The Adoption of Agricultural Innovations

Geoffrey Kaine

B. Ag Ec. (UNE), M. Ec. (UNE)

Thesis submitted in fulfilment of the requirements of the degree of
Doctor of Philosophy of the University of New England

May 2008

Acknowledgements

This thesis has been several years in the making and I have had the generous support of many people and a number of organisations.

I would like to thank my supervisors, Vic Wright and Ray Cooksey, for their constant support and encouragement. Their constructive suggestions, criticism and advice have been invaluable. Ray has brought a fresh and different perspective that has enriched and ordered my thinking. Vic has been a mentor, colleague and friend to me over many years. He has been steadfast in his encouragement, quick to correct sloppy thinking, and merciless in his teasing.

I would also like to acknowledge Vic and Jim Lees for their contributions to our early work on the adoption of innovations in agriculture. The ideas presented in this thesis had their origins in this work.

A special thanks to Denise Bewsell and Eli Niall who shared the vision of this research and who debated and discussed the ideas expressed in this thesis at length during many long hours on the road when interviewing producers.

I am indebted to all those producers from many agricultural industries across Australia and New Zealand that were kind enough to share their experiences, knowledge and insights with me. I owe my understanding of the practical complexities and pragmatic realities of managing farm systems to them.

I would also like to express my appreciation to the many organisations here in Australia and New Zealand that funded the research projects that have allowed me to develop, test and refine my ideas over the years. I would particularly like to thank the Victorian Department of Primary Industries for providing me with the opportunity to complete this thesis.

I am especially grateful to my colleagues in Practice Change Research, Tatura for their willingness to challenge, discuss and debate the ideas contained in this thesis, and for their patience and forbearance when I have absent, consumed by the task of writing.

This thesis would never have been completed without the generous support of my very dear colleague and friend Fiona Johnson. I am indebted to Fiona for encouraging

me and creating the opportunity for me to complete this thesis by taking on the difficult and arduous task of managing our team and our projects single-handed during my absences.

My wife Jean has been inspirational. Jean is my measure of courage, generosity and self-awareness. She is also my measure of self-indulgence and mischievousness. She has supported me always and in every way. She has been steadfast in her confidence in, and her encouragement of, me. Thank you, Jean.

Thanks to Mum, Debbie, Anne and Fred for your love.

Abstract

Technological change and innovation is a fundamental force shaping our lifestyles, our culture and our future. We devote a substantial proportion of our wealth to research activities that span all areas of society, including agriculture. We make this investment, at least with regard to agricultural research, primarily to create wealth and conserve our natural resources.

The return to our investment in agricultural research, the wealth created and the resources conserved depends, in part, on the extent to which primary producers adopt the products of that research. Consequently, maximising the return to our investment in agricultural research involves identifying what research products are likely to be adopted by primary producers and by how many, and determining what processes are required to ensure the diffusion of research products among producers as rapidly as possible. All these depend on an intimate understanding of how the products of research can contribute to better satisfying the needs of primary producers in the conduct of their agricultural enterprises.

The case was made in this thesis that established schools of thinking on the adoption behaviour of primary producers do not provide a rigorous, explicit procedure for discovering how innovations can contribute to satisfying the needs of primary producers as managers of agricultural enterprises. As a consequence, policy makers and investors in research and extension have lacked a rigorous method for identifying the population of potential adopters of agricultural innovations. This means policy making and investment in research and extension has sometimes lacked a thoroughly defensible foundation for setting priorities for agricultural research, and for designing and evaluating programs for promoting the adoption of agricultural innovations.

The aim in this thesis was to describe a framework for discovering how agricultural innovations contribute to satisfying the needs of primary producers as managers of agricultural enterprises. Meeting this objective required describing a method for properly specifying the population of potential adopters of agricultural innovations. Drawing on consumer behaviour theory and farming systems theory a method was described that was based on the assumption that the adoption of agricultural innovations is a highly involving decision for producers and the hypothesis that the

benefits to be had from adopting an agricultural innovation are influenced by particular elements in a farming system that are specific to each innovation. These elements were termed the farm context for an innovation. The method allowed the population of potential adopters to be classified into segments on the basis that producers with different farm contexts obtained different benefits from an agricultural innovation.

The method was tested by application in four case studies in which the population of potential adopters of agricultural innovations was estimated through the identification of the farm context. The case studies included intensive irrigated and extensive dryland agricultural industries, cropping and livestock industries, and perennial cropping industries. The case studies covered innovations with different diffusion characteristics ranging from relatively simple and easy-to-trial innovations to innovations that were more complex and difficult to trial. The case studies spanned the four dimensions of farm context (strategic, labour and lifestyle, technology and practice, and biophysical) and illustrated the ways in which the mix of these dimensions in the farm context differs across innovations.

The results of the case studies supported the hypothesis and demonstrated that the method for identifying and quantifying the population of potential adopters of an agricultural innovation by identifying the farm contexts for an innovation has merit. The results from the case studies also indicated that the method was generalisable across agricultural industries, innovations that differed in their diffusion characteristics, and the different dimensions of the farm system that shaped the benefits to be had from an innovation.

Certification

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

I certify that any help received in preparing this thesis, and all sources used, have been acknowledged in this thesis.

Signature

Table of contents

List of tables

List of figures