp 430-448.

Hancock, J., Cooper, I. and Nguyen, N. (2002). *Rotations, Risk and Reward: Farming system choice on the Eyre Peninsula of South Australia*, [Online] Accessed: 9th October, 2003, Available at: <http://www.agrifood.info/Review/Perspectives/Hancock.htm>.

Hardaker, J. B., Huirne, R. B. and Anderson, J. R. (1997). *Coping with risk in agriculture*, CAB International, Wallingford, U.K.

Harwood, J., Heifner, R., Coble, K., Perry, J. and Somwaru, A. (1999). *Managing Risk in Farming: Concepts, Research and Analysis*, Agricultural Economic Report No.774, United States Department of Agriculture.

Hughes, B. W., Whetherby, K. G., Kew, G. A. and Lewis, D. L. (1990). An assessment of wind erosion on Eyre Peninsula during 1988/89, Technical Report, Department of Agriculture South Australia, Australia.

Jose, H. D. and Valluru, R. S. K. (1997). 'Insights from the crop insurance Reform Act of 1994', *Agribusiness*, 13, pp 587-598.

Just, D. R., Wolf, S. and Zilberman, D. (2003). 'Principles of risk management service relations in agriculture', *Agricultural Systems*, 75, pp 199-213.

Kay, R. D. and Edwards, W. M. (1999). *Farm Management*, WCB/McGraw-Hill.

Kennedy, M. (1979). 'Generalizing from single case studies', *Evaluation Quarterly*, 3, pp 661-678.

Knutson, R. D., Smith, E. G., Anderson, D. P. and Richardson, J. W. (1998). 'Southern farmers' income risk', *Agricultural and Applied Economics*, 30, pp 35-46.

Krause, M. (1995). *Risk management: rural property planning*, Inkata Press.

Krueger, R. A. and Casey, M. A. (2000). *Focus Groups: A practical guide for applied research*, SAGE Publications, Inc., Thousand Oaks, California.

Marra, M., Pannell, D. J. and Abadi Ghadim, A. (2003). 'The economics of risk, uncertainty and learning in the adoption of new agricultural technologies: Where are we on the learning curve?' *Agricultural Systems*, 75, pp 215-234.

Martin, S. (1996). 'Risk management strategies in New Zealand agriculture and horticulture', *Review of Marketing and Agricultural Economics*, 64, pp 31-44.

Meuwissen, M. (2001). 'Income risk management in agriculture', *European Review of Agricultural Economics*, 28, pp 373-375.

Meuwissen, M. P. M., Hardaker, J. B., Huirne, R. B. M. and Dijkhuizen, A. A. (2001). 'Sharing risks in agriculture; principles and empirical results', *Netherlands Journal of Agricultural Science*, 49, pp 343-356.

Nguyen, C. N. (2002). *Farming risks in the Upper Eyre Peninsula*, Master of Agri. Business, University of Adelaide, Roseworthy Campus, SA, Australia.

Patrick, G. F. and Musser, W. N. (1997). 'Sources of and responses to risk: factor analysis of large-scale U.S. cornbelt farmers', In *Risk Management Strategies in Agriculture: State of the Art and Future Perspectives*, (Huirne, R. B. M., Hardaker, J. B. and Dijkhuizen, A. A., eds), Backhuys Publishers, Mansholt Institute, Wageningen, The Netherlands, pp. 45-54.

Patrick, G. F., Wilson, P. N., Barry, P. J., Boggess, W. G. and Young, D. L. (1985). 'Risk perceptions and management responses: producer generated hypotheses for risk modelling', *Southern Journal of Agricultural Economics*, 17, pp 105-116.

Potter, M. (2003). 2004-05 Pre-Budget Submission, National Farmers' Federation Limited, ACT, Australia.

Robinson, J. R. C. (1999). 'Risk management through alternative production practices and management strategies: discussion', *Journal of Agricultural and Applied Economics*, 31, pp 287-289.

Truscott, M. A. and Egan, J. P. (2000). *Climate Risk Management*, SARDI, South Australia, Australia.

Whetherby, K. G., Davies, W. J. and Matheson, W. E. (1983). *Wind Erosion on Eyre Peninsula 1975/79*. Technical Paper No.7, Department of Agriculture South Australia, Australia.

Williams, J. and Schroder, W. R. (1999). *Agricultural price risk management: the principles*



of commodity trading, Oxford University Press, Melbourne, Australia.

Wilson, W. W. and Wagner, R. (2002). Price risk management strategies for grain importers, Department of Agribusiness and Applied Economics, North Dakota State University.

Wolff, B., Knodel, J. and Sittitrai, W. (1993). 'Focus group and surveys as complementary research methods: A case example', In Successful focus groups: Advancing the State of the Art, (Morgan, D. L., eds), SAGE Publication, Inc, Newbury Park, California, USA, pp. 118-135.