

The Decision Making of Organic and Conventional Agricultural Producers

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Preface

The AERU has from time to time undertaken research that relates to organic farming, including confidential client research and more general studies of changes in farming and land use. In this study the issue of farmer decision making is expressly examined with a view to highlighting precisely why farmers do, or do not, adopt organic production techniques. The approach used in this report highlights reasons and constraints in decision making. The results would be useful to policymakers and industry participants concerned with fostering the more widespread adoption of organic techniques.

**A C Zwart
DIRECTOR**

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Summary

Interviews with 16 organic farmers and 27 conventional farmers in the province of Canterbury, New Zealand were used to explore and describe farmers' decision making concerning the decision to grow, or not grow, organic products. The ethnographic decision tree modelling approach was used to develop a decision tree that shows the criteria relevant to the farmers' thinking. Results showed that six farmers either ignored or rejected organic farming. For the remaining 37 cases, there were five different motivations for growing organic products including: philosophy, consumer preference, personal health, high premiums or problems with conventional production, and some farmers preferred not to use chemicals or wanted to improve their soil. There were 29 cases for which a specific motivation applied, but in 11 cases a significant constraint prevented these farmers from actually growing any organic products. Results are interpreted by comparing them with the available literature on this topic, some general observations are made and policy implications discussed.

CHAPTER ONE

INTRODUCTION: BACKGROUND, OBJECTIVES AND OVERVIEW

The research results reported here are part of a broader study of the development of organic agriculture in New Zealand. The study is focused on the emerging structure of the organic agricultural industry in Canterbury and seeks to identify and analyse the problems associated with any further development of organic exporting. It includes a description of the structure of the emerging industry, that is, of the main businesses involved, and it includes research on both organic and conventional farmers to examine their decision making. These parallel elements of the research programme provide the basis for describing the different structures of organic exporting in Canterbury. The overall study also seeks to compare the developing organic industry in Canterbury with developments in Nelson and in the North Island, in the Bay of Plenty and Gisborne in particular. Following the completion of the Canterbury research, the focus will then move to the other locations where each selected region will be studied in a way similar to Canterbury. Once this work is completed the research will focus on comparative assessments and then provide a rigorous assessment of optimum development strategies for organic exporting.

The research on farmers in Canterbury is reported here. The main objective of this research was to describe and understand the decision making of organic and conventional farmers so that we could understand why, or why not, they grew organic products.

Organic production was self-defined by the farmers themselves not by us as experts. We did not examine whether actual organic standards were being followed. A majority of organic farmers had their organic status certified by Bio-Gro NZ (the organisation formerly known as the New Zealand Biological Producers and Consumers Association) providing certification in conformity with the basic standards of the International Federation of Organic Agriculture Movements (IFOAM). Therefore organic farming is defined as any land use which uses organic techniques. It includes agricultural and horticultural land uses and thereby includes both farmers and growers. However, for ease of reading, this report uses the words 'agriculture' and 'farmer' and they should be taken to include horticulture and growers.

This report provides a review of literature on farmers' decision making with respect to organic farming. It then introduces and explains the method adopted in this study, namely, the ethnographic decision tree approach. The results are presented in terms of what they tell us about understanding both organic and conventional farmers' thinking about organic production. Finally, the conclusion discusses the results, compares them with the existing literature, makes some general observations and considers the policy implications. Not included in this report are results from other aspects of the overall study on the development of organic agriculture in New Zealand. Nor is attention given to how readers might pursue organic production themselves.

CHAPTER TWO

LITERATURE ON DECISION MAKING AND ORGANIC PRODUCTION

2.1 Overseas Literature

There is a small body of published journal literature on decision making and organic farming. This literature includes general commentaries of the changing situation for a given country, including policy, and it includes surveys of farmers specifically focussing on decision making.

Among the general commentaries, Bruckmeier et al. (1994) reviewed structural change in East Germany to state that organic farming occurs more frequently in East compared with West Germany. They surmise that economic incentives and a favourable political situation are the main factors in the decision to convert to organic farming. Farmers were pursuing short-term, opportunistic policies rather than responding to concerns for the environment and long-term environmental changes. In contrast, Sarkozy (1990) reported that 50-60 large farms and several thousand small farms in Hungary have converted to a more organic form of production in response to ecological problems with conventional farming. Apparently, concern for the environment has been an important factor in decision making.

The remaining research is based on farmer surveys. A grant for organic production (annual premium per hectare for three years) was introduced in Sweden in 1989 and Kvist (1994) surveyed 469 farmers to examine their viewpoints. Not surprisingly, existing organic farmers were least affected by the grant, but those converting new areas to organic production were more affected. It seems safe to conclude that farmers bringing land into organic production were influenced by the economic incentive, but this study does not elaborate on decision making. Two Danish surveys (Dubgaard and Sorensen, 1988) provided data on decision making. Their first survey of 331 organic farmers showed that there had been a change away from biodynamic farming to organic farming. Their second survey of 1078 conventional farmers showed that two per cent of respondents considered converting to organic farming. Only ten per cent of these farmers expected a better income, while 33 per cent made the decision on environmental grounds (the remaining percentage comprised a variety of other reasons). This Danish study clearly indicates that farmers' decision making can be influenced by non-economic considerations.

In the U.S. a survey of farmers in Montana (Saltiel et al., 1994) found that both geographical distribution and farm structure exerted some influence on the decision to adopt organic farming practices. Other factors influencing the decision were profitability and awareness of the option. The authors concluded by emphasising the importance of policy to increase awareness of the profitable nature of sustainable agricultural practices. More focused on decision making is part of Lockeretz's (1977) study of economics and resource use by organic and conventional farms. A total of 302 organic farmers were listed using snowball sampling and a questionnaire sent to 250 farmers, from whom there were 174 responses. Most (87 percent), formerly used chemicals but had become dissatisfied with them because of concern over livestock health, dissatisfaction with cost or effectiveness or because they

believed the chemicals were harmful to the soil. However, in many cases the dissatisfaction was not sufficient to lead to a change to organic farming. For about one half of the farmers the influence of salesmen of organic products or other advocates of organic farming were important in their decision making. The two main advantages of organic farming were stated as: health for farmer and family, and health for livestock.

There is some research on decision making and the use of organic fertiliser, but it is only partly relevant to organic farming. Gladwin (1989b) tested a tree model on a sample of 40 farmers in Malawi in order to learn why they used organic fertiliser (manure or compost) and/or chemical fertiliser on their maize crops. The decision tree showed that farmers believed that it was necessary to apply both types of fertiliser, or they believed that either one was more suited to maize and more profitable to use. These motivations led them to use organic fertiliser if certain conditions were met (e.g. had enough animals to make manure), that is, they were not constrained in any way. Alternatively, the farmers would use chemical fertiliser if other conditions were met (e.g. chemical fertiliser was available for purchase). The decision tree shows that farmers considered the use of chemical fertiliser to carry with it some risks that the land would become dependent on chemicals. Further, the tree shows that eight farmers did not use fertiliser because of a cash or credit constraint, while 28 farmers used chemical fertiliser and 15 farmers used organic fertiliser.

Gladwin concluded that organic fertiliser was seen by the farmers as desirable to use but they did not depend on it as the sole source of plant nutrients when chemical fertiliser was available at reasonable prices. The farmers saw chemical fertiliser as supplying nutrients and organic fertiliser as building up the structure of the soil and reducing the risk of becoming dependent on chemical fertiliser. From an organic farming point of view, the farmers' interest in organic fertiliser was motivated by concern for soil quality, and this concern was grounded in an appreciation of impact on yields but not grounded in any concern for consumer or farmer safety, for example. Gladwin's research does not directly tell us about organic production per se, and it is not directly relevant to countries with different farming systems.

2.2. Australasian Literature

Conacher and Conacher (1983) surveyed organic farmers in Western Australia mainly to identify the reasons for taking up organic production and assess the perceived degree of success of organic farming methods. There was a 50 per cent response rate to a survey of 248 farmers (202 farmers were in Western Australia, 46 in other states). The survey results focused on 50 farmers who were organic, earned 50 percent or more of their income from organic farming, but included 19 farmers from other states.

Results of the analysis of reasons for farming organically included reasons for the farmer's initial decision to farm organically compared to the reasons just prior to the survey in 1982, i.e. 1981. Just over one half of the farmers (29) stated that their initial reason had remained unchanged. The remaining 21 farmers made changes: some changed from listing specific factors, (e.g. soil fertility, erosion) to a general philosophical reason, while the others changed in the opposite way. The most important reasons both initially and in 1981 (frequencies in brackets) were:

1. Detrimental affects of synthetic chemicals (34)
2. Philosophical factors (33)
3. Decline in soil fertility (25)

4. Pollution of water and soils (16)
5. Costs of fuel, fertilisers and biocides (13).

Conacher and Conacher (1983) reported specific elements for each of the five most important reasons above, but these elements occasionally overlapped with the reasons so that their analysis does not yield an incisive understanding of the reasons. They do, however, give ample examples, including quotes, of what the farmers were referring to when they cited their reasons. No discussion of these particular results was provided.

In 1988 Fisher (1989) studied the then current population of 13 Canterbury organic crop and livestock farmers, and surveyed 52 South Island farmers who had expressed interest in organic farming to examine barriers to the adoption of organic farming. Fisher interviewed some of the practicing organic farmers and engaged in participant observation with four of them. Results showed that organic producers perceived a need to change to organic farming for a variety of reasons and they saw organic farming as a profitable, low-input system, as an environmentally and healthy alternative, and as personally satisfying. Financial concerns were only one aspect of the adoption decision. Also, results showed that conventional farmers were deterred from adopting organic farming because of perceived technical difficulties, current economic conditions, uncertainty of organic product markets and lack of information. Fisher carefully notes constraints to the adoption of organic farming and these include: leasehold or partnership arrangements, high debt levels and binding conventional contracts.

By the early 1990s Wattie Frozen Foods Ltd had become involved in exporting organically grown vegetables and wanted to encourage more farmers and growers to use organic production techniques. In 1993 they commissioned research on current attitudes and possible misconceptions that growers and farmer may have about organic farming (Scully, 1993). Farmers in Canterbury, Manawatu and Gisborne were interviewed by telephone to assess their attitudes and these indirectly tell us something of their decision making. Results showed that there were two main incentives for them to become organic farmers. The most important incentives (percentage selecting them) were:

1. Competitive premiums (50 per cent)
2. Effective treatment for weeds and pest (16 per cent).

These incentives suggest that financial and technical factors would be important in the decision making of conventional farmers. Farmers acknowledged that there were advantages to organic farming, the main ones being: 'better for the environment', 'better for health', 'use less/no chemicals', 'cheaper not using chemicals' and 'could be profitable'. However, while most farmers agreed that organic farming was environmentally friendly most also agreed that they could not afford the loss of earning potential. Most farmers tried to have the lowest level of synthetic inputs and believed that their farm was suitable for organic production. The results also showed that the main barriers for farmers to change from conventional production to organic production were the uncertainties associated with financial returns and weed and pest control. It is likely that Wattie Frozen Foods Ltd have focused on these two issues in their promotion of organic production in Canterbury.

2.3 Conclusion

The overseas literature on organic farming and decision making covers general trends in the incidence of organic farming. Some of it (Bruckmeier et al., 1984; Sarkozy, 1990) speculates on reasons for change and in one case sees the interest in changing to organic

production as stemming from short-term economic opportunism, and in the other sees it as response to environmental problems. It is likely that both motivations influence decision making but neither study specifically examines decision making itself. Similarly, the survey-based reports do not examine directly decision making itself, but report factors or variables associated with decision making. They fail to identify the wide range of reasons or motivations which one would expect to be involved (e.g. Kvist, 1994). Or, if they do cover reasons well, these studies do not compare organic farmers with conventional farmers. Nor do they spell out exactly how the reasoning or decision making actually works, but instead list the frequency with which particular reasons were given by farmers (e.g. Dubgaard and Sorensen, 1988) or list the variables involved (e.g. Saltiel, et al. 1994). In large part the lack of focus on decision making is a product of the survey method used which precludes focusing on how farmers actually make decisions. This problem is overcome by Gladwin's ethnographic decision tree approach but in her study of Malawi farmers the focus was only incidentally on organic farming while its main focus was on choice of fertiliser. However, the method used is highly relevant to studies of decision making and organic farming, and it includes the reasons of both organic and conventional farmers.

The Australasian research provides good details on reasons for organic farming. Conacher and Conacher (1983) identified five distinctive reasons, and for New Zealand Fisher (1989) found that environmental concerns, health and satisfaction were important, with financial concerns only a part of the picture. In addition, he included in his study comparisons with conventional farmers, identifying factors which were constraints to change. These factors were matched by Scully (1993) who identified key concerns (financial and technical) about organic farming among conventional farmers.

Generally, amongst the vast published journal literature on organic farming there is only a small amount on decision making, and little that is directly relevant to New Zealand. None of the literature focuses exclusively on decision making. While a variety of reasons for adopting organic production techniques have been identified the literature also identifies important contextual factors that have influenced farmers significantly. Organic salesmen can be influential, as has been Wattie Frozen Foods Ltd in Canterbury. These findings serve to remind us that decision making cannot be explicated fully in terms of psychological factors only. However, it is clear that research on decision making should include organic and conventional farmers, and that the ethnographic decision tree modelling approach is one approach that focuses on decision making itself.

CHAPTER 3

METHOD: THE ETHNOGRAPHIC DECISION TREE MODEL

3.1 Introduction

The main objective of this research was to develop an understanding of farmers' decision making regarding organic production, including their reasons for or against it. To achieve this objective it was necessary to move beyond attitude and opinion surveys and examine actual decision making. This chapter describes the ethnographic decision tree method used to learn about farmers' decision making. It begins by highlighting the features of the method and then gives details of the procedures used in this research. Finally, some limitations of the approach are considered briefly.

3.2 Features of Decision Tree Modelling

In this research the ethnographic decision tree modelling approach developed by Gladwin (1989a) was used to develop a decision tree that accurately reflected the decisions and constraints involved in the decision of farmers to use, or not use, organic production techniques. This method has been used in New Zealand to study farmers' decision making regarding tree planting (Fairweather, 1992), on or off-farm work (Fairweather, 1995) and new sheep breeds (Jangu et al., 1993).

Decision tree research (Gladwin, 1989a & 1989b) examines real world decisions such as buying fertiliser or not buying fertiliser. It has application to any area of human activity where a decision is made and while it is based on individual ethnographic interviews the decisions of a group of people are examined and interpreted to develop a decision tree model. The method uses ethnographic interviewing to elicit from the decision makers themselves their decision criteria. Ethnographic interviewing involves approaching farmers in a way that acknowledges their expertise in managing a farm and paying attention to what they believe and what they do on their farm. Interviews explore farmers' thinking and records in their own terms their reasons for actions. The decision criteria identified in the interviews are then combined in the form of a decision tree or set of 'if-then' rules.

Ethnographic decision tree modelling seeks to develop a complete decision tree comprising a series of connecting decision criteria. The decision criteria are discrete questions the answers to which are either true or false for any particular subject. The tree must allow each subject to move downwards through a series of criteria to an outcome which is true for that subject. In addition the tree must combine criteria for all subjects in a logical way. The tree thus tells why a particular outcome is achieved because the outcome is preceded by a set of criteria relevant to particular subjects. However, the criteria are not imposed by the researcher but are derived carefully from analysis of the open-ended interviews. The interview data must be carefully examined to learn what criteria lie behind the subject's decision making, and then these criteria are gradually integrated into a complete decision tree. The completed tree is predictive of outcomes once decision criteria are known, that is, for anyone for whom a certain set of criteria is true, the tree predicts that person's decision, in advance of observing what they will do. Decision trees thus represent a logical structure that underlies the decision process.

3.3 Procedures

The principle element of the research design was to compare the decision making of two distinct growers: organic and conventional farmers. To this end interviews were arranged with a total of 43 farmers between February and April, 1996, including 16 who were organic and 27 who were conventional. Of the 16 organic farmers there were four with full organic status, six with transitional status and six not registered with Bio-Gro NZ (see Table 1). Since the objective was to identify most of the reasons for organic farming or for conventional farming it was appropriate to use not a random sample of farmers but a theoretically ordered sample in which diverse types of farmers were sought and included in the study. Thus, the full range of farm sizes, farm types, level of activity (full or part time) and farm locations were included, where possible, since it is likely that these factors have a bearing on decision making. In this way the essential elements of decision making can be identified but not their frequency in the population.

Table 1
Summary of Characteristics of Farmers in the Sample

	Conventional	Organic	Total
1. Farm status:			
Smallholding	6	3	9
Part-time	4	7	11
Full-time	16	7	<u>23</u>
			43
2. Farm type:			
Horticulture - orchard	2	1	3
- other	6	5	11
Cropping (arable/vegetable)	9	5	14
Sheep/beef	3	1	4
Grazing, some cropping	5	2	7
Dairy	3	0	3
Other animal (emus)	0	1	<u>1</u>
			43
3. Certification status:			
Organic status- Bio-Gro			4
- not certified			6
Transitional			6
Conventional			<u>27</u>
			43

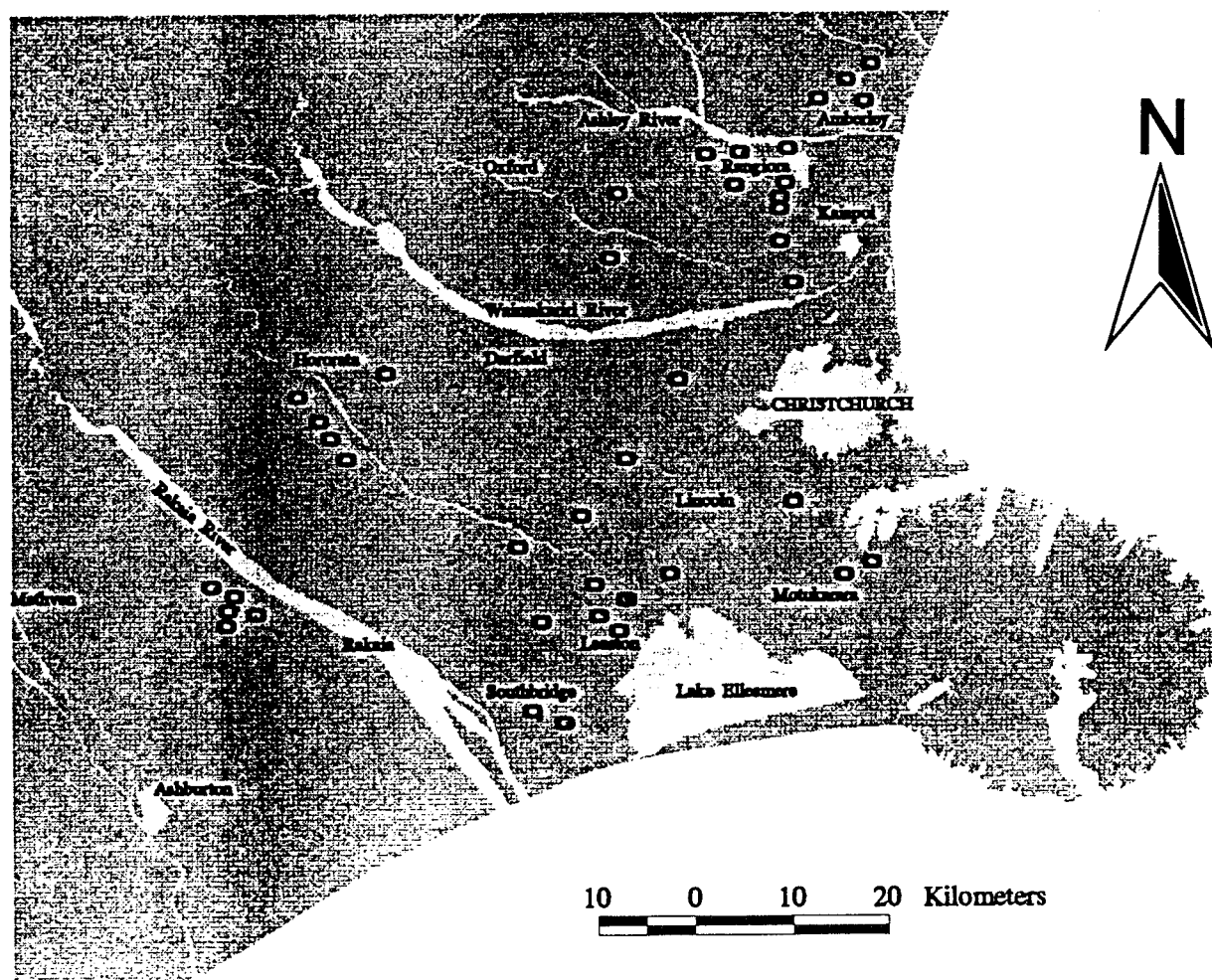
Table 1 shows the characteristics of the farmers in the sample and the first characteristic listed is farm status, referring to the level of productive activity on the farm. There were nine smallholders, that is people with relatively small holdings (5-20 hectares) that produced little or no income and who typically had off-farm income. Eleven smaller farms did have significant levels of production but not to a full-time level, and these were classified as part-time farms. Finally, there were 23 farms that supported one or more people on a full-time basis. The farm type classification is a guide to the land use on the farms, but only a guide because it was difficult to classify some farms. For example, some plants (wheat) grown on a large scale seem clearly to denote a cropping farm, but when the plants are common

vegetables such as peas and carrots, these can be either cropping farms or horticultural farms. In some cases horticultural farms also had grain crops or livestock (sheep/beef). Tomatoes and flowers do appear to be horticultural activities and were classified as such, but broader-scale vegetable crops (e.g. peas) were classified as cropping. Most of the farms were either horticulture (14) or cropping farms (14) and these are the type of farms in New Zealand that include most organic farms (Barrow and Willis, 1993:7). The other main farm type was grazing. The classification of certification status was fairly straightforward. Some organic farmers were not registered: in some cases this was due to minor administrative causes such as not getting paper work completed on time but in others it was a conscious preference not to have Bio-Gro NZ certification.

To obtain names of farmers a variety of methods were used. To begin with a list of names was provided to us by Wattie Frozen Foods Ltd. This list included most of their current organic suppliers plus the names of people who had made enquiries to Wattie Frozen Foods Ltd, and therefore included farmers who were favourably disposed towards organic farming. Names were selected from this list initially in a random way (first name at the top of each column) but selecting these reasonably close to Christchurch. Then names were selected for other reasons such as if they were in the same location as a farmer for whom an interview had been arranged. Using the Wattie Frozen Foods Ltd list resulted in a large proportion of smallholders; later on names were selected that gave an indication of a full-time farm (a farm name was also listed). In order to obtain names of conventional farmers who had not contacted Wattie Frozen Foods Ltd three other sources were used. First, a farmer who also worked at the Farm and Horticultural Management Department at Lincoln University was interviewed and he provided three names; second, a farm consultant near Rangiora provided names and personal introductions to three farmers; and third, an organic food producer with broad knowledge of organic and conventional farmers provided a list of 15 names. In order to include specific types of conventional farms in two different areas of Central Canterbury, farmers known to the first author were approached; each participated in the study and provided names of four neighbours. Finally, a list of 13 names of farmers no longer registered as organic producers was provided by a representative from Agriculture New Zealand and a few of these names were used. Figure 1 shows the location of each of the 40 of the 43 subjects who participated in the study (two farmers who provided a telephone interview were not located precisely and one had sold his farm recently and lived in Christchurch). All of the 43 subjects were interviewed by the first author.

The majority of the interviews occurred on the farm, while a small number (nine) were telephone interviews. In the process of making telephone contact with these latter farmers, they were so forthcoming over the telephone that the interview proceeded spontaneously and was sufficiently detailed to provide a good understanding of their situation and thinking. Nearly all of these farmers were not full-time farmers, and their story was relatively straightforward and easy to record by taking notes.

Figure 1
Map of Mid-Canterbury Showing Location of Respondents



The interviewing procedure consisted of introduction and salutation followed by a brief explanation of the overall project and its general objectives. Then an explanation was provided for the focus of this study on the decision making process of organic and conventional farmers in an attempt to learn the reasons why, or why not, people farmed organically. The interviewer stated that his expertise was in social science, not in farming or organic production. All interviews were tape recorded and detailed notes were made while subjects were speaking. Nearly all interviews were located in the subject's house and typically at the kitchen table. Twenty-nine of the interviews were with the farm man only, 11 were with the farm couple and three were with the farm woman only. While the majority of the interviews were with the farm man only, every effort was made to include farm women, and in future we hope to pursue further the role of women in decision making.

The interview began with the subject giving a thumb-nail sketch of the farm situation, including a brief description of the type of farm. It then moved on to details of what stock or crops were grown and why. Then the farmers were invited to talk about why they had their particular approach to farming. A check list of questions was used occasionally through the interview, but typically at the end of the interview, to ensure that key topic areas were included in discussion. However, most of the interviews proceeded in their own way to cover all of the relevant topics. Each interview took about one hour. The objective of the interview was to record thoroughly all of the main considerations the farmer brought to bear on decision making with respect to organic or conventional production.

Each set of written interview notes was checked for clarity the next day and the essential features for each case were listed on separate paper. These elements were used later to build slowly the decision tree, sequentially integrating each new case. Two follow-up telephone calls were made to farmers at this later time to clarify outstanding issues. After six drafts the decision tree remained stable and effectively recorded, in the aggregate, farmer decision making regarding growing, or not growing, organic products.

3.4 Limitations of the Method

The small sample allows for in-depth interviewing and developing a detailed understanding of farmers' decision making. It is not possible with the way the method was used here to draw conclusions about the farm population in Canterbury. The total sample size was 43 and it was a non-random sample, attempting to select farmers with different types of farm and from different parts of Central Canterbury. At best the numerical data derived from the 43 cases is suggestive only of farm population characteristics. This approach is typical of qualitative studies which seek to understand in detail the phenomenon being studied. The focus is on the fundamental nature and qualities of the topic. A good analogy is the study of English grammar which seeks to identify the kinds of words used in typical conversation where the focus is on describing and defining different types of words (e.g. nouns and verbs) and building up an understanding of the structure of the language. Once the basic structure is established it would then be possible to survey language use and estimate the population frequency of different types of words based on the characteristics of the random sample. (It should be noted that population frequency can also be indicated from knowledge of the language structure.) It is important to establish the structure first before going on to do the survey. It is this groundwork which the present study aims to do.

Despite the limitation with inference to the population, the decision tree can still be important in itself. For example, in identifying particular combinations of decision criteria or constraints one can identify a particular approach to decision making. For people seeking to

encourage organic farming or support farmers' decision making this information can help them better understand the farmers they are dealing with. Some limitations with this decision making approach remain however. It would be a mistake to think that the decision tree presented here exhausts the analysis of decision making. For example, there remain questions about the origin of particular viewpoints, and research could examine why particular reasons are held. There may also be household dynamics, including gender, for those cases in which each member of farming couples are involved, to a greater or lesser degree, in decision making.

CHAPTER 4

RESULTS

4.1 Introduction

The decision making associated with growing products organically, or not growing products organically, proved to be relatively straightforward and the structure of the decision tree that resulted from analysis of the interview data was similar to the structure of other decision trees found in New Zealand (Fairweather, 1992) and overseas (Gladwin, 1989a) research. The tree model developed here shows that farmers must pass some elimination criteria before they go on to consider decision making in any detail. If any of these elimination criteria are relevant to a farmer then they do not consider seriously organic farming. The model then identifies the important decision criteria and most of these take the form of reasons or motivations for growing organic products. If no motivation applies then the farmers do not grow any organic products. However, having a motivation is no guarantee that farmers will actually grow organic products: if a constraint applies then they will not. In the sections that follow the above-mentioned parts of the decision tree are considered in detail and presented as Figures 2 to 4 respectively.

4.2 Elimination Criteria

Figure 2 shows that there were five elimination criteria and that they were relevant to a subtotal of eight cases. Criterion 1 was relevant to one farmer who had not really considered organic farming even though he was not slavishly committed to conventional farming. In fact he related an experience of using a chemical that had poisoned a farm dog, but this had not motivated an interest in organic production. Further, he was quite open to the possibility that organic farming might have something useful to provide to conventional farming. Criterion 2 was relevant to two conventional farmers who were well served by conventional farming. They had largely negative opinions about organic farming, being particularly concerned about lowered yields, the hassle of harvesting weedy crops and the untidiness of organic farms. For these farmers chemicals provided not only a means to manage weeds or pests but also a means to maintain a standard of farming practice which was visible to any observer. One farmer sprayed the grass around his sheds to keep his farm tidy. In both cases the stubble from their grain crops was burnt rather than mulched. They saw organic farming as farming by default. Both mentioned that they had pride in farming to keep control over pests and weeds.

Criterion 3 was relevant to one established farmer who managed a dairy farm on a relatively low input basis. His policy was: "If you don't really need it - don't use it" and he was able to pursue this policy effectively. Part of his farm was used to graze dry stock or young stock and this part received no inputs, and he considered this as organic farming by default. Generally, this farmer had little knowledge of organic farming and was not adversely disposed to it like the two farmers mentioned above. Criterion 4 was relevant to one farmer who believed that organic farming was not viable and he based his views on examples of organic farms he had seen. Such farms were unsuccessful financially and, in his opinion, the farmers were lazy. Fundamentally, this farmer saw no substitute for chemical weed control and had never seriously considered organic farming on his farm.

43 cases



Finally, criterion 5 was relevant to one farmer who was well-informed about farming generally and who again was not impressed with the lowered yields (and impure crops harvested) associated with organic farming and considered that significant premiums would be needed to make it viable. However, he acknowledged that he had not done any gross margin analyses to assess the profitability of a lower yielding organic crop. He also emphasised that organic farming was not sustainable because it needs more land to grow the world's food, uses fossil fuels, and may in fact be benefiting from neighbours' weed control. About half a dozen other farmers mentioned the 'organic farming is not sustainable' argument and referred to an article on this theme that had received good coverage in the rural press. However, one farmer who was positively oriented to organic farming considered that the original research on which this article was based had a poor scientific basis. The issue for Criterion 5 is the unsustainable nature of organic farming, and for the farmer concerned this was very important and for this reason he did not seriously consider organic farming.

The five elimination criteria include reasons which if they apply to any farmers means that these farmers do not even really consider organic farming and they either ignore or reject it. In all cases these farmers were farming full time. The remaining farmers, those for whom none of these criteria apply, went on to consider motivations for organic farming.

4.3 Motivation for Growing Organic Products

People usually do things for a number of reasons or motivations and this is no less true for farmers. Many of the farmers interviewed mentioned more than one motivation but in this analysis attention is given to the one principal motivation which was decisive in understanding that farmer's behaviour.

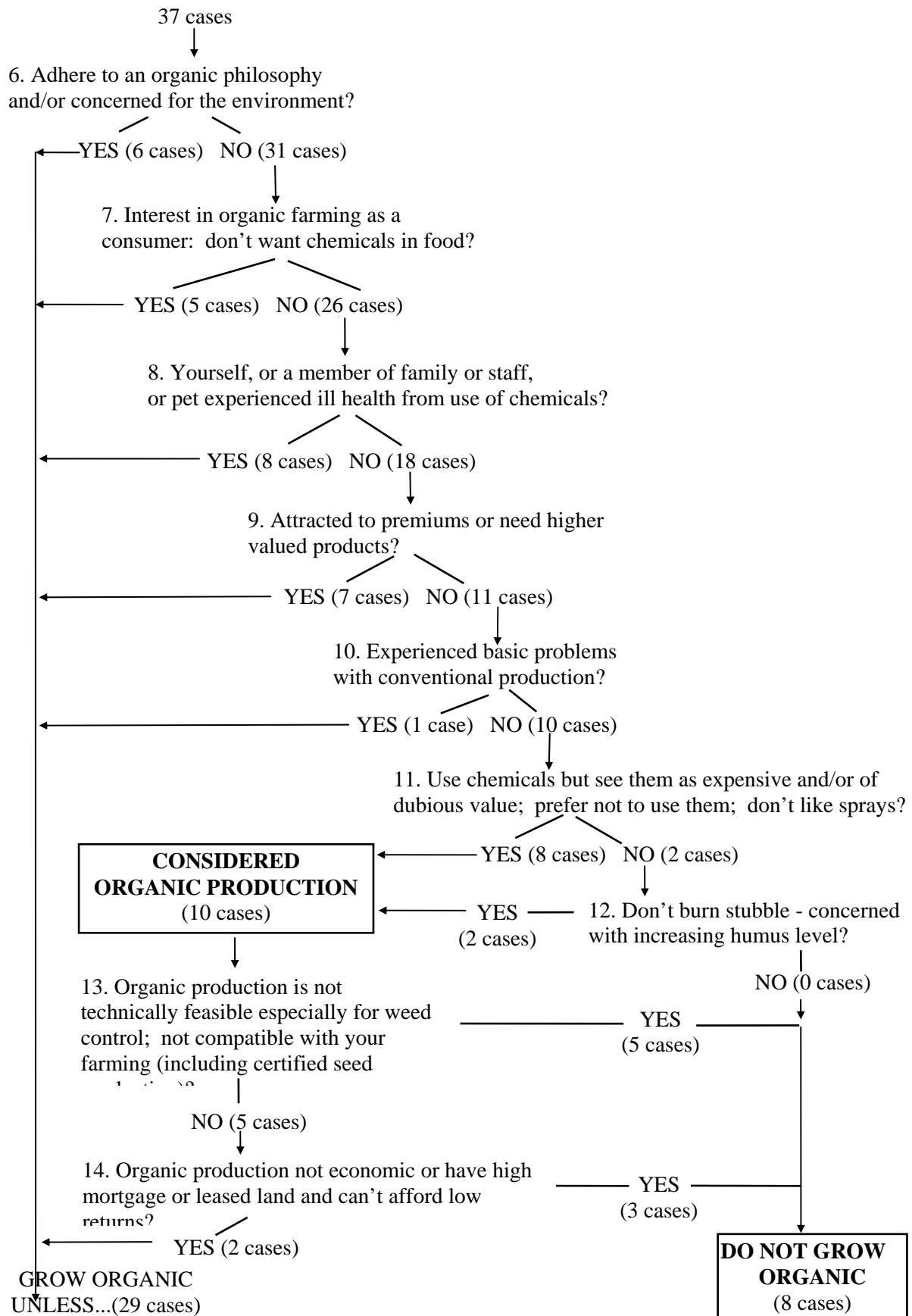
Figure 3 shows five motivations (Criteria 6 to 10) which compel farmers to grow organic products (if possible) and two motivations (Criteria 11 and 12) which lead them to seriously consider organic production. Criterion 6 was relevant to six farmers who emphasised organic philosophy or concern for the environment. Their concerns were general rather than specific. They may have referred to farmers dying of cancer but the experience was not manifest in their immediate family. They may have referred to the balance of nature, that the organic philosophy made sense, or that they had sympathy and concern about the soil. In each case their concern was sufficient in itself to motivate organic farming. Criterion 7 was relevant to five farmers who were slightly more focused in their concern, and that was with respect to chemicals in food. These farmers were health conscious as consumers, that is, they were opposed to all chemicals in food, or were concerned about people eating their products. One farmer believed that organic food tasted better and that conventionally produced food was tasteless.

Criterion 8 was relevant to farmers who said that they had experienced ill health from chemicals. In some cases the ill health was experienced by a member of the immediate family or by a family pet. In other cases the farmers observed peoples' reactions to chemicals. In any case the essential feature of Criterion 8 is the first hand experience of adverse effects from use of chemicals rather than a general aversion, in principle, to the use of chemicals. This experience was a powerful motivation for organic farming.

Criterion 9 was relevant to farmers who emphasised that organic premiums were the most significant factor in their decision making. However, there were two ways that this interest in premiums manifested. First, smallholders and some part-time farmers needed to optimise the use of their land and to receive the best possible return on their capital investment. They were attracted to the premiums, especially those provided by Wattie Frozen Foods Ltd for peas,

Figure 3

Motivations for Growing Organic Products
(Given you have passed Figure 2 criteria)



beans, sweetcorn and carrots, in order to boost per hectare returns. Second, full-time farmers who were able to put some of their farm into organic crops were attracted to the premiums. While these farmers wanted good returns it was not so much because of their overall situation but because they were going to the effort of managing part of their farm on an organic basis. For these farmers the organic crop was part of their production portfolio. Generally then, farmers covered by Criterion 9 were interested in adding value and producing 'higher value crops'. Most (especially the smallholders and part-time farmers) had first hand experience of the returns from conventional crops and wanted to do better.

Criterion 10 was relevant to one farmer who cited some fundamental problems with conventional production. In some cases these problems were mentioned by other farmers but these were ancillary to their main motivation. This farmer believed that his earlier superphosphate fertiliser had not worked well and that stock health could be improved. His father had not used a high level of inputs so it is likely that he was sceptical of the benefits of using chemicals. Further, as was the case with at least one other farmer who critically assessed his methods and found them wanting, he had tried using liquid fertiliser. After a period of adjusting to the demands of organic production he has converted most of his farm to organic crops.

Criteria 6 to 10, if they apply, relate to motivations that directly lead farmers to grow organic products if possible. The remaining two motivations lead them to seriously consider organic production. Criterion 11 was relevant to eight full-time farmers who were using chemicals but who preferred not to use them. In some cases this was motivated by concern for the cost of chemicals - this element of a farm budget is easily identified and valued - and in some cases by concern about working with sprays and their potential effect on their health. There was also some suspicion about the efficacy of sprays, or at least the cost-effectiveness of sprays. One farmer had a policy of using less chemical than recommended and if there was any doubt about the need for a chemical he did not use it. Use of chemicals was related to the intensity of farming and the particular weed problems which were present at that time. Some weeds were perennial problems (twitch, gorse) while others were newcomers (carrot). Intensive crop farmers had high use of chemicals and perhaps were more disposed to finding ways to reduce this element of their costs. However, they also used land that had been cropped for many years and had a large bank of weed seeds that required chemical control.

Criterion 12 was relevant to two farmers who had a special concern for soil quality. They did not burn their grain stubbles and were highly conscious of soil organic structure and humus levels. Their orientation to the soil made them receptive to organic farming techniques.

The ten farmers for whom both Criterion 11 and Criterion 12 were relevant actually considered organic production on their farm. They may have been exposed to some of the ideas that influenced farmers in the elimination part of the decision tree but they went further and gave organic production more consideration. However, despite their interest in organic production only two of them decided to grow organic products. There were two separate constraints for these farmers who considered organic production. First, there were the technical issues as expressed by Criterion 13. There were five farmers who believed that organic production was not possible especially since their cropping entailed managing many weeds. In some cases crop farmers grew certified seeds for premium returns and were required to ensure that there was high purity in their seed crop. Second, there were financial constraints expressed by Criterion 14. There were three farmers who believed organic production was not economically viable and/or that they could not afford low returns because of the level of their mortgage. Typically, these farmers had family responsibilities and an

associated high mortgage which made it difficult to contemplate organic farming when they saw it as leading to lowered and/or uncertain returns. In some respects then the farmers who have considered organic production and decided not to pursue it are influenced by factors similar to those farmers who were eliminated by Criterion 4.

Figure 3 shows that from the total of 37 farmers that passed Figure 2 criteria and entered Figure 3 there were 27 farmers who had a motivation to grow organic and ten who had a motivation to consider organic production. From the latter group there were eight farmers who decided not to grow organic products and two farmers who went on to grow organic products. Thus there were a total of 29 farmers who would grow organic products unless there was a constraint that prevented them. In this study there were no farmers who answered negatively the question in Criterion 12 but it is possible that some farmers would get to this criterion, answer in the negative, and would not grow organic products because no motivation applied to them.

4.4. Constraints to the Organic Farming Decision

Any one motivation is sufficient to lead a farmer to grow organic products. However, any one constraint can prevent a farmer from actually growing organic products. Figure 4 shows the constraints which applied to those farmers who had a motivation to grow organic products. Criterion 15 was relevant to two farmers (smallholders) who had occupations which did not allow them to put time into searching for an organic crop that they could grow, and they did not grow organic crops. Criterion 16 was relevant to one farmer who would have otherwise grown organic peas for Wattie Frozen Foods Ltd but his farm was too small and it was too far from the processing factory. (Wattie Frozen Foods Ltd have extended the boundaries of the procurement region in recent years). Criterion 17 was relevant to seven farmers (four of whom were smallholders) who had not yet found an organic crop, or were still developing production techniques (e.g. production of nursery plugs (small plants)). As one smallholder put it: “We are going around with our eyes wide open, searching for the ultimate crop to make our fortune”. It may have been true for the smallholders in this group that they had considered growing organic peas for Wattie Frozen Foods Ltd but their farms were too small (as in Criterion 16). However, there were two full-time farmers who were looking for organic crops to supplement their ongoing activities in one case, or to move into organic crops more fully in the other. Taken together, Criteria 16 and 17 include eight farmers who were committed to organic production for a variety of reasons but were still looking for their organic crop. While there was one farmer who had started to produce an organic crop it was still in the development stage. Generally then, this group of farmers can be described as “Hopeful Organic”.

Criterion 18 was relevant to three farmers who were very interested in organic production but were unable to pursue their interest largely because of family and financial commitments. Their mortgage required sticking with conventional production because of its certainties. Conventional farming was “too easy” in terms of using known inputs and their expertise to produce a product with a fairly certain financial return. Two of these farmers were on dairy farms and there were no premiums available for organic milk and their heavy soil precluded vegetable crops. In the other case the farmer did have an alternative in producing organic apples and was working towards that goal. While these farmers are not growing organic they want to and they can be labelled as “Frustrated Organic” farmers.

Figure 4
Constraints to the Organic Farming Decision
(Given you have decided to grow organic products)

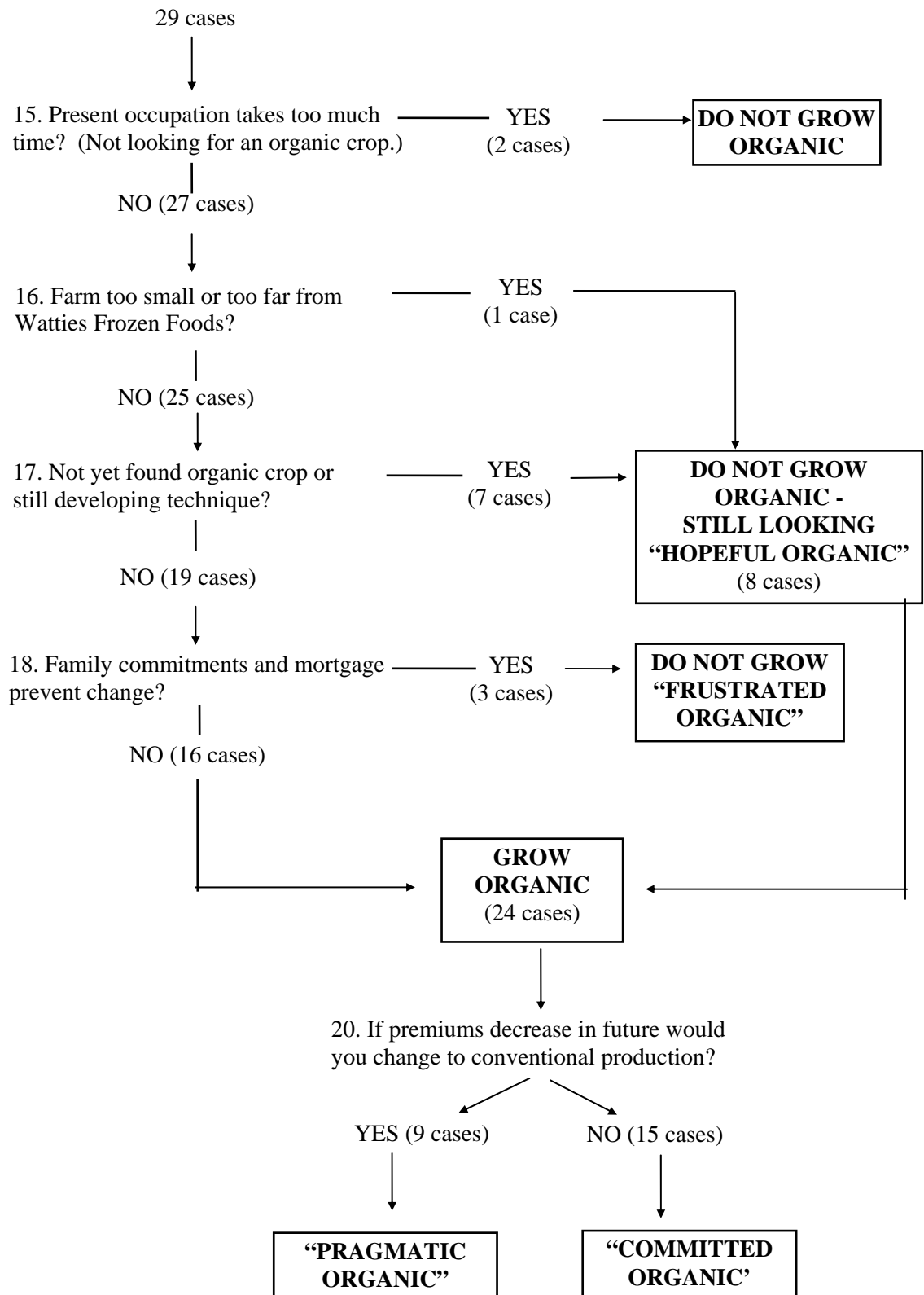


Figure 4 shows that of the 29 farmers who had decided to grow organic there were 13 for whom a constraint applied and they do not grow organic products despite their strong motivation. This leaves 16 farmers who actually grew an organic product of some kind. The figure also shows some additional information about these organic farmers. Criterion 20 identifies their attitude to changes in the premium price for organic products and shows the level of commitment to organic farming. Of the 24 farmers there were nine who would switch to conventional production if price premiums were to decrease in future, and 15 who would not. These data show that among the organic farmers there are two types: the “Pragmatic Organic” and “Committed Organic” farmers.

4.5 Some Quantitative Observations

A non-random sample is not suited to making inferences to a population. However, as suggestions of possible features in a population some of the obvious characteristics of the sample may be relevant and these are noted here merely as suggestions that await future, quantitative research. The location of full-time farmers and part-time farmers or smallholders in the decision tree is ordered rather than evenly spread. Each of the six farmers for whom an elimination criterion was relevant were full-time farmers. Perhaps full-time farming provides a basis from which organic farming can either be ignored or rejected while smallholders and part-time farmers have less flexibility and, in some cases, are very keen to earn premiums for their organic products. However, it is conceivable that smallholders other than those sampled in this study would also ignore or reject organic farming. It is likely that this finding reflects the characteristics of the smallholders selected for study. Further, each of the eight farmers who considered organic production were full-time farmers. Many (eight out of ten) were using chemicals and had reservations about their use. Thus, it is full-time farmers for whom these criteria seem to apply, and it seems unlikely that smallholders would be using many chemicals - if they were, they would be operating at a scale more akin to full-time farmers. Finally, the constraints identified in Criteria 15 to 17 were mostly (eight out of 11 cases) relevant to smallholders, and this makes sense intuitively. There was no clear pattern among the Pragmatic Organic farmers and the Committed Organic farmers with respect to type or size of farming operation.

CHAPTER 5

CONCLUSION

5.1 Introduction

The objective of this research was to examine the decision making of farmers and develop an understanding of why, or why not, they grew organic products. The literature review shows that there is only a limited understanding of this topic both in New Zealand and overseas, although some of it does identify reasons for growing organic products. There have been few studies that include the views of both organic and conventional farmers, and none that specifically focuses on decision making itself. The ethnographic decision tree model was used to address the research objective and it worked well to highlight elimination criteria, key motivations and constraints.

5.2 Main Findings and Comparison to the Literature

The results show that farmers did not grow organic products if there was an elimination criterion that applied to them in which case they had never really considered organic farming. Some had considered it but found it wanting technically (Criterion 13) or financially (Criterion 14). Further, farmers did not grow organic products if there was no motivation that was applicable to them. Among the motivations were views that related to philosophy (Criterion 6), food (Criterion 7), health (Criterion 8), premium prices (Criterion 9) or problems with conventional production (Criterion 10). While there were a variety of motivations that led farmers to organic farming it was achieved only if there was no constraint that applied to them. They did not grow organic products if they were too busy (Criterion 15), if they were still looking (Organic Hopefuls) or if they were subject to other commitments (Frustrated Organic). Generally, there were a significant number of constraints that affected 11 out of the 29 farmers who had decided to grow organic products, such that there was significant interest in organic farming that was unable to be realised.

Some of the findings in this study of a wide variety of Canterbury farmers are consistent with results obtained in other studies. For example, some of the overseas and Australasian research found that environmental and philosophical motivations for organic farming were significant, and usually more so than financial reasons - a finding confirmed in this study. Further, the literature to date has reported dissatisfaction with conventional farming in terms of livestock health, harm to the soil or cost effectiveness, and this theme was an essential part of the decision tree described here. Fisher (1989) and Scully (1993) showed that conventional farmers were put off by perceived technical difficulties and uncertainty of organic product markets, themes that are shown again clearly among the constraints identified in the decision tree.

Comparison of the results of this study to those reported in the literature show not so much as novel findings here but a more comprehensive account of decision making in one study. The results confirm many of the findings from the earlier studies and highlight consistent themes in farmers' decision making. The decision tree integrates all the apparently relevant aspects of decision making in a reasonably succinct and efficient manner, and it provides some additional

insights. First, it provides a more refined assessment of the different types of both organic and conventional farmers. Organic farmers can be of at least four types: Organic Hopefuls, Frustrated, Pragmatic and Committed, each having a shared viewpoint but giving expression to it in different ways. Their actual practice of organic farming is or will be influenced by their viewpoints and situation. Conventional farmers can be of at least two types: never really considered organic farming or have seriously considered it. Second, the decision tree readily identifies constraints that are preventing change to organic farming - constraints that apply to both organic and conventional farmers. These will be examined in more detail later when the prospects for encouraging organic farming are considered.

5.3 Diversity of Motivation for Organic Farming

The results of this study show that farmers come to be interested in organic farming for a variety of reasons. There are some fundamental patterns. First, some organic farmers were motivated by such unsurprising reasons as organic philosophy (Criterion 6), or concern for chemicals in food (Criterion 7). Others were concerned about personal health (Criterion 8). These reasons can be characterised as typical of current views on food production and environmental problems which are common in contemporary urban discourse on organic farming. Second, some farmers were motivated by premiums, and this is not unexpected. Third, there were motivations relating to conventional production, either with experience of basic problems (Criterion 10), antipathy to chemicals (Criterion 11), or concern for the soil (Criterion 12).

Fairly predictable were the findings relating to the organic movement generally. Criterion 6 and Criterion 7 refer to two strands of the modern organic agriculture movement - one relating to the environment and one relating to food quality. These strands are similar to the findings in James's (1993) analysis of organic food consumption decisions in Britain. In James's study, organic food consumption was found to be incorporated into existing discourses rather than forming its own social discourse. Three prominent discourses tended to be predominant in people's decisions to eat organic food - and the actual practice of organic food consumption was shaped by which discourse it was being incorporated into. The first of these discourses was environmentalism (James 1993, 208). The reason for eating organic food was that it had beneficial long-term effects on the environment. The second discourse was lifestylism (James 1993, 211). Lifestylism did overlap with the environmentalist discourse, but directly related food consumption as an indicator of having an 'alternative' lifestyle to the perceived norm. The third discourse was health (James 1993, 213). This third discourse incorporated organic food purchasing decisions into wider concerns about food and health and was by far the most numerically significant. To conclude, James (1993) introduces the idea that organic consumption decisions were not necessarily logically derived from an ideological commitment just to environmentalism, and in fact, three different discourses all were invoked to produce the same ends.

The 11 cases in Criteria 6 and 7 (committed to organic philosophy or averse to having chemicals in food), relate to the first two discourses in James's study - environmentalism and lifestylism. Criterion 7 is also related to Criterion 8 (concerns about health), and taken together they total 13 cases which have the same motivation described in James's third discourse. While the specific focus of the decisions were different (growing as against consuming organic food), the underlying structure of the decisions with these three criteria were very similar between the Canterbury study and James (1993).

Unlike James's findings, a significant group of farmers were attracted to organic production for reasons clearly situated within the experience of conventional farming (Criteria 9-12). Most of these decisions centred around the desire to pursue the higher premiums for organic products or the desire to reduce costs of spraying - both typical decision criteria within conventional farming. These kinds of decisions bear no relation to James's (1993) findings as there was no mention of consumer decisions relating to organic food having a better price or lower cost (mainly due to the fact that organic food tends to be around 30 per cent more expensive than conventional food).

Somewhat surprising among the findings were the eight farmers who reported first hand experience of ill health from use of chemicals (Criterion 8). With the non-random sample used in this study the proportion reporting ill health may be quite distorted, however, it is noteworthy that the eight out of nineteen farmers with a straightforward motivation (Criteria 6-8) to grow organic products mentioned health when most farmers and observers believe that conventional production is not particularly dangerous. Typically, the environmental danger of conventional farming is seen as manifesting in more generalised, adverse environmental effects.

An expected finding was the financial motivation expressed in Criterion 9. For some farmers this was very important, even though they may have also identified with some of the other motivations. Five out of seven of the farmers covered by this criterion were also Pragmatic Organic, meaning that they would switch to conventional production if premiums were to decrease in the future. Of the two farmers that were not Pragmatic Organic one was covered by Criterion 15 (not enough time) while the other was a Committed Organic, but who would not grow any organic products if there were no premiums. Thus it is likely that, in general, financial motivation is not important for most farmers who are Committed Organic.

The motivations for organic production that related to the unsatisfactory aspects of conventional production were reported by full-time farmers who were perhaps more aware than we anticipated of some of the shortcomings of conventional production. They comprised a group who have considered organic production, albeit without necessarily seeking all the relevant information, and most decided against organic production. Perhaps they were not motivated as strongly as the organic farmers to seek or develop alternative production methods. The two farmers who were not constrained by Criterion 13 or Criterion 14 and did grow organic products marketed them either to Wattie Frozen Foods Ltd or played a role in New Zealand Biograins.

Among the farmers in this group who had considered organic farming and decided to grow organic products one can recognise the growing ascendancy of organic farming as a rejuvenation of 'old style' farming, that is, farming with lowered purchased inputs. Some farmers in this group identified with, or were familiar with, low input farming or they had a parent who had not embraced high input farming. Farmers covered by Criterion 1 and Criterion 3 were similar. This type of farmer has not modernised or taken on the demands of high input production typically advocated by research centres of various types. These farmers can become 'invisible' or unnoticed because they do not participate frequently in technology dissemination activities such as field days. This group of farmers may be more common among the farming population than is recognised currently. The farmers in this study who were from this group had come to organic farming along a different pathway of experience compared to those that had some affiliation with the current organic agriculture movement. In effect, these two groups of organic farmers had similar interests but quite distinct motivations and would appear to be unlikely bedfellows. In any case, traditional farming as practiced

before World War II, approximately, has growing legitimacy now and is gaining credibility because of the organic movement. There are retired farmers and older farmers who remember the traditional farming techniques, and some of the organic farmers in this study have sought out help and advice from them. Some of these organic farmers were critical of current scientific practices although they did not appear to be aware of the diversity of approaches to farming that can derive from current science.

Finally, we can note the two broad responses of conventional farmers to the prospect of organic farming - some do not really consider it, while others do actually consider it but do not see it as technically or economically viable. Farmers in the first category were to some extent not encouraged to consider organic farming because their conventional farming was either unproblematic or profitable, or both. There was little that caused them to consider organic farming. There were some similarities between the two types however, since it was the technical and economic viability of organic production that formed the basis of their decision.

5.4 Other Observations

A number of other observations can be made about the results. These include: the role of mortgage levels, the significance of attitude change and the current level of acceptability of organic farming.

The first theme here is the effect of the farmer's financial position on ability to consider or put into practice organic farming methods. Criterion 14 was relevant to three full-time farmers who had considered organic farming but had a large mortgage and could not afford low returns. Criterion 18 was relevant to three full-time farmers who were similarly affected by their mortgage level. These six farmers were not atypical because most farmers have to borrow to enter farming, maintain or expand production, or provide for succession from one generation to the other. In social science terms these farmers are 'subsumed' to the circuits of finance capital, and this subsumption limits their flexibility. The important point about these results is that some farmers, but not all, emphasised this type of financial constraint.

The second theme is the attitudinal change needed for effective change in production techniques. In large part it is not simply a question of farmers changing their techniques but changing their whole approach to farming, rather like a paradigmatic change that occurs when scientists, or others, thoroughly revise their prevailing theories or understanding of their world. One full-time organic farmer recognised this phenomenon, even within himself, during the process of adjusting from conventional farming to organic farming. Initially the Bio-Gro NZ regulations appeared daunting and unnecessary but he had, over a period of time, overcome the technical challenges and adjusted his attitudinal set as well. He emphasised that conventional farmers cannot suddenly change and become organic farmers.

A related point here is the demand that organic farming takes on managerial skill. As one farmer put it: "The best organic farmers are good conventional farmers first". This claim illustrates that organic farming is not easy, and that it requires a good knowledge of husbandry, in the broadest sense, to become an effective organic farmer. Another said: "It would have been easier to learn conventional farming first and then change to organic farming". The latter observation may be contentious because it could be argued that the demands on management required of organic farming could be more easily achieved by someone not influenced by conventional farming. However, putting this debate aside, the issue here is that organic farming requires a different approach to management and a different approach to problem solving.

The key point is that there may not be a uniform farming knowledge. Kloppenburg (1991) (but see also Molnar et al., 1992; Flora 1992; Kloppenburg, 1992; Hassanein & Kloppenburg, 1995; Feldman & Welsh, 1995) develops this point in his analysis of the failings of formal agricultural extension. The position taken by Kloppenburg is that agricultural knowledges and skills are often generated over long periods of time in specific locations involving complex interactions of different factors. Given that agricultural production takes place in such a situation, generalised knowledge systems and models - as provided by agricultural science - can often be unsuitable in specific situations. The most striking examples are taken from the failure of North American seeds and farming systems to be adapted to local conditions in the Green Revolution in India. For another example, in New Zealand, Campbell (1994) illustrated adaptation of general principles to specific settings during the rural downturn of the 1980s as experienced conventional farmers, who had a long-term knowledge of one piece of land, were able to reduce inputs and manoeuvre their farm operations in 'crisis-mode' with more success than newly arrived farmers (often with large capital outlay) who were farming 'by the book'. Organic agriculture requires complex variables to be taken into account and often this can only take place through long-term experience attained on one farm. Thus, generalised scientific principles need to be specifically adapted to particular locations using local knowledge. One implication of this point is that for organic farmers who are forced into a different approach to problem-solving, this is not necessarily 'unscientific' or characteristic of unsuccessful farmers. In fact, the opposite may apply as is being increasingly advocated in newer systems of agricultural extension like 'farmer first'.

The third theme is the general level of acceptability of organic farming to conventional farmers. Most of the organic farmers reported that there was a change in attitude among their neighbours to the idea of organic farming. It now did not convey the 'long hair and sandals' image formerly associated with organic farming. This point confirms the same observation made by Scully (1993). Some conventional farmers appear to be watching organic developments. However, farmers who were negative about organic farming were quick to refer to examples of failed organic farmers in their area. As one farmer put it: "Becoming an organic farmer is the first step to leaving farming". For others, organic farming was farming by default. In one case an organic farmer growing peas on part of his farm was reluctant to let his neighbours know what he was doing. Despite these sentiments there seems to be a growing acceptance of organic farming. It may even be the case that as the numbers of organic farmers increases in future it will become a legitimate form of mainstream farming.

5.5 Some Observations on Organic Certification

Linked to the area of attitude change is the issue of organic philosophy. The Bio-Gro NZ certification process is important for the developing industry but in its application is problematic for two reasons. First, some farmers perceive Bio-Gro NZ as providing certification only if a proper organic viewpoint is held by the farmer, despite what actual practices are being pursued. This use of non-production criteria was of great concern to some farmers, especially if they did not obtain certification. They saw it as making certification an arbitrary, and therefore inherently unfair, process. Second, some of the certifying officers were seen as less suitable or less well qualified compared to others. Problems with certification meant that two of the farmers interviewed refused to play a part in the process, while a few others did not seek registration because their product received no premium anyway (e.g. sheepmeat). In one case an organic farmer was seeking registration through alternative authorities. Some of the smallholders considered the annual application fee to be very high. However, not all farmers reported problems, and for them the registration process was entirely acceptable.

5.6 Policy: Research Needs and Prospects for Encouraging Organic Farming

In this following discussion the assumptions are made that the aim of policy is to encourage organic farming, and that organic farming is a distinct production system compared to conventional farming. It is not assumed that policy initiatives are the responsibility of government.

The first part of the decision tree relevant to policy is the list of elimination criteria. Farmers covered by Criterion 1 and Criterion 3 could be easily informed about organic farming because they have no particular views about it, that is, they do not have negative attitudes and would appear to be easy to persuade. Farmers covered by Criterion 3 would be good candidates for organic farming because their farms are run on a low input basis. Farmers covered by Criteria 2, 4 and 5 have stronger views about organic farming and would need considerable persuasion and/or provision of good evidence on the technical and economic viability of organic farming (see later discussion) and on its sustainability. The farmers most resistant to change would be those covered by Criterion 2 - they have little need to change and see successful farming as that which is currently practiced.

The second part of the decision tree relevant to policy is the group of motivations covered by Criteria 6 to 12. Some of these indicate needs for research to strengthen the claims that can be made to support organic farming. For example, Criterion 8 refers to personal experience of ill health and it may be the case that a farmer survey could document the extent of such experiences among the farm population. Pryde (1981) surveyed farmers in 1980 to find that 4.4 per cent of the sample reported that their health was affected by chemical usage in the last 12 months. Farmers also reported other health problems, including allergies (26 per cent), which could stem from chemical use. At present there may be wider acceptance of the possibility of ill health from chemicals, and therefore more reporting of instances. Alternatively, there may be more careful use of chemicals. Careful surveying would be needed to monitor farmer opinions and compare the present situation with 1980.

Criterion 9 emphasises premiums and there is a need for careful analysis of the gross margins associated with growing organic products. Some research has been conducted of this type (e.g. Lamb, 1994) and it shows that the best growers of organic crops for Wattie Frozen Foods Ltd can achieve excellent returns, but the lowest returns occurred for organic growers, typically on small farms. Further research is needed to cover a wider range of products and these results need to be widely publicised. This would have the effect of motivating more farmers to grow organic products (i.e. making Criterion 9 more widely used), and it would address the concerns about financial viability expressed by farmers covered by Criterion 4 and Criterion 14. Generally, farmers' view on the economics of organic production show contrasting positions: some accept that premiums can be obtained while others deny that organic production is economic. Clearly, there is scope for more informed decision making on this topic. Further, ideas about what is 'good' farming and what is 'tidy' farming may need to change to allow organic farming to have a greater role to play.

Not only is further research on the gross margins of organic crops needed, but attention must be given to providing premiums to encourage farmers to grow organic products. Where export premiums can be obtained then these provide the greatest incentive to farmers - both smallholders and conventional farmers. As the decision tree has demonstrated, this function is vital to supporting the development of organic production. If the companies offering

premiums did not operate in Canterbury then it is likely that a key element of the decision tree (Criterion 9 - premiums) would not be so relevant, and most of the organic farmers would be motivated by philosophy, food and health factors only.

The decision tree highlights a number of constraints to organic production and focusing on these can also guide the development of policy recommendations. The main constraints are the views popular among many conventional farmers that organic farming is not technically or economically viable (Criteria 4, 13 and 14). The economic viability issue has just been discussed. On the technical side there is scope for research, demonstration and dissemination of techniques to solve technical problems. Many farmers were concerned about weed control and yet some of the organic farmers said that they had overcome most of the problems associated with this aspect of organic production. Some claimed that it was a matter of timely cultivation combined with careful observation and prompt response to emerging weeds. It seems that weed control is possible, and there are new techniques recently developed, but that they are not so convenient as using chemicals. Preventing adoption of organic techniques is the apparent suitability of some chemicals. A popular chemical is Roundup and its apparently benign effect on the soil makes it difficult for conventional farmers to see why it is not environmentally acceptable. Another apparently benign traditional practice is the use of superphosphate fertiliser, and some farmers believe that its use is necessary to benefit soil structure and improve humus levels. There is also a need for research on the crop rotations that are viable under organic farming. Another element to technical development is research which would lead to improved seed dressing and cleaning technology. This would allow efficient separation of seeds harvested from grain crops with a high proportion of weed seeds.

The other important constraints (Criterion 16 and Criterion 17) relate to farmers who were still looking for an organic crop. Some in this group are perhaps best described as wishful thinkers and have small areas that will not contribute significantly to production. However, they may be useful in that they can develop new techniques or crops that will benefit the industry. The size of farm is a problem for many in this group. Research and publicity on organic financial viability needs to emphasise the role and importance of farm size. Hopeful Organic farmers may not actually become significant producers, although this depends on their ability and initiative to develop an organic product, and on contextual factors such as provision of research results or other technical or marketing assistance. The Frustrated Organic farmers were more practical in orientation and actually engaged in full-time conventional farming and may be quite adept at changing to organic production.

Finally, the constraint of a high mortgage was referred to Criterion 14 and Criterion 18. We are ambivalent about this issue. On the one hand it seems plausible that mortgage levels significantly influence decision making and finding ways to overcome this constraint would appear to be effective in encouraging organic production. Perhaps improved financial analysis might show that the barrier is more apparent than real. On the other hand, a high mortgage may have resulted from the high cost of land and therefore the cost of entering farming and is likely to be an enduring aspect of primary production. Under competition for land it may not be possible to do anything other than intensive farming in the majority of cases (but see the point about the need for gross margin analysis made above). If this is the case then it may be more likely that organic farming will occur on the margins of commercial agriculture, such as on smallholdings and part-time farms where off-farm income provides a basis for the development of organic production systems. Where premiums for organic products are available then there is greater likelihood that organic production will occur among a broader range of farmers.

Generally, the results of this study indicate that there is considerable potential for the continued development of organic production in Canterbury. While the financial incentives have played a significant role there are still other farmers who grow organic production in the absence of premiums. Further, among conventional farmers themselves there may be a significant proportion who have not fully embraced high input farming systems and would be well placed to convert to organic production. Some farmers in this study were not really aware of organic farming: they ignored it rather than rejected it. There are signs that low input or traditional styles of farming are gaining legitimacy and this development could, in time, encourage more farmers to try alternative systems. Further, a significant proportion of full-time farmers in this study had considered organic farming. If ways are found to address the issues of economic and technical viability of organic farming, including farmers' attitudes to change, then a major stumbling block for conventional farmers would be addressed and the conversion to organic farming would occur more quickly.

This policy discussion has noted already the areas for future research which would have an impact on promoting organic farming. Other areas for future research include topics that relate to our understanding of decision making itself. For example, there is the issue of the social dynamics between members of the farm household, specifically those between farm men and women, and how these interactions influence decision making. The research reported here has studied the outcomes of negotiations, implicit or explicit, among farm couples and it is likely that these interactions, and gender roles, have a bearing on decision making. Future research could address this issue and examine who makes decisions. Another topic for research is the issue of representativeness of the sample. Future research could use a random sample of farmers and develop a decision tree for which the proportions of farmers selecting particular criteria would indicate the proportions in the population. Such an approach would indicate more clearly the potential for encouraging organic production and provide additional results that would be useful for the development of policy.

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