



ARGOS Research Report: Number 07/08

ISSN 1177-7796 (Print)  
ISSN 1177-8512 (Online)

## New Zealand Farmer and Grower Attitude and Opinion Survey: Kiwifruit Sector

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October, 2007



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## Acknowledgements

This work was funded by the Foundation for Research, Science and Technology (Contract Number AGRB0301). ARGOS also acknowledges financial assistance from: ZESPRI International Ltd, Fonterra, Merino New Zealand Inc., COKA (Certified Organic Kiwifruit Growers Association) and in-kind support from Te Runanga O Ngāi Tahu.

Many members of the ARGOS team made valuable contributions to the design of the questionnaire.



# Summary

## Research objectives

The specific research objective addressed in this report is to assess the kiwifruit sector on a number of topical dimensions. In addition, a related objective is to assess how these dimensions may vary by management system (gold, green and organic).

## Results

### Orchard and orchardist characteristics

- There were no significant differences in orchard size.
- Gold orchardists had significantly higher levels of off-farm income, and worked off-farm for a greater number of hours per week compared to organic orchardists.

### Respondent characteristics and background

- Most of the respondents were men, aged from 56 to 59 years old on average, most expressed Christian beliefs, and almost all were New Zealand Europeans.
- More organic orchardists (40 per cent) held an agricultural or horticultural diploma or certificate compared to green (17 per cent) or gold (29 per cent), and more gold orchardists (17 per cent) had an agricultural or horticultural degree compared to green (two per cent) or organic (13 per cent).
- Like other farmers, most kiwifruit orchardists had a rural background.
- Compared to other sectors (sheep/beef, dairy and horticulture), more kiwifruit orchardists had their upbringing further than 100 kilometres from their orchard (59 per cent compared with 31 per cent).
- Proportionately fewer orchards (15 per cent) had a successor compared to other farms (23 per cent).
- Organic orchardists had owned their orchards longer than gold orchardists (21 years compared with 16 years).
- Most lived on their orchard (80 per cent) but this was a smaller proportion than other sectors (91 per cent).
- The orchards had a greater proportion of farm managers making key decisions (38 per cent compared with 19 per cent).

### GMO and organic intentions

- Like other farmers and horticulturalists, kiwifruit orchardists were not keen to use GMOs with organic orchardists (compared to gold and green) having a stronger intention not to use GMOs.
- Green and gold orchardists tended to be neutral about their intentions to use organic methods.

### Management strategies

- Organic orchardists had stronger agreement with alternative management systems and less agreement with conventional management systems.

### Dependency on inputs

- Green and gold orchardists were more dependent on chemicals and manufactured fertilisers while organic orchardists were more dependent on composts and organic remedies.
- Dependency on chemicals and other inputs did not differ between green and gold orchardists, except for the use of fertiliser – green orchardists being more dependent.

#### Other attitudes and characteristics

- Kiwifruit orchardists, like other farmers, tended to be satisfied with their situation and saw a generally bright future.

#### Orchard environment

- Environmental conditions were judged to have improved in the last five years.

#### Organic practices

- Two practices (protection of natural enemies and avoiding dependency on external inputs) were more important for organic orchardists.
- There were fewer differences between organic and other orchardists compared to other farmers.
- Similar to other farmers, no practice was judged generally to be unimportant or of neutral importance.

#### Relationship to the land and Maori connections

- Kiwifruit orchardists as much as other farmers tended to feel they were part of the land.
- Like other farmers, Maori connections were not strong for kiwifruit orchardists.

#### Attitudes towards nature

- Organic orchardists were sceptical that 'human ingenuity will ensure that we do not make the earth unliveable'.
- Organic orchardists gave more support to the pure nature rather than a cultured nature position on attitude to nature.



# Chapter 1

## Introduction: Background, Objectives and Outline

### 1.1 Background

The core of the ARGOS research design is a longitudinal panel study. Panels of 12 farms were selected to represent conventional, integrated and organic management for the sheep/beef sector, green, gold (both employing IPM practices according to ZESPRI's plant protection programmes) and organic management for the kiwifruit sector, and conventional and organic management for the dairy sector. The research involves gathering data on these farms in order to assess the nature of production from environmental, economic and social points of view and the design rests on testing the null hypothesis that there is no difference between management systems. Farms in the panels were generally typical of their sectors in terms of obvious characteristics such as size<sup>1</sup>, level of production etc. Farms from a range of geographies and with different levels of intensity of production were chosen in order to achieve results that would be applicable to a broad range of farms.

Behind this design is the assumption that the ARGOS panels are reasonably representative of the sectors to which they belong. To test this assumption, it was necessary to survey both the panel and the various sectors making up agricultural production in New Zealand, gathering data on a number of dimensions of farming in order to make comparisons. A companion report, entitled 'The Representativeness of ARGOS Panels and Between Panel Comparisons', addresses the issue of how well the panels represent their sectors.

The survey provides the means to examine farmer attitudes and practices more broadly and to assess what differences may occur in the different sectors and for farms under different management systems. It is important to note that the requirements for testing the panels has had important affects on the design of the surveys, a point that will be elaborated in Chapter 2.

### 1.2 Research Aim and Objectives

The survey research investigates farming generally and makes assessments of a number of issues relating to the sustainability of farming. 'Sustainability' is a concept widely used in debates about the wise use of the world's finite, renewable and undiscovered resources. The term and associated ideas have gained credence along with realisation that many seemingly common global resources will become scarce or that some seemingly abundant energy sources (e.g., coal) have prohibitive pollution costs. Sustainability as a concept has breadth, depth and complexity as it can involve conservation, innovation and concerns over the welfare of future generations. Because it can be difficult, for example, to both conserve and foster new things while considering the priorities, needs and welfare of future generations, sustainability is difficult to define. Because it may not be useful to use the word 'sustainability' if specific definitions are needed, in this report it is used as a covering term for a range of ways of talking and thinking, and a range of ideas relating to the wise management of both resources and the environment with a long-term view in mind.

These investigations were conducted using the data from a national survey. The questionnaire used was developed with contributions from the team of ARGOS researchers with a view to establishing some knowledge about farmers' attitudes, beliefs and practices.

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<sup>1</sup> The size of farms was limited by the need to match non-organic farms with the available organic farms and in some cases organic farms were smaller than the industry average.

The survey generated a large amount of data. In order to make the results easier to comprehend, they are presented in separate outputs, as follows:

1. Analysis of agriculture generally by focussing on the three main sectors (sheep/beef, dairy and horticulture, excluding kiwifruit) and the three main management systems (conventional, integrated and organic).
2. Analysis of the kiwifruit sector comparing the three main production systems of gold, green and organic production (this report).
3. Further analysis of the survey data.

The first two outputs systematically cover all the questions in the questionnaire and therefore give an account of attitudes, beliefs and practices that relate to the general theme of sustainability. They are presented as ARGOS research reports. The latter output builds on the first report and provides some detailed analysis and interpretation of the data in order to provide greater insight into farmers' thinking. It is intended to be published later as an article.

The specific research objective addressed in this report is to assess the kiwifruit sector on a number of topical dimensions. In addition, a related objective is to assess how these dimensions may vary by management system. This report is largely descriptive and does not provide detailed interpretation of the results. It is important to publish this report, even if in modest terms, in order to make the core results available to the kiwifruit industry.

### **1.3 Outline of report**

Chapter 2 considers the design of the research, the questionnaire and the survey details. Chapter 3 present the results for the kiwifruit sector. Finally, Chapter 4 summarises the results and provides some general points of discussion.

## Chapter 2

# Survey Design and Methods

### 2.1 Introduction

A self administered postal questionnaire was used to collect data from farmers in New Zealand. This chapter provides details about the construction and design of the questionnaire, including data on the response rates.

### 2.2 The questionnaire

A number of ARGOS researchers contributed to the development of the questionnaire. The subject matter for questions was open to a range of topics considered important across all ARGOS objectives for potentially providing some insights to issues of sustainability and as indicated by the literature in a number of disciplines. The overall scope of the questions fitted within the rubric of sustainability and this theme was used to order the items and provide some coherence to the questionnaire. The following sub-sections review each part of the questionnaire. At this point the aim is to introduce the questions.

The questionnaire comprised a twelve page A4 booklet with printing on both sides of each page. A copy of the questionnaire is provided in the appendix. A separate covering letter introduced the questionnaire and explained the purpose of the study.

The general layout and format of the questionnaire followed an established design from earlier national surveys of farmers and growers (e.g., Cook, et al., 2000; Fairweather, et al., 2003). The questionnaire requested approximately 150 responses, depending upon the particular situation of each respondent. This size of the questionnaire in terms of the number of responses may have been slightly above the number generally considered necessary to obtain a good rate of returned questionnaires as well as a greater proportion of fully completed questionnaires (e.g., Dillman, 2000). The use of an established layout and design from earlier studies suggested the questionnaire would be easy to understand.

To pre-test the questionnaire 16 people involved in farming completed a draft of the questionnaire and subsequently provided their thoughts and opinions on its content and structure. Only minor changes were made prior to finalising the questionnaire. The finalised questionnaire was posted on August 12<sup>th</sup>, 2005 and a reminder postcard was sent to encourage further responses on September 20<sup>th</sup>, 2005.

#### General questions

The questionnaire began with Section A, a set of general questions about the respondent's background to farming or growing.

First, an enquiry was made regarding whether the respondent's background was either one of four presented options. The options were 'mainly farming', 'rural non farm or orchard', 'mainly horticultural' and 'urban'. Second, the distance to the main location of the respondent's upbringing was measured using four categories. The categories ranged from 'on this farm or orchard' to '100 kilometres or further'.

In an enquiry targeted at determining how the farm or orchard came to be owned by the present owner, the importance of various means of ownership were sought. Measurements on five point scales of importance/unimportance were taken for each of six factors including inheritance and various means of borrowing. An 'other' category was included with provision

for specifying what means of ownership this referred to. In addition, to further clarify the importance of succession, respondents were asked to indicate whether there was a successor who would eventually take over their farm or orchard.

A further general question asked how many years the respondent had managed, owned or been associated with their farm or orchard. Also, for a simple point of clarification, respondents were asked if they lived on their farm or orchard.

To ascertain who had the role of key decision maker, a question set presented a number of options and combinations of options including farm or orchard operators and family owners as well as an 'other' category.

### **Farm or orchard management system**

Section B began with a series of questions to enable a comprehensive assessment of current management systems and intentions to use management systems. First, a question set was presented to ascertain current use of and percentage of gross revenue from the current management system as well as intentions to use particular management systems. Nineteen currently available management systems were listed as well as options for 'other' management systems.

To more clearly ascertain future plans of farmers, immediately following the management system question was a question designed to examine in detail, intentions to use any management system over the next ten years. In addition, further inquiry was made of the general importance of management systems for the sustainability of New Zealand's primary production.

Of similar design to the question regarding intentions to use management systems were three questions designed to respectively measure intentions to use genetically modified plants or animals, intentions to use organic methods and intentions to use integrated management. Intentions to use genetically modified plants and intentions to use organic methods have been measured in previous national surveys of farmers and growers (Cook, et al, 2000; Fairweather, et al., 2003). The inclusion of these questions enabled comparison over time of responses to these topical issues.

A question set was then used to ascertain reasons for accepting or rejecting alternative management systems. Five statements related to the use of these systems were presented for the agreement or disagreement of respondents. The statements were directly related to the conclusions of Darnhofer et al. (2005) who documented reasons for converting to organic farming by Austrian farmers. The study led to the identification of five types of farmers: 'committed conventional', 'pragmatic conventional', 'environment-conscious but not organic', 'pragmatic organic' and the 'committed organic'. The discussion of each type enabled a short summary to be prepared which encapsulated the key attributes of each type. After confirming with the lead author that the summary was accurate, each was used in the questionnaire. A rating of each summary was sought rather than the selection of the one that respondents thought best represented their view. This was done because it was possible that some respondents would not clearly identify with just one position and hence an assessment of each statement would allow for more subtle assessments at the same time it would still be possible to identify which one was most strongly identified with where this was indicated.

Dependency on chemicals fertilisers and a number of organic practices was then measured. These questions were designed to provide an indicator of reliance on agrichemicals which could then be compared to organic methods to replace or reduce the use of chemicals. A five point dependency scale was used to measure these responses.

To determine the level of farm or orchard produce consumed by the respondent's household, percentages of household food obtained from the farm or orchard was gathered. Similarly, the percentage of household food sourced from hunting, fishing, or gathering was also measured.

A general measure of satisfaction was taken on a five point-scale anchored by 'very dissatisfied' and 'very satisfied'. A further question measured future prospects for the respondent's farm or orchard with a measurement taken on a five point 'very bleak' to 'very bright' scale. Further details of future expectations for five years time was presented as options which included 'still farming, with most income from farm work' and 'land sold and working in another job' as well as an 'other' option.

### **Farm or orchard environment**

Section C included measures of the physical environment of the farm or orchard. The first question set was designed to measure perceived changes in aspects of the environment by recording the 'condition at present' with the 'condition five years previously'. On a five point 'excellent' to 'poor' scale general conditions of soil health, exotic species diversity, stream health and native species diversity were measured both at present and at an estimated condition five years previously.

### **Farm or orchard practices**

Section D on 'farm or orchard practices' contained a question set measuring the importance of 15 practices. This question set was derived from Milestad and Darnhofer (2003) consideration of three elements of organic orientation applied to the farm level, including: the amount of change the system can undergo while maintaining its functions and structure, the degree of self organization, and the capacity for learning and adaptation. The components of each element were then considered against the IFOAM basic standards to show that organic farming has a number of promising characteristics for building organic orientation. Milestad and Darnhofer produced a summary table which showed the characteristics of farm organic orientation and the matched aspects of the IFOAM basic standards. This table provided the means to develop a list of questions to assess New Zealand farmers' assessment of the importance of organic practices. Since the IFOAM basic standards specify actual on-farm practices, it was possible to frame each standard as a farm practice and ask respondents how important each was.

All practices were in some way related to organic or 'green' production as indicated by the IFOAM standards, although it was expected that conventional farmers or growers may have undertaken the practices as part of their normal farm or orchard management. Thus the practices are not definitive as distinguishing organic farming and do not preclude the kinds of practices undertaken by conventional farmers. We have labelled the practices as 'organic practices' in order to indicate the context of our enquiry. At the least, they are the minimum standard set by IFOAM. The point is not so much the provision of definitive criteria but of practices that might get a different response from organic and conventional farmers. We hypothesised that farmers with an organic orientation would rate these statements as more important.

### **Relationship to the land**

Five questions were used to measure respondent relationships with the land (Section E). Each asked for a simple 'yes' or 'no' response and, because of the possibility of respondents being presented with an unfamiliar line of questioning, respondents could choose to indicate they were uncertain. Respondents were asked whether they felt a part of their land, whether they could sense when all is well with their land and whether there was a mysterious or unknowable aspect to their land. Respondents were also asked if they believed they had a relationship with their land after their death, assuming the respondent or a family member still

owned the land and whether they believed they would have relationship with their land after death, assuming the land had been sold.

### **Maori Connections**

Six questions enquired about relationships with local Maori (Section F). First, a question sought evidence of the respondent's family relationships with Maori in the past and whether this relationship was positive or negative. Second, an enquiry was made of knowledge of Maori battles, old pathways and former pā sites near or on the respondent's land. Respondents were asked if they knew Maori names of rivers or mountains in their locality as well as the stories behind these names. It was also asked whether the respondent was a Maori descendant, whether they had a relationship with Maori, and whether they were actively involved with an iwi or hapu. Together these questions were designed to enable a view of relationships with local Maori to be developed.

### **Wetlands**

A focus was taken on the use of wetlands using two sets containing four questions each (Section G). Respondents were asked to rate the importance of recreational and sporting activities as well as simply looking at, and presumably appreciating, wetlands. In addition, where applicable, the importance of four possible barriers to wetland development on the respondent's properties were measured.

### **Nature**

The six questions in Section H measured attitudes towards nature. These questions reflect a distinction between conceptions of pure nature versus cultured nature (Newton et al., 2002). The first question represented the idea that interfering with nature could be disastrous. The second question suggested that people had the ingenuity to fix problems with nature and another suggested that human beings were themselves a part of nature. Three further questions were designed to ascertain the degree to which respondents thought their properties were manmade as opposed to being natural.

### **Farming Information**

A further section (I) measured farm information including the size of the orchard or farm and the predominant farming activity. Gross revenue was also measured both for the previous year as well as an estimate for the 2004-5 financial year.

### **Demographic information**

Seven questions gathered demographic information about the survey respondents (Section J). The questions were designed to gather data sufficient for testing the representativeness of the survey sample against New Zealand census data. The question about religious beliefs departed more than the other questions from census questions by including 'agnostic', 'atheist' and 'spiritual but not religious'. Of note, this question did not ask for adherence to a particular denomination but was a more general inquiry of religious beliefs. The remaining questions recorded age, gender, ethnicity, province in which the farm or orchard is located, household size and composition, and education. Further measures were taken of tertiary agricultural or horticultural qualifications and an open response was sought to gauge the respondents' perceptions of the importance of such qualifications. Participation in any off-farm/off-orchard employment was measured and details were taken of the type and years of off-farm work. To further clarify this aspect, off-farm work respondents were asked to indicate whether they had any off-farm or off-orchard employment in the last year as well as the approximate income obtained from this source, hours per week worked off-farm or off-orchard, and reasons for off-farm/orchard employment.

## **2.3 Sampling and response rates**

As explained in the first chapter, the general purpose of the overall ARGOS survey research was to examine the sheep/beef, dairy and horticulture sectors along with a separate survey

of the kiwifruit sector. In addition, all ARGOS farmers and orchardists were sampled so that they could be compared to their respective sectors in order to test representativeness of the panels. Throughout this report the focus is on the kiwifruit sector, with comparisons made between gold, green and organic management systems, and some comparisons to the other sectors.

Gold, green and organic orchardists were surveyed for the kiwifruit industry. Table 1 shows the population numbers and sampling numbers used. The sample size was 200 each for green and gold, with the gold sample including all orchardists with gold-only orchards. In order to obtain good representation of gold orcharding, we did not include orchards with both green and gold production. The total population of organic orchardists was used. The response rates ranged from 42 per cent for organic to 50 per cent for gold. These response rates are higher than the more usual 32 per cent for farmer surveys. This was most likely influenced by ZESPRI's endorsement of the survey.

**Table 1: Kiwifruit population (2005) and sample numbers by management system**

	KiwiGreen (Hort 16A) Gold	KiwiGreen Hayward	Organic			Sum
	Gold		Green+Gold	Green	Gold	
Population	200	1,700	29	116	4	2,049
Target sample	200	200	29	116	4	549
Actual sample	99	94		63		256
Response rate (%)	50	47		42		47

Note: This table excludes 500 orchards with both gold and green production.

The sampling in this study has some unusual characteristics compared to normal surveys. As noted in Chapter 1, the surveying was part of a broader research goal of assessing the representativeness of the ARGOS panels. This meant that for each ARGOS panel it was necessary to obtain a sample for the respective sector of sufficient size to allow good comparisons to be made. If we had used a simple random sample of farmers and horticulturalists in New Zealand there would not have been sufficient number of kiwifruit orchardists. Therefore it was necessary to conduct a specific survey of each management system in the kiwifruit sector. The survey of all the gold only orchards and the organic orchardists, since they were of the entire population, means that the samples have different characteristics and that it is not appropriate to add up the results across these samples and make inferences to the kiwifruit sector as a whole. In effect, this report is based on the results of three separate surveys, one for each management system. Accordingly, the tables to be presented give the results for each management system and do not provide an overall estimate of the kiwifruit sector as a whole. Note that there are a few times when an overall average is given when comparing the kiwifruit sector with other sectors. This policy is not technically correct but is used to keep the comparison simple.

The need to have a design that addresses our research objective of comparing ARGOS panels with sectors means that there are good sample sizes for each management system and these provide a good basis for making comparisons across the three management systems.

## **2.4 Statistical Analysis**

The analysis of the questionnaire data used the usual methods – frequencies, cross tabulations and ANOVAs. Most responses in the questionnaire use categorical data and a major assumption is made in treating these data as continuous for analysis purposes. This method reduces the amount of data that needs to be included in each table thus avoiding the use of very complex and large tables. The robustness of the normal distribution is also assumed. It also enables us to calculate statistically significant differences between means whereas just using the perhaps more appropriate chi-squared tests on cross-tabulations only shows up relationships between variables which are far more difficult to express succinctly. Sometimes the tests between three means showed that the variances were not homogenous and in this instance Tamahere's T2 Test was used which just compares two means at a time using each variance separately rather than producing a variance calculated from the three groups. Hence, Tamahere's T2 Test is very conservative due to its limitation on the degrees of freedom compared with the original, and significances that would show up initially disappear. In addition it is worth noting that some means, which may appear to be obviously different, are not statistically significant mainly because the samples sizes and variances are different.



## Chapter 3 Results

### 3.1 Introduction

This chapter presents the results following the order in the questionnaire as described earlier in Chapter 2. Where appropriate, comparisons are made with the results presented in the report which covers the main agricultural production sectors and management systems. These comparisons help to put the kiwifruit sector in perspective.

### 3.2 General character of the orchards and orchardist profile

Information depicting the general character of the orchards is shown in Table 2. Note that in some cases the kiwifruit production occurred with other farming activity and the data in this table have been prepared for just dedicated orchards. There were 13 dairy, seven pastoral, one specialised livestock and one arable farm among those orchards with other farming activity. There was no significant difference in farm size or average gross revenue. Off-farm income was reasonably common for all orchard types with between 40 and 48 per cent working off farm, and was at a greater level to that for sheep/beef and horticulture (35 per cent). Off-farm income for gold was significantly higher than organic. For all orchard types, off-farm work was at or over 30 hours or more per week, and at a significantly higher level for gold orchardists compared to organic. Like other farm types the most highly rated reason for off-farm work was personal interest (3.64, approaching important). However, unlike other farm types where 'secondary income source' was ranked as the next most important item, kiwifruit orchardists considered off-farm work important to subsidise farm and capital investments (3.31, neutral to important), and as a primary source of income (3.29).

**Table 2: Profile for kiwifruit orchards sampled**

<b>Orchard type</b>	<b>Average farm size (ha)</b>	<b>Average gross revenue 2003-4 (\$)</b>	<b>Percentage with off-farm income</b>	<b>Average off-farm income (\$)</b>	<b>Average hours per week off-farm</b>
Gold	8.4	181,613	48	94,054 <sup>a</sup>	40 <sup>a</sup>
Green	12.5	163,806	40	66,665	38
Organic	11.0	153,680	45	60,365 <sup>b</sup>	30 <sup>b</sup>

Note: the super script letter, where different, denotes a statistically significant difference.

Table 3 provides information about the kiwifruit respondents. Like other sectors, most of the respondents were men, most expressed Christian religious beliefs and almost all were New Zealand Europeans. Ranging from 56 to 59 years the average age was also similar to other farm types.

**Table 3: Profile of kiwifruit orchardists sampled – personal characteristics**

<b>Orchard type</b>	<b>Percentage of male respondents (%)</b>	<b>Percentage declaring Christian religious beliefs</b>	<b>Percentage declaring New Zealand European ethnicity</b>	<b>Average age</b>
Gold	80	57	96	56
Green	85	51	97	59
Organic	82	54	98	58

For all kiwifruit orchardists, 91 per cent reported having a husband, wife or partner, and 45 per cent reported son(s) or daughter(s) living in their household. These results were almost identical to those from the other farm types.

The relationship between orchard type and overall educational level was not significant (Table 4). A more specific query of qualifications produced a significant relationship between the orchard type and those who had an agricultural or horticultural certificate or diploma (Chi-squared test = 8.45, d.f. = 2, p = 0.015). Forty per cent of organic orchardists had a diploma or certificate compared with 17 per cent of green and 29 per cent of gold orchardists. As well there was a significant relationship between the orchard type and those who had a university degree (Chi-squared test = 9.67, d.f. = 2, p = 0.008), with 17 per cent of gold orchardists holding an agricultural or horticultural degree compared with two per cent of green and 13 per cent of organic orchardists.

**Table 4: Profile of kiwifruit orchardists sampled – highest level of education completed**

<b>Orchard Type</b>	<b>Percentage who attended secondary school but left without qualifications</b>	<b>Percentage who attended secondary school and left with qualifications</b>	<b>Percentage with a technical trade certificate</b>	<b>Percentage with undergrad diploma or certificate</b>	<b>Percentage with university qualification</b>	<b>Total (N)</b>
Gold	16	23	15	10	37	89
Green	24	29	14	13	19	99
Organic	16	25	12	20	28	61

### 3.3 Background questions

As is generally true of other farmers and horticulturalists, most of the kiwifruit respondents – from 74 per cent (green) to 88 per cent (organic) – were from a rural background. Across all kiwifruit orchards there were more who had their upbringing further than 100kms from their orchard (59 per cent) which was more than was evident for other farm types (31 per cent). This reflects the fact that some orchardists are retired farmers who have come to the Bay of Plenty from elsewhere to semi-retire on a kiwifruit orchard. It also suggests less inheritance or continuation of kiwifruit farming across generations.

Averaging across the three orchard types for factors enabling ownership (range 1 = very unimportant to 5 = very important) borrowing from the bank, like in other sectors, was the

most important (mean = 3.65). This was followed by money from outside farming (mean = 3.62), money from other farming (mean = 2.43) and borrowing from family (mean = 2.43).

When asked if there was a successor who wanted to take over the farm or orchard, across the three types there were 15 per cent who had a successor to continue with the orchard. This was less than the 23 per cent recorded for the sheep/beef farmers and horticulturalists and the 35 per cent for dairy farmers. This finding conforms to the interpretation of data on the initial capital source for buying the orchard that inheritance is less important in kiwifruit.

Regarding years of ownership the overall average was 17.8 years with organic orchardists having a significantly higher average (mean = 21) than gold orchardists (mean = 16). Most respondents (80 per cent) lived on their farm or orchard but this is a smaller proportion than other farmers (91 per cent). Like other farmers, for most (76 per cent) it was mainly the principal farm/orchard operator who made the key decisions on the farm or orchard and 11 per cent indicated the farm family, including children, made the key decisions<sup>2</sup>. For other farms this percentage was 20 per cent. For 38 per cent of the kiwifruit orchards there was a manager making key decisions whereas for other farms it was only 19 per cent, a finding which supports the view that managers are common on kiwifruit orchards.

### 3.4 Farm or orchard management system and intentions

As the kiwifruit orchardists were already involved in a quality assured management system this enquiry of kiwifruit orchardists was redundant. Regarding the intention to use GMOs, as shown in Table 5, organic orchardists were particularly negative about using these; other orchardists on average also indicated they did not intend to use GMOs. These results are in keeping with the kiwifruit industry's caution about the use of GMOs. Also shown in the table are the results for intentions to use organic practices. Logically, organic orchardists were very positive about organic methods but those involved in green or gold tended to be more neutral.

**Table 5: Intention to use GMOs and organic**

<b>Intention</b> (1=have a strong intention, 2=intend to use, 3=no intention either way, 4= intend not to use, 5=have a strong intention not to use)	<b>Gold</b>	<b>Green</b>	<b>Org</b>
To either use or not use genetically modified plants or animals on your farm or orchard within the next ten years, if they become available	3.74 <sup>a</sup>	3.47 <sup>a</sup>	4.53 <sup>b</sup>
To either use or not use organic methods on your farm or orchard within the next ten years	3.10 <sup>a</sup>	3.26 <sup>a</sup>	1.34 <sup>b</sup>

<sup>2</sup> Note that these totals do not add together in a simple way. This is due to these questions being asked separately so some people responded positively to more than one of them.

### 3.5 Types of management strategies and values

Table 6 shows positions on alternative management systems by type of orchard. It can be seen that those involved in organic production supported the last two alternative management positions and were less supportive of the first two positions. Gold and green were similar in their responses. These results are not particularly surprising but they do show that the positions one would predict were found to be the case. They also suggest that it is the organic orchardists that are the most distinctive.

**Table 6: Positions on alternative management systems**

Item (1=strongly disagree, 2=disagree, 3=neither disagree nor agree, 4=agree, 5=strongly agree)	Gold	Green	Org
Opposed to alternative management systems (Committed Conventional)	3.24 <sup>a</sup>	3.36 <sup>a</sup>	2.38 <sup>b</sup>
Ambivalent about alternative management systems but change is a risk (Pragmatic Conventional)	3.80 <sup>a</sup>	3.71 <sup>a</sup>	2.96 <sup>b</sup>
Practiced alternative management systems but not formalised (Environmentally Conscious but not Organic)	2.95	3.06	2.78
Positive about alternative management systems (Pragmatic Organic)	2.95 <sup>a</sup>	2.88 <sup>a</sup>	3.86 <sup>b</sup>
Positive, and committed to organic philosophy (Committed Organic)	2.40 <sup>a</sup>	2.22 <sup>a</sup>	3.87 <sup>b</sup>

### 3.6 Dependency on inputs

The results for the enquiry on dependency on inputs are shown in Table 7. The table shows that both green and gold orchardists were dependent on chemicals and manufactured fertilisers and that organic orchardists were not dependant on these inputs. Organic orchardists were moderately dependent to dependent on composts and organic remedies but neither green nor gold orchardists were. As shown, manures were only slightly used by any of the orchardists. Of note, the use of inputs did not significantly differ between green and gold orchardists except for the use of fertilisers with green orchardists being more dependent.

**Table 7: Dependency on inputs**

Input (1=not dependent, 2=slightly dependent, 3=moderately dependent, 4= very dependent, 5=extremely dependent)	Gold	Green	Org
Chemicals for the control of pests or parasites	3.63 <sup>a</sup>	3.59 <sup>a</sup>	1.68 <sup>b</sup>
Chemicals for the control of weeds	2.81 <sup>a</sup>	3.00 <sup>a</sup>	1.42 <sup>b</sup>
Manufactured fertilisers	3.39 <sup>b</sup>	3.73 <sup>a</sup>	1.73 <sup>c</sup>
Composts	2.31 <sup>a</sup>	2.20 <sup>a</sup>	3.87 <sup>b</sup>
Manures (other than directly applied by animals)	1.81 <sup>a</sup>	2.07	2.45 <sup>b</sup>
Organic remedies for the control of pests or parasites	1.66 <sup>a</sup>	1.56 <sup>a</sup>	3.89 <sup>b</sup>
Organic remedies for the control of weeds	1.33 <sup>a</sup>	1.30 <sup>a</sup>	3.05 <sup>b</sup>

### 3.7 Other attitudes and characteristics

The average percentage of household food sourced from the kiwifruit orchard was greater for organic orchardists (15 per cent) than it was for green (eight per cent) or gold (eight per cent) but not significantly so. Percentages for food sourced from hunting, fishing and gathering were minimal for all three groups (average of three per cent).

On a scale from 1 ('very dissatisfied') to 5 ('very satisfied'), many orchardists (77 per cent) gave a score of 4 indicating they were 'satisfied' with their current orcharding situation. Similarly, on a scale from 1 ('very bleak') to 5 ('very bright'), the majority (60 per cent) gave a score of 4 indicating they saw the future prospects for their orchard as 'bright'. These results were similar to other sectors.

In terms of where orchardists might be in five years most orchardists indicated they would still be farming (29 per cent) or still farming with significant off-farm income (24 per cent) and a large proportion indicated they would be retired or have the land leased or managed (23 per cent).

### 3.8 Farm or orchard environment

Respondents rated the general condition of four features of the environment at five years ago and at present. These results are shown in Table 8. There were no significant differences between these ratings across the orchard types. The last section of the table shows the differences between the score given to the environmental condition five years ago and at present for each variable. It summarises the changes and shows positive scores which with this scale means a positive change or an improvement in the environmental condition has been perceived by the respondents. All of these differences are significantly different from zero except for the gold orchardists who do not think that stream health has improved over the past five years.

**Table 8: Condition five years ago and at present**

<b>General condition</b> (1=excellent, 2=very good, 3=good, 4=neither good nor poor, 5=poor)	<b>Gold</b>	<b>Green</b>	<b>Org</b>
<b>Five years ago</b>			
Soil health	3.00	3.00	2.97
Exotic species diversity	3.33	3.35	3.05
Stream health	2.86	2.98	2.77
Native species diversity	2.94	3.38	3.22
<b>At present</b>			
Soil health	2.25	2.21	2.06
Exotic species diversity	2.94	2.76	2.67
Stream health	2.64	2.71	2.58
Native species diversity	2.53	2.85	2.80
<b>Differences between five years ago and present</b>			
Soil health	0.75	0.82	0.90
Exotic species diversity	0.33	0.59	0.38
Stream health	0.23 n.s.	0.25	0.19
Native species diversity	0.40	0.52	0.35

### 3.9 Organic practices

Regarding organic practices, as shown in Table 9, there were only two differences between panels within the kiwifruit orchardists. This result is different compared to what was found for the other sectors where there were a total of ten differences across management systems. The fact that there were fewer difference here compared to the other sectors studied suggests that experience with IPM based production schemes may have made organic practices more acceptable to all types of orchardists. However, organic orchardists saw it as more important to achieve pest control by protecting natural enemies of pests, and to use skills and knowledge to avoid dependency on external inputs. Of note, similar to other farmers, none of the items were considered on average to be unimportant. In general the practices were as important for orchardists as they were for other farmers.

**Table 9: Importance of organic practices**

<b>Farm or orchard practice:</b> (1=very unimportant, 2=unimportant, 3=neither unimportant nor important, 4=important, 5=very important)	<b>Gold</b>	<b>Green</b>	<b>Org</b>
Developing practical farming skills based on specific knowledge, observation and experience of my own land	4.31	4.16	4.33
Managing in a way that is compatible with natural cycles, including unpredictable events	4.15	4.06	4.26
Returning microbial plant or animal material to the soil to improve it	4.09	4.06	4.37
Achieving pest control by protecting natural enemies of pests, (e.g., encouraging beneficial insects)	3.80 <sup>a</sup>	3.71 <sup>a</sup>	4.32 <sup>b</sup>
Achieving a balance between crop production and animal husbandry	3.83	3.98	4.00
Maintaining and promoting diversity by increasing the number of crop and plant varieties and/or animal breeds	3.21	3.28	3.65
Respecting the physiological and behavioural needs of livestock and/or plants	4.12	4.06	4.27
Achieving social responsibility in production and processing (e.g., providing good working conditions)	4.19	4.27	4.20
Using local knowledge in farming practice	4.30	4.36	4.10
Developing knowledge of the ecosystem on my farm	4.13	4.05	4.24
Using varieties and species adapted to local conditions	4.24	4.06	4.11
Using skills and knowledge to avoid dependency on external inputs such as fertilisers, chemicals, or expertise	3.75 <sup>a</sup>	3.52 <sup>a</sup>	4.12 <sup>b</sup>
Supporting local and regional markets with the produce from my farm or orchard	3.23	3.29	3.35
Supporting and enhancing the things that positively influence ecosystem quality	3.94	3.95	4.15
Keeping good relations with neighbouring or other farmers so as to discuss farming issues, practices, problems or projects with them	4.29	4.20	4.10

### **3.10 Relationship to land**

Kiwifruit orchardists' understandings of their relationship to the land was very similar to that of other farmers. For example, 84 percent of orchardists and 86 per cent of farmers agreed that they were a part of their land. Also, kiwifruit orchardists (82 per cent) claimed to have a sense that all was well with their land and 62 per cent did not think their land was mysterious. The orchardists (67 per cent) were more likely than farmers (58 percent) to disagree that they will have a relationship with their land after death, assuming they or a member of their family still owned the land. Finally 79 per cent did not believe they will have a relationship with their land after death, assuming they no longer owned the land. This was similar to the 76 per cent of farmers who had a negative response to this question, indicating some orchardists felt they would be linked to the land after death through family but if there was no family on their land there would not be such a link.

### **3.11 Maori connections**

Like other farmers Maori connections were not strong among kiwifruit respondents. Only 12 per cent stated that, if their family had been in the locality for a number of generations, their family had a relationship with Maori. Thirty three per cent did not answer this question as they indicated they had not been in the locality very long. Of those who had a relationship with Maori, half (50 per cent) indicated it was positive.

Fifty-three per cent of kiwifruit respondents had not heard of (a) battles between Maori tribes that may have occurred near or on your land, (b) old Maori pathways near or on your land or (c) former pā sites near or on your land (compared with 61 per cent of other farmers). Also like other farmers (65 per cent), most kiwifruit orchardists (74 per cent) did know the Maori names of rivers or mountains in their locality, but most (72 per cent) did not know the stories behind these names. Like other farmers (94 per cent) most (91 per cent) were not of Maori ancestry, most (79 per cent) stated that they did not have a relationship with local iwi or hapu, and most (96 per cent) were not actively involved with an iwi or hapu. Of those with a relationship with local iwi or hapu, only 46 per cent described the relationship as positive whereas for other farmers it was 68 per cent.

### **3.12 Nature**

Table 10 shows that all types of kiwifruit orchardists agree with the statement that human interference with nature often produces disastrous consequences. Organic orchardists had slight disagreement with the view that human ingenuity will ensure that we do not make the earth unliveable while the other types had slight agreement. It was generally agreed by all orchardists that humans were a part of nature and all orchardists were generally neutral about the orchard being an extension of natural systems as opposed to a human made system. Organic orchardists tended slightly to agreement that the orchard was mainly natural while the other two panels tended slightly to disagreement. All types of orchardists were more positive that an orchard is mainly human made, though organic orchardists were in less agreement with this view compared to Green orchardists.

These results show organic kiwifruit orchardists are a little sceptical about human ingenuity and support the pure nature position rather than the cultured nature position, at least as indicated by three of the four items used to measure this. These viewpoints are consistent with an organic philosophy.

**Table 10: Attitudes to nature by sector**

<b>Attitude to nature:</b> (1=strongly disagree, 2= disagree, 3= neither disagree nor agree, 4=agree, 5= strongly agree)	<b>Gold</b>	<b>Green</b>	<b>Org</b>
When humans interfere with nature it often produces disastrous consequences	3.59	3.58	3.90
Human ingenuity will ensure that we do not make the earth unliveable	3.20 <sup>a</sup>	3.19 <sup>a</sup>	2.73 <sup>b</sup>
Human beings are part of nature (cultured nature)	4.10	4.04	4.08
My farm or orchard is more an extension of natural systems as opposed to a human made system (pure nature)	3.00	3.00	3.25
My farm or orchard is mainly natural (pure nature)	2.72 <sup>a</sup>	2.80 <sup>a</sup>	3.31 <sup>b</sup>
My farm or orchard is mainly human made (cultured nature)	3.68	3.88 <sup>a</sup>	3.53 <sup>b</sup>



## **Chapter 4**

# **Summary, Discussion and Conclusion**

### **4.1 Introduction**

The main objective of this research was to contribute to an improved understanding of the characteristics for kiwifruit production in NZ, relative to other farming sectors. A postal survey was used and included questions on a range of topics from general background, assessments of orchard environment, importance of orchard practices, attitudes to nature, and demographic information.

### **4.2 Summary of results**

The key results for kiwifruit are presented in this summary along with comparisons to other sectors (sheep/beef, dairy and horticulture) where there is a statistically significant difference.

#### **Key features and comparisons**

Orchard and orchardist characteristics

- There were no significant differences in orchard size.
- Gold orchardists had significantly higher levels of off-farm income, and worked off-farm for a greater number of hours per week compared to organic orchardists.

Respondent characteristics and background

- Most of the respondents were men, aged from 56 to 59 years old on average, most expressed Christian beliefs, and almost all were New Zealand Europeans.
- More organic orchardists (40 per cent) held an agricultural or horticultural diploma or certificate compared to green (17 per cent) or gold (29 per cent), and more gold orchardists (17 per cent) had an agricultural or horticultural degree compared to green (two per cent) or organic (13 per cent).
- Like other farmers, most kiwifruit orchardists had a rural background.
- Compared to other sectors (sheep/beef, dairy and horticulture), more kiwifruit orchardists had their upbringing further than 100 kilometres from their orchard (59 per cent compared with 31 per cent).
- Proportionately fewer orchards (15 per cent) had a successor compared to other farms (23 per cent).
- Organic orchardists had owned their orchards longer than gold orchardists (21 years compared with 16 years).
- Most lived on their orchard (80 per cent) but this was a smaller proportion than other sectors (91 per cent).
- The orchards had a greater proportion of farm managers making key decisions (38 per cent compared with 19 per cent).

GMO and organic intentions

- Like other farmers and horticulturalists, kiwifruit orchardists were not keen to use GMOs with organic orchardists (compared to gold and green) having a stronger intention not to use GMOs.
- Green and gold orchardists tended to be neutral about their intentions to use organic methods.

#### Management strategies

- Organic orchardists had stronger agreement with alternative management systems and less agreement with conventional management systems.

#### Dependency on inputs

- Green and gold orchardists were more dependent on chemicals and manufactured fertilisers while organic orchardists were more dependent on composts and organic remedies.
- Dependency on chemicals and other inputs did not differ between green and gold orchardists, except for the use of fertiliser – green orchardists being more dependent.

#### Other attitudes and characteristics

- Kiwifruit orchardists, like other farmers, tended to be satisfied with their situation and saw a generally bright future.

#### Orchard environment

- Environmental conditions were judged to have improved in the last five years.

#### Organic practices

- Two practices (protection of natural enemies and avoiding dependency on external inputs) were more important for organic orchardists.
- There were fewer differences between organic and other orchardists compared to other farmers.
- Similar to other farmers, no practice was judged generally to be unimportant or of neutral importance.

#### Relationship to the land and Maori connections

- Kiwifruit orchardists as much as other farmers tended to feel they were part of the land.
- Like other farmers, Maori connections were not strong for kiwifruit orchardists.

#### Attitudes towards nature

- Organic orchardists were sceptical that ‘human ingenuity will ensure that we do not make the earth unliveable’.
- Organic orchardists gave more support to the pure nature rather than a cultured nature position on attitude to nature.

### **Summary sketch of the kiwifruit production sector**

Like farmers in the other sectors kiwifruit orchardists were older European men with Christian beliefs, had a rural background, were not keen on using GMOs, they felt they were part of their land, and they did not have strong Maori connections. Compared to other sectors, more kiwifruit orchardists had an upbringing more than 100 kilometres from their orchard, fewer lived on the orchard, fewer had a successor, and more had a manager making the key decisions. More organic orchardists had an agricultural or horticultural diploma or certificate while more gold orchardists had an agricultural or horticultural degree. In terms of management systems, the main differences were between organic and the others. Organic orchardists were more positive about alternative management systems, more dependent on composts and organic remedies, rated two organic practices higher and had a stronger interest in developing wetlands. Their attitudes to nature were consistent with an organic philosophy. These distinctive features of organic kiwifruit orchardists were a close match to the organic farmers in the other sectors.

### **4.3 Discussion and conclusion**

The results show that the kiwifruit orchardists had both similarities and differences when compared to other farmers in New Zealand. While they shared some obvious demographic

characteristics, such as being older, male Europeans, they also had some distinctive qualities consistent with the nature of kiwifruit orcharding. That is, they did not share to the same extent some of the traditional farming characteristics of livestock farmers where the farmer is closer to the farm and tend to have a stronger family focus, usually expressed by having the farm family as a main supply of labour on the farm and possibly stronger interest in farm succession. Kiwifruit orchardists may come from further afield and need not live on the orchard since competent managers are available to run the orchards. Kiwifruit orcharding is distinct in that it provides retirement opportunities for farmers from other sectors and it tends to be located near urban centres (e.g., Te Puke, Tauranga, Kati Kati) so that off-orchard interests and needs (e.g., health care) can be pursued.

In addition to the differences between kiwifruit orchardists and other farmers, there were differences within the sector as well. Across the three management systems included in the study, it was the organic orchardists who stood out as the most distinctive. These particular results, while at times not individually surprising in any way, nevertheless add up to suggest that a pattern of difference in responses consistent with core elements of an organic philosophy emerged in the survey data. Reference to such a philosophy was demonstrated in their use of different practices and inputs on their orchard and their holding a distinctive view of nature.



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## Appendix 1: The Questionnaire



# **New Zealand Farmer and Grower Attitude and Opinion Survey: Sustainability in Primary Production**

**2005**

### **General instructions:**

- Please put the number for your best answer in the box provided, or in some cases write your answer in the box.
- To preserve the confidentiality of your replies please use the freepost envelope provided.
- Please return the questionnaire to John Fairweather, AERU, P O Box 84, Lincoln University, Canterbury.

## A. Farm or Orchard Background

1. What is your background to farming or growing?

- |                               |                          |  |
|-------------------------------|--------------------------|--|
| (1) Mainly farming            | (3) Mainly horticultural |  |
| (2) Rural non farm or orchard | (4) Urban                |  |

2. What is the distance to the main location of your upbringing?

- |  |                               |  |
|--|-------------------------------|--|
| (1) On this farm or orchard                    | (3) More than 50 kilometres   |  |
| (2) Not this locality but within 50 kilometres | but less than 100 kilometres  |  |
|  | (4) 100 kilometres or further |  |

3. How important was **each** of the following in enabling your farm or orchard to be owned by its present owner?

- |                                       |                    |
|---------------------------------------|--------------------|
| (1) Very unimportant                  | (4) Important      |
| (2) Unimportant                       | (5) Very important |
| (3) Neither unimportant nor important |                    |

Inherited land	
Succession of lease	
Money made from other farming business	
Money made from outside farming	
Borrowing from family	
Borrowing from bank	
Borrowing from others, please specify _____	

4. Is there a successor who wants to take over your farm or orchard?

- |         |        |            |  |
|---------|--------|------------|--|
| (1) Yes | (2) No | (3) Unsure |  |
|---------|--------|------------|--|



5. For how many years have you managed, owned or been associated with your current farm or orchard?

6. Do you live on your farm or orchard?  
(1) Yes      (2) No

7. Who makes the key decisions for your farm or orchard?  
(1) Yes      (2) No

Mainly the principal farm/orchard operator	<input type="text"/>
Mainly the spouse or partner of the principal farm/orchard operator	<input type="text"/>
Both the spouse or partner and the principal farm/orchard operator together	<input type="text"/>
The farm/orchard family, including parents or children	<input type="text"/>
The farm or orchard manager	<input type="text"/>
Other, please specify _____	<input type="text"/>

## B. Farm or Orchard Management System

1. Do you currently use, or intend to use, any the following management systems?  
Please tick the appropriate boxes and indicate the approximate percentage of your gross revenue that is covered by that system.

	Using now	% of gross revenue	Intend to use in future
Green Tick			
Organic standard - Bio-Gro			
Organic standard- AgriQuality			
Organic standard - Demeter			
Project Green			
SmartPlan			
Sustainable winegrowing			
Market Focused			
Kiwi Green			
EUREPGAP			
N Z Fresh Produce Approved Supplier Programme			
DeerQA			
AFFCO Select			
FernMark Quality Programme			
Pipfruit Integrated Fruit Production			
Agrichemical Code of Practice			
Fertiliser Code of Practice			
FertMark			
SpreadMark			
Other system relating to deer _____			
Other system relating to cattle _____			
Other system relating to lambs _____			
Other system relating to fruit _____			
Other system, please specify _____			

2. Which one of the following statements best represents your intention to use any of the above management systems within the next ten years?

- (1) I have a strong intention to use such systems
- (2) I intend to use such systems
- (3) I have no intention either way
- (4) I intend not to use such systems
- (5) I have a strong intention not to use such systems

3. In your opinion, how important are these management systems for the sustainability of New Zealand's primary production?

- (1) Very unimportant
- (2) Unimportant
- (3) Neither unimportant nor important
- (4) Important
- (5) Very important

4. Which one of the following statements best represents your intention to either use or not use genetically modified plants or animals on your farm or orchard within the next ten years, if they become available?

- (1) I have a strong intention to use plants or animals that have been genetically modified
- (2) I intend to use plants or animals that have been genetically modified
- (3) I have no intention either way
- (4) I intend not to use plants or animals that have been genetically modified
- (5) I have a strong intention not to use plants or animals that have been genetically modified

5. Which one of the following statements best represents your intention to either use or not use organic methods on your farm or orchard within the next ten years?

- (1) I have a strong intention to use organic methods
- (2) I intend to use organic methods
- (3) I have no intention either way
- (4) I intend not to use organic methods
- (5) I have a strong intention not to use organic methods

6. Which one of the following statements best represents your intention to either use or not use integrated management (conditions or constraints on some management practice to minimise negative impacts) on your farm or orchard within the next ten years?

- (1) I have a strong intention to use integrated management
- (2) I intend to use integrated management
- (3) I have no intention either way
- (4) I intend not to use integrated management
- (5) I have a strong intention not to use integrated management

7. How much do you disagree or agree with the general sentiment of each of the following statements about alternative management systems?

- |                                |                    |
|--------------------------------|--------------------|
| (1) Strongly disagree          | (5) Agree          |
| (2) Disagree                   | (6) Slightly agree |
| (3) Slightly disagree          | (7) Strongly agree |
| (4) Neither disagree nor agree |                    |

I have not really considered alternative production systems and I believe they may not be environmentally friendly, may not produce better products, and may not be technically nor economically feasible. I need to focus on minimising costs and maximising output per hectare.

I don't have a real disagreement with alternative production systems, but changing may be very risky because there may be technical challenges, uncertain prices, or regulatory constraints. I need to be convinced they will work on my farm before I change.

I am committed to using alternative production systems but I am not registered, certified or accredited in any way. I want flexibility in what I do and want to avoid any costs and paperwork involved in being registered.

I use alternative farming systems because they offer me good financial prospects or allow me to develop new production skills that increase my control over what I am doing on my farm. They may allow me to decrease dependency on expensive external inputs, be more flexible or use local knowledge and minimise expenses.

I reject conventional farming with its synthetic fertilisers and pesticides, and use alternative production systems to improve soil health, even if I have to forgo some income. I will adapt my management accordingly to remain true to my philosophy, which is part of a broader social movement.

8. How dependent is your farm or orchard on **each** of the following:

- |                          |                         |
|--------------------------|-------------------------|
| (1) Not dependent at all | (4) Very dependent      |
| (2) Slightly dependent   | (5) Extremely dependent |
| (3) Moderately dependent |                         |

Chemicals for the control of pests or parasites	<input type="text"/>
Chemicals for the control of weeds	<input type="text"/>
Manufactured fertilisers	<input type="text"/>
Composts	<input type="text"/>
Manures (other than directly applied by animals)	<input type="text"/>
Organic remedies for the control of pests or parasites	<input type="text"/>
Organic remedies for the control of weeds	<input type="text"/>

9. Approximately what percentage, if any, of your household food is produced on your farm or orchard?  %

10. Approximately what percentage, if any, of your household food is sourced from hunting, fishing, or gathering by you and your family?  %

11. Generally, how satisfied are you with your farming or growing situation at present?

- |                                       |                    |                      |
|---------------------------------------|--------------------|----------------------|
| (1) Very dissatisfied                 | (4) Satisfied      | <input type="text"/> |
| (2) Dissatisfied                      | (5) Very satisfied |                      |
| (3) Neither satisfied nor unsatisfied |                    |                      |

12. Do you see the future prospects of your farm or orchard as:

- |                              |                 |                      |
|------------------------------|-----------------|----------------------|
| (1) Very bleak               | (4) Bright      | <input type="text"/> |
| (2) Bleak                    | (5) Very bright |                      |
| (3) Neither bleak nor bright |                 |                      |

13. Which option best reflects where you might be in five years from now?

- |   |                      |
|---|----------------------|
| (1) Still farming, with most income from farm work                        | <input type="text"/> |
| (2) Still farming but with significant income from new activities on farm |                      |
| (3) Still farming but with significant income from off-farm work          |                      |
| (4) Land sold and working in another job                                  |                      |
| (5) Land passed on to next generation, semi retired or retired            |                      |
| (6) Land sold and retired   |                      |
| (7) Other, please specify _____   |                      |

**C. Farm or Orchard Environment**

1. For each of the following items, please estimate their general condition five years ago and at present.

- (1) Excellent
- (2) Very good
- (3) Good
- (4) Neither good nor poor
- (5) Poor
- (6) Don't know/Not applicable

	Five years ago	At present
Soil health		
Exotic species diversity		
Stream health		
Native species diversity		

**D. Farm or Orchard Practices**

1. Please rate the importance **to you** of **each** of the following statements:

- (1) Very unimportant
- (2) Unimportant
- (3) Neither unimportant nor important
- (4) Important
- (5) Very important
- (6) Not applicable

Developing practical farming skills based on specific knowledge, observation and experience of my own land	
Managing in a way that is compatible with natural cycles, including unpredictable events	
Returning microbial plant or animal material to the soil to improve it	
Achieving pest control by protecting natural enemies of pests, (e.g., encouraging beneficial insects)	
Achieving a balance between crop production and animal husbandry	
Maintaining and promoting diversity by increasing the number of crop and plant varieties and/or animal breeds	
Respecting the physiological and behavioural needs of livestock and/or plants	
Achieving social responsibility in production and processing (e.g., providing good working conditions)	
Using local knowledge in farming practice	

Developing knowledge of the ecosystem on my farm	<input type="checkbox"/>
Using varieties and species adapted to local conditions	<input type="checkbox"/>
Using skills and knowledge to avoid dependency on external inputs such as fertilisers, chemicals, or expertise	<input type="checkbox"/>
Supporting local and regional markets with the produce from my farm or orchard	<input type="checkbox"/>
Supporting and enhancing the things that positively influence ecosystem quality	<input type="checkbox"/>
Keeping good relations with neighbouring farmers so as to discuss farming issues, practices, problems or projects with them	<input type="checkbox"/>

### E. Relationship to Land

1. Do you feel that you are part of your land?

(1) Yes (2) No (3) Uncertain

2. Can you sense when all is well with your land?

(1) Yes (2) No (3) Uncertain

3. Do you have the feeling that your land mysterious, that is, is there an unknowable aspect to your land which you believe exists?

(1) Yes (2) No (3) Uncertain

4. Do you believe you will have a relationship with your land after your death, assuming you or a member of your family still owned the land?

(1) Yes (2) No (3) Uncertain

5. Do you believe you will have a relationship with your land after your death, assuming you had already sold the land?

(1) Yes (2) No (3) Uncertain

## F. Maori Connections

1. If your family has been in your current locality for a number of generations, did your ancestors have a relationship with Maori?

(1) Yes\* (2) No (3) Don't know (4) Not long in locality

\*If yes, would you describe your ancestors' relationship as:

(1) Positive (2) Negative (3) Neither negative nor positive (4) Don't know

2. Do you know about or have heard of any (a) battles between Maori tribes that may have occurred near or on your land, (b) old Maori pathways near or on your land or (c) former pā sites near or on your land?

(1) Yes (2) No (3) Don't know

3. Do you know the Maori names of rivers or mountains in your locality?

(1) Yes\* (2) No

\*If Yes, do you know the stories behind these names?

(1) Yes (2) No

4. Are you a Maori descendant?

(1) Yes (2) No (3) Likely (4) Unlikely (5) Unsure

5. Do you have any relationship with a local iwi or hapu?

(1) Yes\* (2) No

\*If yes, would you describe this relationship as:

(1) Positive (2) Negative (3) Neither negative nor positive

6. Are you actively involved with an iwi or hapu?

(1) Yes (2) No



**G. Wetlands**

1. How important to you is each of the following recreational activities on your farm or orchard?

- (1) Very unimportant
- (2) Unimportant
- (3) Neither unimportant nor important
- (4) Important
- (5) Very important
- (6) Not applicable

Spending time and money on developing wetland areas

Waterfowl shooting

Fishing in wetlands and waterways

Spending time looking at wetland areas


2. How important to you is each of the following factors limiting wetland development on your farm or orchard:

- (1) Very unimportant
- (2) Unimportant
- (3) Neither unimportant nor important
- (4) Important
- (5) Very important
- (6) Not applicable

I do not have the money

I do not have the expertise

Wetlands are inappropriate for the environment of my farm

I have no interest in developing wetlands


## H. Nature

1. How much do you disagree or agree with each of the following statements?

- |                                |                    |
|--------------------------------|--------------------|
| (1) Strongly disagree          | (4) Agree          |
| (2) Disagree                   | (5) Strongly agree |
| (3) Neither disagree nor agree |                    |

When humans interfere with nature it often produces disastrous consequences

Human ingenuity will ensure that we do not make the earth unliveable

Human beings are part of nature

My farm or orchard is more an extension of natural systems as opposed to a human made system

My farm or orchard is mainly natural

My farm or orchard is mainly human made


## I. Farming Information

1. What is the size of your farm or orchard?

hectares

2. What is your predominant farming activity?

- |                          |                           |
|--------------------------|---------------------------|
| (1) Dairy                | (4) Arable or cropping    |
| (2) Pastoral             | (5) Horticulture          |
| (3) Specialist livestock | (6) Other, please specify |

3. What was the annual gross revenue from your farm for the 2003-04 financial year?

Approximate figures only

4. What is your budgeted annual gross revenue for the 2004-05 financial year?

Approximate figures only

**J. Personal information**

1. Please provide the year you were born.

2. Please provide your gender (1) Male (2) Female

3. Which of the following best describes your religious beliefs?

- (1) Buddhist
- (2) Christian
- (3) Hindu
- (4) Islam/Moslem
- (5) Jewish
- (6) Agnostic
- (7) Atheist
- (8) Spiritual but not religious
- (9) No religious beliefs
- (10) Other, please specify

4. To which ethnic group do you most identify?

- (1) NZ Maori
- (2) NZ European/European
- (3) Tongan
- (4) Samoan
- (5) Chinese
- (6) Indian
- (7) Other Asian
- (8) Other, please specify

5. Please provide the province in which your farm is located

6. Which, if any, of the following people live with you in your household?

(1) Yes (2) No

Husband, wife or partner

Mother or father

Son(s) or daughter(s)

Sister(s) or brother(s)

Girlfriend or boyfriend

Flatmate(s)

7. Including yourself, how many people live in your household?

8. What is your highest level of education completed?

- |  |  |
|--|--|
| (1) Attended primary school                              | (4) Trade technical qualification or similar |
| (2) Attended secondary school,<br>without qualifications | (5) Undergraduate diploma or certificate     |
| (3) Attended secondary school,<br>with qualifications    | (6) University                               |
- 

9. Do you have any of the following tertiary agricultural or horticultural qualifications?

(1) Yes (2) No

Occasional short course	<input data-bbox="1270 826 1374 898" type="checkbox"/>
Apprenticeship	<input data-bbox="1270 902 1374 974" type="checkbox"/>
Certificate/diploma	<input data-bbox="1270 978 1374 1050" type="checkbox"/>
University degree	<input data-bbox="1270 1055 1374 1126" type="checkbox"/>

10. Do you think such qualifications are important in farming or growing?

(1) Yes\* (2) No\* (3) Unsure

\*If yes or no please say why:

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11. In the last four years, have you had any off-farm/off-orchard employment as well as farming?

(1) Yes\* (2) No

\$

**\*If Yes**, please specify the type of employment and number of years of employment

Type of employment

Number of years


12. In the last year have you had any off-farm or off-orchard employment?

(1) Yes\*      (2) No

**\*If yes:**

(a) What is the approximate annual off-farm income before tax?

\$

(b) What were the hours per week?

(c) Please rate the importance to you of **each** of the following reasons for your off-farm employment.

- (1) Very unimportant                      (4) Important
- (2) Unimportant                            (5) Very important
- (3) Neither unimportant nor important

As a secondary income source

As a primary income source

To subsidise farm and capital investments

For health insurance or other benefits

For personal interest

As primary career

Other, please specify \_\_\_\_\_

Thank you for completing the questionnaire. Please return it in the freepost envelope.