

**An Economic Assessment of a New Oilseed Technology
in Barwon, Victoria: The Implications for Uptake
of Farmers' Beliefs and Risk Attitudes**

A thesis submitted in fulfilment of the requirements
for the degree of Doctor of Philosophy
of the University of New England

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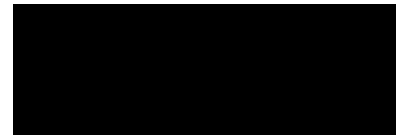
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Declaration

I certify that the substance of this thesis has not already been submitted for any degree and is not being currently submitted for any other degree.

I certify that, to the best of my knowledge, any help received in the preparation of this thesis and all sources used have been duly acknowledged.



Mofe Ogisi

Dedication

This work is dedicated to the memory of my parents, David Esanjumi and Susan Mary and to my son, Patrick Jolomi, who has given me a better appreciation of life.

Acknowledgments

I am greatly indebted to Professor J.B. Hardaker who, despite retirement and various other commitments, supervised the last eleven months of this work. His encouragement, against all odds, brought this work to fruition.

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Lastly, without reservation, all residual errors in this study remain the sole responsibility of the author.

Abstract

The uptake of new technology by farmers is likely to be influenced by their perceptions of the riskiness of that technology and by their attitude to risk. Farmer beliefs about risks are shaped by both experience and received information. A lack of familiarity with a new technique often results in biased farmer perceptions of the riskiness of the technique. However, as more information about the technology is acquired from various sources, including extension services, these perceptions are likely to change. This study is an evaluation of a new oilseed on the basis of how its riskiness is perceived by five case-study farmers and by two experts.

The analysis is carried out with regard to the assessment of a new technology, Linola. Linola™ is a new oilseed crop developed by CSIRO through chemical and genetic manipulation of the inedible-oil producing linseed to a variety that produces quality edible oil similar in composition to sunflower oil.

A general survey of the literature on the production of the major oilseeds in Australia is undertaken with emphasis on the potential of these crops to be more than disease break crops. Various aspects of the global and Australian markets for oilseeds and their products are considered with emphasis on how these factors affect both the short- and long-term production of this crop grouping in Australia in particular.

Some theories of decision making under uncertainty are discussed. Contrasting arguments for profit-maximisation and utility-maximisation as the basis of risky choice by decision makers are advanced. Since risk is partly due to imperfect knowledge, producer perceptions become central; only subjective probabilities can be a valid measure of risk if the aim is to obtain decisions consistent with decision maker beliefs. The Bernoullian or subjective expected utility maximisation approach allows the explicit incorporation of the risk attitudes and subjective, personal beliefs of decision makers in modelling decisions concerning resource allocation. This paradigm is employed in this work to incorporate farmer beliefs in the analysis of the potential of a new technology.

Various efficiency criteria under uncertainty are considered and arguments proffered for the application of stochastic dominance with respect to a function as the evaluative choice criterion in this work. Stochastic dominance with respect to a function is a more discriminating criterion than either the first or second degree stochastic dominance criteria. It is implemented by defining an appropriate range for the decision maker's absolute risk aversion coefficient.

The new technology is evaluated according to the selected efficiency criterion in whole-farm context using utility-efficient programming. The formulation is used to model five case study properties in the Barwon district of Victoria applying a single-attribute (pre-tax net farm cash balance), negative exponential utility function.

An interval approach was used to elicit individual preference ranges for average pre-tax incomes for the respondent farmers. Each of the five respondent farmers included in this study was found to be slightly or moderately risk averse over the income ranges used. These ranges were incorporated in the utility-efficient models developed for each of the five case farms. The data used in the activity and enterprise return budgets applied in each model were scaled for each farm based on subjective triangular distributions of yields and prices elicited from the farmers and from two experts. Such scaling is intended to reflect producer and expert perceptions within each of the models.

The results of the investigation confirm the importance of farmer perceptions of the riskiness of new technologies and provide insights into how such perceptions may be influenced by the quality and mode of transmission of information regarding new production techniques. The main findings of the evaluation of Linola are that the respondent farmers do not consider the crop to be worth growing at present and that this view is not a result of aversion to risk by the farmers. Also, there is an apparent lack of convergence in the beliefs of farmers and experts about the potential performance of Linola with researcher beliefs being the most optimistic. The conclusion is drawn, that while risk aversion may be important in the selection of farming portfolios by farmers, their beliefs about potential farming activities are more important with regard to the assessment of the riskiness of new technologies such as Linola. With regard to State and Commonwealth policy relating to this particular technology, it is noted that, with the small likelihood of any significant market failure, intervention is unwarranted since the crop is protected by the PVR act. Thus, the company charged with the distribution and marketing of the crop can 'trade' the necessary research risks and maximise the rent value of the technology without the intervention of the State or Commonwealth governments.

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