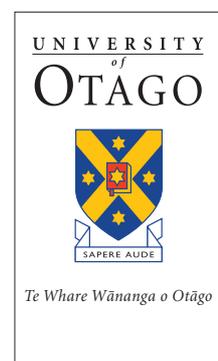# The Representativeness of ARGOS Panels and Between Panel Comparisons

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Research objectives

To use questionnaire survey data:
- To compare ARGOS panels with their respective farming sectors in order to assess how each panel matched its sector.
- To compare ARGOS panels within sectors.

Results

Data summary - number of variables with significant differences

Panels compared to sectors		
Sheep/beef	Conventional	8
	Integrated	8
	Organic	17
Kiwifruit	Gold	6
	Green	3
	Organic	7
Dairy	Conventional	8
	Organic	3
Between panels		
Sheep/beef	Org cf. IM + CV	14
	Org cf. CV	3
	Org cf. IM	9
	CV cf. IM	2
Kiwifruit	Org cf. Gold + Green	6
	Org cf. Gold	2
	Org cf. Green	6
	Green cf. Gold + Org	1
	Green cf. Gold	2
Dairy	Org cf. CV	17

- The majority of questionnaire variables received similar scores by the panel and by the sector and this sustains a conclusion that the panels are generally representative of their sectors.

- Taking a narrow view, and focussing on differences, the results show that the sheep/beef conventional and integrated panels, all the kiwifruit panels and the dairy panels are good representatives of their sectors while the sheep/beef organic panel is a moderately good representative of its sector.

- Farmers in the sheep/beef panels compared to the sheep/beef sector are younger and, in addition, two out of the three panels have higher farm revenue and more people in their households. Younger age means that the ARGOS sheep/beef panels have a higher proportion with a successor, have a more on-farm orientation and have a higher proportion living with sons or daughters. Also, for the panels as a whole, nearly one half had a certificate or diploma compared to one quarter in the sector. ARGOS farmers appear to be more committed to and serious about full-time farming.

- The sheep/beef and kiwifruit organic panels have a slightly more commercial approach to farming compared to their respective sectors.

- The comparison between panels in each sector shows that the organic panels are the most distinctive.

- While some bias occurred during selection of farms and orchards for the organic panels, this bias is towards commercial organic production which may be typical of future developments in primary production as organic production gains further credibility.

- In terms of between panel comparisons, the distinctiveness of the organic panels suggests that for all the other measured variables produced by ARGOS research, it is more likely that significant differences will occur in comparisons of organic with either conventional or integrated production, or for kiwifruit with gold or green production.

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, Kiwigreen, gold 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[1], 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 panels are reasonably representative of the sectors to which they belong. The analysis presented in this report tests this assumption. Survey data from both the panels and the sectors are used in order to make comparisons on a number of dimensions of farming.

1.2 Research Objectives

The main research objective is to compare ARGOS panels with their respective farming sectors in order to assess how well each panel represented its sector. For example, we can compare the characteristics of a given sheep/beef panel with the appropriate sheep/beef farm population for those farms using the same management system. Note that this is made difficult by comparing a panel of 12 with a sector sample drawn from the population. Such a small panel requires a very large difference on some measured variable to show as a statistically significant difference. Realistically, the main focus will be on seeing if the panels are strikingly different from the sector population or are different in ways that we would expect. An additional objective is to document attitudes and behaviours of ARGOS farmers that can be measured by questionnaire. A final objective is to use the panel data to compare panels within sectors. We would like to know, for example, if ARGOS conventional or organic farmers are different in any way. We expect that farmers using alternative management systems would have different characteristics.

Readers seeking details of the questionnaire design and administration are referred to the companion report entitled: New Zealand farmer and grower attitudes and opinion survey: Analysis by sector and management system. An account of the questions asked is given in that report and is not repeated here. However, the questionnaire is included in the Appendix to this report.

1.3 Outline of report

In Chapter 2, the results are presented in two parts. First, data are presented for the panels in comparison to their respective sectors, and then panels are compared within each sector. In Chapter 3 the results are summarised and an overall assessment of the panels' representativeness, and their differences, is made.

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[1] 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.

Chapter 2
Results

2.1   Introduction

This chapter starts with an examination of the panels in comparison to their respective sectors. It then compares panels within each sector.

All variables in the questionnaire were assessed in the search for differences between panels and their respective population sector. In total, there are 145 variables so the relatively small numbers of significant differences reported below are suggestive of reasonable similarity between panels and their respective sectors.

We have reported the significance level of t tests rather than significance within a level of confidence in order for readers to see for themselves the relevant data. Further, note that sometimes the tables report an abbreviated version of an item in the questionnaire so caution is needed in interpreting the table results and attention should be given to the text, where full wording is used. The scale used to evaluate each variable is included in the tables but to avoid making the tables too detailed the scale is not repeated for each variable unless the scale changes. The majority of the scales are five point importance scales with one representing 'very unimportant' and five representing 'very important'.

2.2   Panels compared to sectors

In the following presentation of results we have moderated the formal requirements of English expression in order to simplify the wording of the results. Often we refer to the panel in shorthand as 'they' rather than referring to 'farmers in this panel'.

For two of the three tables in the sheep/beef section below the numbers in the sector are quite low, less than 28, so making comparisons with panels with around 12 cases is difficult and not too much should be read into the significant differences found. For the kiwifruit and the dairy sectors that sector numbers are better.

2.2.1 Sheep/beef panels compared to sectors

Table 1 shows the items for which there were significant differences between the sheep/beef conventional panel and the sheep/beef conventional sector. Compared to the sector, the conventional panel were neutral about using GMOs compared to a slightly negative intention for the sector. They were less dependent on manures and had more disagreement with the Committed Conventional position. They had stronger agreement with balancing between crop and animal production. Their farm revenues were higher and they were younger. Finally, they had larger family sizes.

Table 1: Items with significant differences for the sheep/beef conventional panel compared to the sheep/beef conventional sector

Item	Panel (11)	Sector (108)	Significance
Intention to use GMOs (1=strong intention)	3.09	3.52	0.003*
Dependence on manures (1=not dependent at all)	1.09	1.71	0.000*
Opposed to alternative management systems (Committed Conventional) (1=disagree)	2.36	3.14	0.019
Achieving a balance between crop and animal husbandry (1=very unimportant)	4.36	3.72	0.003*
Annual gross revenue 03-04	356,777	160,578	0.001
Budgeted gross revenue 04-05	347,222	164,194	0.002
Age	46	55	0.005
Number in household	4.2	3.0	0.010

Note: 1. The use of an asterisk indicates that tests for unequal variances have been used. This policy applies to all scores so indicated.
2. In some panels the number of farms is less than 12 because of changes in farmer participation in the ARGOS study.

Overall, these data are showing that the ARGOS sheep/beef conventional panel is not quite as conventional as the sector as indicated by their disagreement with the Committed Conventional position. Their lower dependence on manures and higher agreement with balancing crop and animal husbandry may reflect the importance of cropping for some of the ARGOS farmers, many of whom produce more than just animal products. But these data may be suggesting a slightly unconventional approach to farming. An important difference is their younger age and larger family size – indicating they are at an earlier stage in their life cycle – and higher revenues, suggesting they may be more focused on production. We would expect that farmers of younger age would have higher debts and be more focussed on production.

Table 2 shows the items for which there were significant differences between the sheep/beef integrated panel and the sheep/beef integrated sector. Compared to the sector, the integrated panel more strongly disagreed with the Pragmatic Conventional position and the Pragmatic Organic position. They stated that they were very dependent on manufactured fertilisers while farmers in the sector were moderately dependent. They stated that they had no dependence on organic remedies for pests. They rated developing practical farming skills and keeping good relations with farmers as more important, and fishing as of slight importance compared to the sector with some unimportance. Finally, they are younger than the sector.

Table 2: Items with significant differences for the sheep/beef integrated panel compared to the sheep/beef integrated sector

Item	Panel (10)	Sector (23)	Significance
Ambivalent about alternative management systems but change is a risk (Pragmatic Conventional) (1=strongly disagree)	2.61	3.87	0.001
Positive about alternative management systems (Pragmatic Organic)	2.22	3.00	0.030
Dependence on manufactured fertilisers (1=not dependent at all)	4.00	3.30	0.040*
Dependence on organic remedies for pests	1.00[1]	1.43	0.005
Developing practical skills (1=very unimportant)	4.90	4.43	0.010*
Keeping good relations	4.70	4.13	0.008
Fishing (1=very unimportant)	3.29	2.41	0.030
Age	43	53	0.010

Note: 1. Since the average here is one there is no variation in the data so the test is for whether the responses in the sector are different from zero. This policy applies to all such scores.

In summary, the integrated panel's slight rejection of the Pragmatic Conventional and Pragmatic Organic positions suggests that they have a stronger commitment to IM compared to the integrated sector, distancing themselves from conventional and organic production. Their dependency results show reliance on manufactured fertiliser and rejection of organic remedies. Their emphasis on practical skills and good relations with neighbouring farmers suggest a stronger traditional approach to farming since these are characteristics often associated with farming in earlier times. Again, they are younger than the sector. This panel to sector comparison shows eight differences but this number must be tempered by noting the low numbers involved, ten farmers compared with 23 farmers, which means there are no strong sector data on which to ground the comparison. For this reason it would be inappropriate to make too much of these differences.

Table 3 shows the items for which there were significant differences between the sheep/beef organic panel and the sheep/beef organic sector. Compared to the sector, the organic sheep/beef panel rated bank borrowings as more important in enabling farm ownership, and they have a strong intention to use any one of the management systems listed in the questionnaire. They gave different ratings to three of the positions on alternative management systems, expressing more disagreement with the Pragmatic Conventional position and less agreement with the Pragmatic Organic and Committed Organic positions on alternative management systems. They rated their dependence on three inputs as lower than the sector, and they rated the condition of native species diversity, both five years ago and at present, as lower than the sector. They had a very low percentage of household food sourced from hunting, fishing or gathering. In terms of practices, they rated two organic practices as more important. Their gross revenue was higher, they had larger number of people living in their household, and they were younger.

Table 3: Items with significant differences for the sheep/beef organic panel compared to the sheep/beef organic sector

Item	Panel (13[1])	Sector (28)	Significance
Borrowing from bank (1=very unimportant)	4.17	3.13	0.048
Intention to use any of the listed management systems (1=strong intention to use)	1.00	1.62	0.048
Intention to use organic methods	1.00	1.41	0.019*
Ambivalent to alternative management systems but change is a risk (Pragmatic Conventional) (1=disagree)	1.85	2.67	0.043
Positive about alternative management systems (Pragmatic Organic)	3.25	4.24	0.011
Positive and committed to organic philosophy (Committed Organic)	3.15	4.00	0.038
Dependence on chemicals for weed control (1=not dependent at all)	1.00	1.59	0.035
Dependence on manufactured fertilisers	1.00	1.63	0.031
Dependence on organic remedies for weeds	1.46	2.19	0.054
Native species diversity – 5 years ago (1=excellent)	4.00	3.31	0.050
Native species diversity – at present	3.73	2.69	0.006
Percentage of household food sourced from hunting or fishing	0.8	8.5	0.012*
Developing practical skills (1=very unimportant)	4.85	4.46	0.035*
Returning material to the soil	4.92	4.61	0.013
Annual gross revenue 03-04	$285,000	$120,102	0.011
Number of people in household	3.9	2.9	0.031
Age	47	54	0.003*

Note: 1. One farm is going through the organic certification process thus increasing the panel size.

In total, there are 17 differences here. The panel expresses stronger intentions to use alternative management systems compared to the population, although they do not rate the Pragmatic and Committed Organic positions as highly. They are less dependent on three inputs (even saying that their dependence on organic remedies is lower than the sector) and rate two organic practices as more important. They have higher gross revenue, more people in the household and are younger. Perhaps some of these differences stem from the fact that many farms in the organic sector would have been smaller scale and would express a stronger commitment to an organic farming philosophy and less commitment to financial returns. Generally, there is ambivalence in these results with a mix of stronger and weaker response across the variables listed. Some of this variation may be due to the low numbers involved.

Finally, there are some remaining data for a few questions in the questionnaire which had yes/no/unsure or other categorical answers. For these questions the appropriate way to analyse the data is to run cross tabulations of all the panels together against the sector data and assess the Chi square value. A significant Chi square indicates that the proportions in the panels do not match the proportions in the sectors. In effect, this is a comparison of the panels as whole against the sector without partitioning into management system. This approach was necessary because the numbers were too small for a more refined assessment. Generally, these analyses show results that are consistent with earlier observations.

There were some differences as follows. About one quarter (23 per cent) of the sector respondents had a successor to take over the farm but among the panels there were over one third (36 per cent) and far fewer in the panels said they did not have a successor (12 per cent cf. 35 per cent) (Chi-square test = 7.2, d.f. = 2, p = 0.027). More panel farmers than sector farmers were intending to be 'still farming with most income from farm work' (61 per cent cf. 36 per cent) or 'still farming but with significant income from new activities on farm' (18 per cent cf. nine per cent), while more sector farmers than panel farmers were intending to be 'still farming but with significant income from off-farm work' (27 per cent cf. 15 per cent) or 'land sold. leased, managed or passed on…' (28 per cent cf. six per cent) (Chi-square test = 13.5, d.f. = 3, p = 0.004). There were 87 per cent of panel respondents who lived in a household with sons or daughters compared with 62 per cent in the sector (Fishers Exact test = 6.5 d.f. = 1, p = 0.010). These last two results are consistent with the panels being younger, as described earlier. This demographic fact may also explain the other results: the higher number of panel farmers with a work on farm orientation since the other options included retirement etc, and the higher numbers with a successor.

Responses to the gender question show that all the panel respondents were men but in the sector there were 14 per cent who were female. In response to the education question, the panel respondents were more likely to hold a certificate or diploma (47 per cent cf. 26 per cent) (Fishers Exact test = 4.8, d.f. = 1, p = 0.046). Among the sector farmers, more had off-farm employment in the past year (38 per cent cf. 18 per cent) (Fishers Exact test = 5.0, d.f. = 1, p = 0.028).

Overall, these data for the panels taken together show that ARGOS sheep/beef farmers are more likely to have a successor to work the farm, to hold a certificate or diploma and less likely to have off-farm work. ARGOS farmers are younger and appear to be more committed to and serious about full-time farming.

2.2.2   Kiwifruit panels compared to sectors

Table 4 shows the items for which there were significant differences between the kiwifruit gold panel and the gold sector. Compared to the sector, the gold panellists rated inherited land in enabling farm ownership as neutral compared to unimportant. They had some agreement with the Pragmatic Organic position but were not dependent on organic remedies. They were more positive about the future, saw waterfowl shooting as more unimportant, but gave slight importance to spending time looking at wetland areas. Not having money was unimportant as a limitation on wetland development. Overall, the gold panel is similar to the sector.

Table 4: Items with significant differences for the kiwifruit gold panel compared to the kiwifruit gold sector

Item	Panel (12)	Sector (84)	Significance
Importance of inherited land in enabling farm ownership (1=very unimportant)	3.09	1.69	0.019*
Positive about alternative management systems (Pragmatic Organic) (1=strongly disagree)	3.64	2.95	0.054
Dependence on organic remedies for weed control (1=not dependent at all)	1.00	1.33	0.000*
Future prospects (1=very bleak)	3.91	3.59	0.013*
Spending time looking at wetland areas (1=very unimportant)	3.40	2.52	0.017*
Limitation to wetland development – do not have money (1=very unimportant)	1.75	3.08	0.036

Table 5 shows the items for which there were significant differences between the kiwifruit green panel and the green sector. Compared to the green sector, the green panel have owned their orchards for fewer years. They rated as more important achieving pest control by protecting natural enemies, and they assigned less importance to waterfowl shooting. Overall, the green panel is similar to the green sector.

Table 5: Items with significant differences for the kiwifruit green panel compared to the kiwifruit green sector

Item	Panel (12)	Sector (99)	Significance
Years on current farm	7.92	17.6	0.000*
Achieving pest control by protecting natural enemies (1=very unimportant)	4.27	3.71	0.100
Waterfowl shooting (1=very unimportant)	1.80	2.38	0.044*

Table 6 shows the items for which there were significant differences between the kiwifruit organic panel and the organic sector. Compared to the sector, the organic panel have more disagreement with the third option on alternative management systems namely the practiced but not formalised position (Environmentally Conscious but not Organic) presumably because it refers to being unregistered and this is disapproved of since they have taken the trouble to become registered. The panel members rated as less important the succession of lease in orchard ownership, and rated as more important borrowing from the bank. They reported less dependence on chemicals for control of weeds, and a lower proportion of household food sourced from the farm. Achieving a balance between crop production and animal husbandry was rated neutral, while waterfowl shooting was rated unimportant. Overall, the organic panel is similar to the sector. The general pattern is for a slightly more focussed or commercial approach to organic production, with less household food sourced from the orchard, less dependence on chemicals and less interest in waterfowl shooting.

Table 6: Items with significant differences for the kiwifruit organic panel compared to the kiwifruit organic sector

Item	Panel (12)	Sector (63)	Significance
Practiced alternative management systems but not certified organic (Environmentally Conscious but not Organic) (1 = strongly disagree)	1.91	2.78	0.028
Importance of succession of lease to orchard ownership (1=very unimportant)	1.11	1.67	0.003*
Importance of borrowing from the bank to orchard ownership	4.40	3.34	0.011*
Dependence on chemicals for control of weeds (1=not dependent at all)	1.09	1.42	0.043*
Proportion of household food from orchard	3.5	14.6	0.000*
Achieving a balance between crop production and animal husbandry (1=very unimportant)	2.93	4.00	0.009
Waterfowl shooting	1.17	2.10	0.003*

The sector as a whole was more likely to "Feel a part of their land" than the panel (Chi square = 9.2, d. f. = 2, p = 0.01).

2.2.3 Dairy panels compared to sectors

The reader is reminded that the organic panel comprises converting farms, not fully certified organic farms. Therefore these farmers have had a shorter period of experience with organic production compared to the sheep/beef and kiwifruit sectors. This does not mean that they have no experience. In fact, some of them have made changes to their conventional management before converting to organic production. Note also that there were few organic dairy farms from which to choose the panel and some of them were smaller than the overall average dairy farm size.

Table 7 shows the items for which there were significant differences between the dairy conventional panel and the dairy conventional sector. The conventional panel farmers rated management systems as important for the sustainability New Zealand's primary production while the sector farmers rated it as nearer to neutral. The panel farmers gave a lower rating for their dependence on organic remedies for the control of pests and parasites. Further, they assigned less importance to waterfowl shooting as a recreational activity and less importance to not having expertise for wetland development. They slightly agreed with the idea that their farm is more an extension of natural systems as opposed to a human made system while sector farmers were neutral, and they were neutral (cf. some agreement) that the farm is mainly human made. This is evidence of support for the pure nature position rather than the cultured nature position on human relationships to nature. Finally, the size of farm and the average age for the panel was lower than the sector. Overall, there is a mix of results here with no clear indication of a pattern in the differences. There is a theme of younger farmers, smaller sized farms, and a suggestion of a stronger or supportive view of nature, perhaps as part of being smaller in size and therefore emphasising nature rather than production.

Table 7: Items with significant differences for the conventional dairy panel compared to the conventional dairy sector

Item	Panel (12)	Sector (114)	Significance
Importance of management systems for the sustainability of New Zealand's primary production	4.18	3.33	0.010
Dependence on chemicals for control of pest and parasites (1=not dependent at all)	2.25	2.84	0.034
Importance of waterfowl shooting (1=very unimportant)	1.92	2.78	0.019
Importance of not having expertise for wetland development (1=very unimportant)	2.20	2.73	0.038
My farm or orchard is more an extension of natural systems as opposed to a human made system (1=strongly disagree)	3.58	3.04	0.036
My farm or orchard is mainly human made	3.00	3.61	0.031
Size of farm	116	192	0.002
Age	45	54	0.028

Table 8 shows the items for which there were significant differences between the dairy organic panel and the dairy organic sector. There were very few differences between the organic panel farms and their sector counterparts. The panel farmers slightly disagreed with the Environmentally Conscious but not Organic position while sector farmers disagreed, suggesting that the latter have a stronger commitment to organic farming or at least, greater acceptance of the importance of registration. Similarly, sector organic farmers agreed with the Committed Organic position while panel farmers were neutral. Clearly in terms of these statements about management position, panel farmers are not as strongly committed to organic farming as the sector farmers. These results are suggesting that the panel is not such a strong version of organic farming compared to the sector.

There were no significant differences across the sector and the panels for the variables only able to be analysed using cross tabulations.

Table 8: Items with significant differences for the organic dairy panel compared to the organic dairy sector

Item	Panel (12)	Sector (23)	Significance
Practiced alternative management systems but not certified organic (Environmentally Conscious but not Organic) (1 = strongly disagree)	2.75	1.91	0.012
Reject conventional farming and use alternative production systems (Committed Organic)	3.50	4.65	0.010
Supporting and enhancing the things that positively influence ecosystem quality (1 = very unimportant)	4.00	4.43	0.025

2.3 Comparisons across panels within each sector

The comparisons across panels involve testing for statistical difference with small numbers (from 7-13) in each panel. Accordingly, we have used the ten per cent confidence level in order to include a greater number of differences to compensate. Accordingly, these results should be treated with a greater degree of uncertainty.

2.3.1 Sheep/beef differences between panels

The tables below show that the organic panel is different from the other two panels on many variables. The organic farmers compared to both the integrated management (IM) and the conventional management panels:
- Had a stronger intention to use any of the listed management systems.
- Had a stronger intention not to use GMOs.
- Had a stronger intention to use organic methods.
- Had a stronger intention to use integrated methods.
- Disagreed with the Committed Conventional position.
- Disagreed with the Pragmatic Conventional position.
- Were neutral cf. disagree with the Committed Organic position.
- Were not dependent on chemicals for pest and parasites.
- Were not dependent on chemicals for weed control.
- Were less dependent on manufactured fertilisers.
- Had greater dependency on organic remedies for control of weeds.
- Were neutral cf. good rating of the condition of native species diversity five years ago.
- Assigned more importance (cf. neutrality for other panels) to returning microbial plant and animal material to the soil.
- Assigned more importance to maintaining or promoting diversity by increasing the number of crop and plant varieties and/or animal breeds.

Organic farmers compared to conventional farmers only:
- Had greater dependency on organic remedies for control of pests and parasites.
- Assigned greater importance to managing a way that is compatible with natural cycles.
- Assigned more importance to using skills and knowledge to avoid dependency on external inputs such as fertilisers, chemicals, or expertise.

Organic farmers compared to integrated farmers only:
- Were neutral with the Pragmatic Organic position cf. disagreement by IM.
- Had a lower rating of the condition of soil health five years ago.
- Had a lower rating of the condition of native species diversity now.
- Assigned more importance to developing knowledge of the ecosystem of the farm.
- Assigned more importance to achieving pest control by protecting natural enemies of pests.
- Assigned more importance to respecting physiological and behavioural needs of livestock and plants.
- Assigned less importance to waterfowl shooting.
- Assigned less importance to fishing in wetland and waterways.
- Had more agreement (cf. neutrality of IM) with the statement that when humans interfere in nature it often produces disastrous consequences.

Conventional farmers compared to integrated farmers:

- Gave a stronger rating for the importance of management systems for the sustainability of New Zealand's primary production.
- Gave a lower rating for keeping good relations with neighbouring or other farmers.

Overall, these results show that even with the small numbers in the panels there are still some statistically significant differences between them. In most cases this was for organic compared to conventional and IM (14 differences). The organic panel was also different to the integrated panel on nine variables and different to the conventional panel on three variables. The conventional panel compared to the integrated panel was different on two variables.

Most of the differences relate to the distinctiveness of the organic panel. This panel includes farmers who express intentions and have views about alternative management systems which are entirely consistent with being organic. They expressed views on dependency on inputs that fit their organic viewpoint and they rated two organic practices as more important. The organic panel was also different to the integrated panel on nine variables and different to the conventional panel on three variables. One unusual result was that the organic panel had a stronger intention to use integrated management than the integrated panel. The conventional panel compared to the integrated panel was different on only two variables.

Table 9: Intention to use a management system

Type	N	Mean	Std. Dev.
(1) Conventional	11	2.27	.647
(2) Integrated management	9	2.22	.667
(3) Organic	13	1.00	.000
Total	33	1.76	.792
1. Range 1 = strong intention to use, 5 = strong intention not to use			

Note: Since there is no variation in response for organic farmers it is not appropriate to use a statistical test.

Table 10: Importance of management systems for the sustainability of New Zealand's primary production

Type	N	Mean	Std. Dev.
(1) Conventional	11	3.18	1.328
(2) Integrated management	9	4.11	.601
(3) Organic	13	3.85	1.345
Total	33	3.70	1.212
1. Range 1 = very important, 5 = very unimportant			
2. Means with significant differences 1-2, (p = 0.092)			

Table 11: Intention to use GMOs

Type	N	Mean	Std. Dev.
(1) Conventional	11	3.09	.302
(2) Integrated management	9	3.33	.866
(3) Organic	13	4.77	.439
Total	33	3.82	.950
1. Range 1 = strong intention to use, 5 = strong intention not to use 2. Means with significant differences 2-3 (p = 0.002), 1-3 (p = 0.000)			

Table 12: Intention to use organic methods

Type	N	Mean	Std. Dev.
(1) Conventional	11	3.18	.751
(2) Integrated management	9	3.22	1.093
(3) Organic	13	1.00	.000
Total	33	2.33	1.291
1. Range 1 = strong intention to use, 5 = strong intention not to use			

Table 13: Intention to use integrated management

Type	N	Mean	Std. Dev.
(1) Conventional	11	2.18	.751
(2) Integrated management	9	2.33	.707
(3) Organic	12	1.50	1.000
Total	32	1.97	.897
1. Range 1 = strong intention to use, 5 = strong intention not to use 2. Means with significant differences 2-3 (p = 0.033), 1-3 (p = 0.063)			

Table 14: Committed conventional

Type	N	Mean	Std. Dev.
(1) Conventional	11	2.36	.924
(2) Integrated management	9	2.56	1.014
(3) Organic	13	1.62	.961
Total	33	2.12	1.023
1. Range 1 = disagree, 5 = agree 2. Means with significant differences 2-3 (p = 0.032), 1-3 (p = 0.068)			

Table 15: Pragmatic Conventional

Type	N	Mean	Std. Dev.
(1) Conventional	11	2.91	.944
(2) Integrated management	9	2.67	1.000
(3) Organic	13	1.85	.801
Total	33	2.42	1.001
1. Range 1 = disagree, 5 = agree 2. Means with significant differences 2-3 (p = 0.045), 1-3 (p = 0.008)			

Table 16: Pragmatic Organic

Type	N	Mean	Std. Dev.
(1) Conventional	11	2.73	.905
(2) Integrated management	9	2.22	.441
(3) Organic	12	3.25	1.055
Total	32	2.78	.941
1. Range 1 = disagree, 5 = agree 2. Means with significant differences 2-3 (p = 0.024*)			

Table 17: Committed organic

Type	N	Mean	Std. Dev.
(1) Conventional	11	2.18	.874
(2) Integrated management	9	1.67	.500
(3) Organic	13	3.15	1.068
Total	33	2.42	1.062
1. Range 1 = disagree, 5 = agree 2. Means with significant differences 2-3 (p = 0.001) 1-3 (p = .012)			

Table 18: Dependency on chemicals for pests or parasites

Type	N	Mean	Std. Dev.
(1) Conventional	11	2.82	.751
(2) Integrated management	9	3.44	1.130
(3) Organic	13	1.23	.439
Total	33	2.36	1.220
1. Range 1 = not dependent at all, 5 = extremely dependent 2. Means with significant differences 2-3 (p = 0.001) 1-3 (p = .000*)			

Table 19: Dependency on chemicals for weeds

Type	N	Mean	Std. Dev.
(1) Conventional	11	3.00	1.095
(2) Integrated management	9	3.22	.972
(3) Organic	13	1.00	.000
Total	33	2.27	1.306
1. Range 1 = not dependent at all, 5 = extremely dependent			

Table 20: Dependency on manufactured fertilisers

Type	N	Mean	Std. Dev.
(1) Conventional	11	3.73	1.348
(2) Integrated management	9	4.00	.707
(3) Organic	13	1.00	.000
Total	33	2.73	1.645
1. Range 1 = not dependent at all, 5 = extremely dependent			

Table 21: Dependency on organic remedies for pests and parasites

Type	N	Mean	Std. Dev.
(1) Conventional	11	1.36	.674
(2) Integrated management	9	1.00	.000
(3) Organic	13	2.77	.927
Total	33	1.82	1.044
1. Range 1 = not dependent at all, 5 = extremely dependant			
2. Means with significant differences 1-3 (p = 0.001)			

Table 22: Dependency on organic remedies for control of weeds

Type	N	Mean	Std. Dev.
(1) Conventional	11	1.27	.467
(2) Integrated management	9	1.11	.333
(3) Organic	13	2.08	1.441
Total	33	1.55	1.034
1. Range 1 = not dependent at all, 5 = extremely dependant			
2. Means with significant differences 2-3 (p = 0.036) 1-3 (p = .077*)			

Table 23: Native species diversity five years ago

Type	N	Mean	Std. Dev.
(1) Conventional	10	3.14	1.069
(2) Integrated Management	10	3.00	.816
(3) Organic	13	4.00	.775
Total	33	3.48	.965
1. Range 1 = excellent, 5 = poor 2. Means with significant differences 2-3 (p = 0.027), 1-3 (p = 0.055)			

Table 24: Soil health five years ago

Type	N	Mean	Std. Dev.
(1) Conventional	7	3.40	1.075
(2) Integrated Management	7	2.80	0.789
(3) Organic	11	3.46	0.877
Total	25	3.24	0.936
1. Range 1 = excellent, 5 = poor 2. Means with significant differences 2-3 (p = 0.097)			

Table 25: Native species diversity now

Type	N	Mean	Std. Dev.
(1) Conventional	7	3.00	1.155
(2) Integrated Management	7	2.71	.756
(3) Organic	11	3.74	1.104
Total	25	3.24	1.091
1. Range 1 = excellent, 5 = poor 2. Means with significant differences 2-3 (p = 0.055)			

Table 26: Managing in a way that is compatible with natural cycles

Type	N	Mean	Std. Dev.
(1) Conventional	11	4.27	.647
(2) Integrated Management	10	4.70	.675
(3) Organic	13	4.69	.480
Total	34	4.56	.613
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 1-3 (p = 0.096)			

Table 27: Returning material to the soil

Type	N	Mean	Std. Dev.
(1) Conventional	11	4.27	.786
(2) Integrated Management	10	3.50	1.269
(3) Organic	13	4.92	.277
Total	34	4.29	1.001
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 2-3 (p = 0.019) 1-3 (p = 0.067*)			

Table 28: Promoting diversity

Type	N	Mean	Std. Dev.
(1) Conventional	11	3.09	1.044
(2) Integrated Management	10	3.10	1.101
(3) Organic	13	4.08	.954
Total	34	3.47	1.107
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 2-3 (p = 0.031) 1-3 (p = 0.026)			

Table 28: Knowledge of ecosystem

Type	N	Mean	Std. Dev.
(1) Conventional	11	4.00	1.095
(2) Integrated Management	10	3.60	.966
(3) Organic	13	4.46	.519
Total	34	4.06	.919
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 2-3 (p = 0.026)			

Table 30: Avoiding external inputs

Type	N	Mean	Std. Dev.
(1) Conventional	11	3.45	.934
(2) Integrated Management	10	3.70	.675
(3) Organic	13	4.23	.725
Total	34	3.82	.834
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 1-3 (p = 0.022)			

Table 31: Achieving pest control by protecting natural enemies of pests

Type	N	Mean	Std. Dev.
(1) Conventional	11	3.55	1.036
(2) Integrated Management	10	4.00	0.047
(3) Organic	13	4.38	0.768
Total	34	4.00	0.853
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 2-3 (p = 0.076*)			

Table 32: Respecting physiological and behavioural needs of livestock and/or plants

Type	N	Mean	Std. Dev.
(1) Conventional	11	4.36	0.505
(2) Integrated Management	10	3.90	1.370
(3) Organic	13	4.62	0.506
Total	34	4.32	0.878
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 2-3 (p = 0.055)			

Table 33: Keeping good relations with neighbouring or other farmers

Type	N	Mean	Std. Dev.
(1) Conventional	11	4.27	.647
(2) Integrated Management	10	4.70	.483
(3) Organic	13	4.23	.599
Total	34	4.38	.604
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 1-2 (p = 0.066)			

Table 34: Waterfowl shooting

Type	N	Mean	Std. Dev.
(1) Conventional	10	3.00	1.155
(2) Integrated Management	8	3.50	.756
(3) Organic	12	2.50	.905
Total	30	2.93	1.015
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 2-3 (p = 0.031)			

Table 35: Fishing in wetland and waterways

Type	N	Mean	Std. Dev.
(1) Conventional	9	2.67	0.866
(2) Integrated Management	7	3.29	0.756
(3) Organic	9	2.22	1.093
Total		2.68	0.988
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 2-3 (p = 0.033)			

Table 36: Interfering with nature has consequences

Type	N	Mean	Std. Dev.
(1) Conventional	11	3.55	.688
(2) Integrated Management	10	3.00	1.054
(3) Organic	13	4.15	.987
Total	34	3.62	1.015
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 2-3 (p = 0.006)			

2.3.2 Kiwifruit differences between panels

The tables below show the following panel differences.

The organic orchardists compared to gold and green orchardists:
- Had a stronger intention to use organic methods.
- Disagreed with the Committed Conventional position on alternative management systems.
- Agreed with the Committed Organic position on alternative management systems.
- Disagreed with the Environmentally Conscious but not Organic position on alternative management systems.
- Had lower dependence on chemicals for pests and parasites, for weeds, and for manufactured fertilisers, and higher dependence on composts and organic remedies for control of pests and parasites.
- Saw future prospects as less bright.

Organic orchardists compared to gold orchardists only:
- Gave less importance to money made from other farming business in enabling orchard ownership.
- Gave some importance to wetlands being inappropriate for the environment of their farm.

Organic orchardists compared to green orchardists only:

- Had higher dependency on organic remedies for control of weeds.
- Had a stronger intention not to use GMOs.
- Gave more importance to money made from outside farming in enabling orchard ownership.
- Had more agreement with the statement that when humans interfere with nature it often produces disastrous consequences.
- Had less agreement with the statement that human ingenuity will ensure that we do not make the earth unliveable.
- Rated as neutral (cf. important) achieving a balance between crop production and animal husbandry.

Green orchardists compared to gold and organic orchardists:
- Had been associated with the orchard for fewer years.

Green orchardists compared to gold orchardists only:
- Assigned lower importance (cf. neutral) to inherited land in enabling farm ownership.
- Disagreed with the Pragmatic Organic position on alternative management systems.

Overall, the results show again that most of the differences relate to the organic panel. For the organic panel compared to both gold and green there were six differences; for organic compared to gold only, two differences; and for organic compared to green there were six differences. Green orchardists were different to both gold and organic on one variable; and green compared to gold only had two differences.

The organic panel shows differences as expected about intentions, alternative management positions and dependencies. However, they saw future prospects as less optimistic perhaps because they are aware of the limitations of the organic system on production or that they are responding to the reduction to the premium for organic kiwifruit. The green differences are modest in number. They have been on their orchard for less time.

Table 37: Importance of money made from other farming business in enabling farm ownership

Type	N	Mean	Std. Dev.
(1) Green	7	3.14	1.773
(2) Gold	10	3.10	1.663
(3) Organic	9	1.78	1.302
Total	26	2.65	1.648
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 2-3, (p = 0.081)			

Table 38: Importance of inherited land in enabling farm ownership

Type	N	Mean	Std. Dev.
(1) Green	7	1.57	1.134
(2) Gold	11	3.09	1.640
(3) Organic	10	1.70	1.059
Total	28	2.21	1.475
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 1-2 (p = 0.027, 2-3 (p = 0.025)			

Table 39: Importance of money made from outside farming in enabling farm ownership

Type	N	Mean	Std. Dev.
(1) Green	8	2.75	1.282
(2) Gold	10	3.10	1.449
(3) Organic	9	4.11	1.537
Total	27	3.33	1.494
1. Range 1 = very unimportant, 5 = very important 2. Means with significant differences 1-3, (p = 0.062)			

Table 40: Years associated with current orchard

Type	N	Mean	Std. Dev.
(1) Green	12	7.92	6.667
(2) Gold	11	17.27	11.900
(3) Organic	11	16.36	9.179
Total	34	13.68	10.102
Means with significant differences 1-2, (p = 0.024), 1-3 (p = 0.040)			

Table 41: Intention to use GMOs

Type	N	Mean	Std. Dev.
(1) Green	12	3.58	1.165
(2) Gold	11	4.18	.982
(3) Organic	11	4.82	.603
Total	34	4.18	1.058
1. Range 1 = strong intention to use, 5 = strong intention not to use 2. Means with significant differences 1-3 (p = 0.015)			

Table 42: Intention to use organic methods

Type	N	Mean	Std. Dev.
(1) Green	12	3.67	1.073
(2) Gold	11	3.09	1.300
(3) Organic	11	1.55	.688
Total	34	2.79	1.366
1. Range 1 = strong intention to use, 5 = strong intention not to use 2. Means with significant differences 2-3 (p = 0.002), 1-3 (p = 0.000)			

Table 43: Agreement with committed conventional

Type	N	Mean	Std. Dev.
(1) Green	12	3.58	1.165
(2) Gold	11	2.73	1.104
(3) Organic	11	2.18	1.250
Total	34	2.85	1.282
1. Range 1 = strongly disagree, 5 = strongly agree 2. Means with significant differences 1-2 (p = 0.091), 1-3 (p = 0.008)			

Table 44: Agreement with Environmentally Conscious but not Organic

Type	N	Mean	Std. Dev.
(1) Green	11	2.64	1.027
(2) Gold	11	3.18	.982
(3) Organic	11	1.91	.944
Total	33	2.58	1.091
1. Range 1 = strongly disagree, 5 = strongly agree 2. Means with significant differences 2-3 (p = 0.005), 1-3 (p = 0.094)			

Table 45: Agreement with pragmatic organic

Type	N	Mean	Std. Dev.
(1) Green	11	2.82	1.079
(2) Gold	11	3.64	1.027
(3) Organic	11	3.45	1.036
Total	33	3.30	1.075
1. Range 1 = strongly disagree, 5 = strongly agree 2. Means with significant differences 1-2 (p = 0.077)			

Table 46: Agreement with Committed Organic

Type	N	Mean	Std. Dev.
(1) Green	12	2.17	1.267
(2) Gold	11	2.45	.934
(3) Organic	11	3.36	1.433
Total	34	2.65	1.300
1. Range 1 = strongly disagree, 5 = strongly agree 2. Means with significant differences 1-3 (p = 0.026), 2-3 (p = 0.093)			

Table 47: Dependency on chemicals for pests or parasites

Type	N	Mean	Std. Dev.
(1) Green	12	3.75	.754
(2) Gold	11	3.73	.905
(3) Organic	11	1.73	1.009
Total	34	3.09	1.288
1. Range 1 = not dependent at all, 5 = extremely dependent 2. Means with significant differences 2-3 (p = 0.000), 1-3 (p = 0.000)			

Table 48: Dependency on chemicals for weeds

Type	N	Mean	Std. Dev.
(1) Green	12	2.92	1.084
(2) Gold	11	2.82	1.328
(3) Organic	11	1.09	.302
Total	34	2.29	1.292
1. Range 1 = not dependent at all, 5 = extremely dependent 2. Means with significant differences 2-3 (p = 0.004), 1-3 (p = 0.000*)			

Table 49: Dependency on manufactured fertilisers

Type	N	Mean	Std. Dev.
(1) Green	12	3.67	.651
(2) Gold	11	3.82	1.079
(3) Organic	11	1.73	.786
Total	34	3.09	1.264
1. Range 1 = not dependent at all, 5 = extremely dependent 2. Means with significant differences 2-3 (p = 0.000), 1-3 (p = 0.000)			

Table 50: Dependency on composts

Type	N	Mean	Std. Dev.
(1) Green	11	2.09	.944
(2) Gold	11	2.00	.894
(3) Organic	11	4.18	.751
Total	33	2.76	1.324
1. Range 1 = not dependent at all, 5 = extremely dependent 2. Means with significant differences 2-3 (p = 0.000), 1-3 (p = 0.000)			

Table 51: Dependency on organic remedies for the control of pests

Type	N	Mean	Std. Dev.
(1) Green	12	1.33	.888
(2) Gold	11	1.73	.647
(3) Organic	10	4.20	1.033
Total	33	2.33	1.514
1. Range 1 = not dependent at all, 5 = extremely dependent 2. Means with significant differences 2-3 (p = 0.000), 1-3 (p = 0.000)			

Table 52: Dependency on organic remedies for the control of weeds

Type	N	Mean	Std. Dev.
(1) Green	12	1.08	0.289
(2) Gold	11	1.00	0.000
(3) Organic	10	2.60	1.776
Total	33	1.52	1.202
1. Range 1 = not dependent at all, 5 = extremely dependent 2. Means with significant differences 1-3 (p = 0.025*)			

Table 53: Future prospects

Type	N	Mean	Std. Dev.
(1) Green	11	3.91	.539
(2) Gold	11	3.91	.302
(3) Organic	11	3.55	.522
Total	33	3.79	.485
1. Range 1 = very bleak, 5 = very bright 2. Means with significant differences 2-3 (p = 0.078), 1-3 (p = 0.078)			

Table 54: Wetlands inappropriate for environment of my farm

Type	N	Mean	Std. Dev.
(1) Green	6	2.83	1.169
(2) Gold	4	2.00	0.816
(3) Organic	6	3.50	1.378
Total	16	2.88	1.258
1. Range 1 = very unimportant, 5 = very important			
2. Means with significant differences 2-3 (p = 0.072)			

Table 55: When humans interfere with nature it often produces disastrous consequences

Type	N	Mean	Std. Dev.
(1) Green	11	3.09	0.701
(2) Gold	11	3.00	1.183
(3) Organic	11	3.82	0.751
Total	33	3.30	0.951
1. Range 1 = strongly disagree, 5 = strongly agree			
2. Means with significant differences 1-3 (p = 0.085*)			

Table 56: Human ingenuity will ensure that we do not make the earth unliveable

Type	N	Mean	Std. Dev.
(1) Green	12	3.42	0.900
(2) Gold	11	2.82	1.079
(3) Organic	11	2.73	0.905
Total	34	3.00	0.985
1. Range 1 = strongly disagree, 5 = strongly agree 2. Means with significant differences 1-3 (p = 0.096)			

Table 57: Achieving a balance between crop production and animal husbandry

Type	N	Mean	Std. Dev.
(1) Green	4	4.00	0.816
(2) Gold	5	3.60	0.548
(3) Organic	6	2.83	1.329
Total	15	3.40	1.056
1. Range 1 = very unimportant, 5 = very important			
2. Means with significant differences 1-3 (p = 0.096)			

2.3.3 Dairy differences between panels

Table 58 shows that there are many differences between the dairy organic panel members and conventional dairy panel members. The converting organic panel farmers:
* Had a stronger intention to use organic methods.
* Had more disagreement with the Committed Conventional position.
* Had more disagreement with the Pragmatic Conventional position.
* Agreed with the Pragmatic Organic position.
* Were not dependent on chemicals for the control of pests or parasites.
* Were not dependent on chemicals for the control of weeds
* Had less dependence on manufactured fertilisers.
* Had more, but still low, dependence on composts.
* Were very dependent on organic remedies for the control of pests or parasites.
* Were moderately dependent on organic remedies for the control of weeds.
* Produced nearly one quarter of household food from the farm compared to on tenth for conventional farmers.
* Rated the general condition of soil health five years ago as neither good nor poor compared to conventional farmers rating it as good.
* Rated the general condition of native species diversity at present as good compared to conventional farmers rating it as very good.
* Assigned more importance to returning microbial plant or animal material to the soil to improve it.
* Assigned more importance to maintaining and promoting diversity by increasing the number of crop and plant varieties and/or animal breeds.
* Assigned more importance to using skills and knowledge to avoid dependency on external inputs such as fertilisers, chemicals, or expertise.
* Were neutral about their farm as an extension of natural systems as opposed to human made compared to some agreement by conventional farmers.

Overall, the results show that the organic panel has a stronger intention to use organic methods and takes positions on alternative management system which are consistent with being organic. They expressed little dependency on chemicals or manufactured fertilisers but expressed dependency on composts, organic remedies, and produced more household food from the farm, and they were more negative about soil health five years ago and less positive about native species diversity at present. Further, they rated three organic practices as important. Finally, the organic panel was neutral about the farm being an extension of natural systems, a result that does not appear to fit with their organic orientation. Despite the dairy panel being new to organic farming, they hold beliefs entirely consistent with organic farming.

Table 58: Items with significant differences for the organic dairy panel compared to the organic conventional panel

Item	Conventional (12)	Organic (12)	Significance
Intention to use organic methods (1=strong intention to use)	2.75	1.17	0.002
Not considered alternative management systems (Committed Conventional) (1=strongly disagree)	3.25	2.18	0.064
Ambivalent to alternative management systems but change is a risk (Pragmatic Conventional) (1=strongly disagree)	3.67	2.45	0.004
Positive about alternative management systems (Pragmatic Organic)	2.83	4.17	0.004
Dependence on chemicals for control of pests or parasites (1=not dependent at all)	2.25	1.08	0.000
Dependence on chemicals for the control of weeds	2.83	1.00	0.000
Dependence on manufactured fertilisers	3.58	1.75	0.004
Dependence on composts	1.67	2.58	0.074
Dependence on organic remedies for control of pests or parasites	1.64	3.92	0.000
Dependence on organic remedies for control of weeds	1.27	3.00	0.002
Household food produced on farm	10%	23%	0.066
General condition of soil health five years ago (1=excellent)	2.92	3.91	0.044
General condition of native species diversity at present	2.30	3.30	0.059
Returning microbial plant or animal material to the soil to improve it (1 =very unimportant)	3.83	4.67	0.007
Maintaining and promoting diversity by increasing the number of crop and plant varieties and/or animal breeds	3.17	4.33	0.003
Using skills and knowledge to avoid dependency on external inputs such as fertilisers, chemicals, or expertise	3.55	4.50	0.049
Farm is an extension of natural systems as opposed to human made (1=strongly disagree)	3.58	2.82	0.052

Chapter 3
Discussion and Conclusion

3.1 Introduction

The main objective of this research was to compare ARGOS panels with their respective farming sectors in order to assess how well each panel represented its sector. In addition, the other objective was to use the data to compare panels within sectors. A summary of the key findings is presented before discussing them more generally, since this report has covered a variety of sectors and made a number of comparisons.

3.2 Summary of results

Panels compared to their respective sectors
Sheep/beef
Overall, these data are showing that the ARGOS sheep/beef conventional panel is not quite as conventional as the conventional sector as indicated by their disagreement with the Committed Conventional position. Their lower dependence on manures and higher agreement with balancing crop and animal husbandry may reflect the importance of cropping for some of the ARGOS farmers, many of whom produce more than just animal products. But these data may be suggesting a slightly unconventional approach to farming. An important difference is their younger age and larger family size – indicating they are at an earlier stage in their life cycle – and higher revenues, suggesting they may be more focused on production. We would expect that farmers of younger age would have higher debts and be more focussed on production.

The integrated panel's slight rejection of the Pragmatic Conventional and Pragmatic Organic positions suggests that they have a stronger commitment to IM compared to the integrated sector, distancing themselves from conventional and organic production. Their dependency results show reliance on manufactured fertiliser and rejection of organic remedies. Their emphasis on practical skills and good relations with neighbouring farmers suggest a stronger traditional approach to farming since these are characteristics often associated with farming in earlier times. Again, they are younger than the sector. This panel to sector comparison shows eight differences but this number must be tempered by noting the low numbers involved, ten farmers compared with 23 farmers, which means there are no strong sector data on which to ground the comparison. For this reason it would be inappropriate to make too much of these differences.

For the organic panel compared to the sector there is a total of 17 differences. The panel expresses stronger intentions to use alternative management systems compared to the population, although they do not rate the Pragmatic and Committed Organic positions as highly. They are less dependent on three inputs (even saying that their dependence on organic remedies is lower than the sector) and rate two organic practices as more important. They have higher gross revenue, more people in the household and are younger. Perhaps some of these differences stem from the fact that many farms in the organic sector would have been smaller scale and would express a stronger commitment to an organic farming philosophy and less commitment to financial returns. Generally, there is ambivalence in these results with a mix of stronger and weaker response across the variables listed. Some of this variation may be due to the low numbers involved.

Data comparing all the panels together with the sheep/beef sector showed that more panellists had a successor, they were more likely to be farming in future, more lived with sons or daughters and more hold a certificate or diploma and fewer had off-farm employment in the last year. Fewer had off-farm employment in the past year. ARGOS farmers are younger, and appear to be more committed to and serious about full-time farming.

Kiwifruit
Compared to the sector, the gold panellists rated inherited land in enabling farm ownership as neutral compared to unimportant. They had some agreement with the Pragmatic Organic position but were not dependent on organic remedies. They were more positive about the future, saw waterfowl shooting as more unimportant, but gave slight importance to spending time looking at wetland areas. Not having money was unimportant as a limitation on wetland development. Overall, the gold panel is similar to the gold sector.

Compared to the green sector, the green panel have owned their orchards for fewer years. They rated as more important achieving pest control by protecting natural enemies, and they assigned less importance to waterfowl shooting. Overall, the green panel is very similar to the green sector.

Compared to the sector, the Organic panel have more disagreement with the third option on alternative management systems namely the practiced but not formalised position (Environmentally Conscious but not Organic) presumably because it refers to being unregistered and this is disapproved of since they have taken the trouble to become registered. The panel members rated as less important the succession of lease in orchard ownership, and rated as more important borrowing from the bank. They reported less dependence on chemicals for control of weeds, and a lower proportion of household food sourced from the farm. Achieving a balance between crop production and animal husbandry was rated neutral, while waterfowl shooting was rated unimportant. Overall, the organic panel is similar to the sector. The general pattern is for a slightly more focussed or commercial approach to organic production, with less household food sourced from the orchard, less dependence on chemicals and less interest in shooting.

Dairy
The conventional panel farmers rated management systems as important for the sustainability New Zealand's primary production while the sector farmers rated it as nearer to neutral. The panel farmers gave a lower rating for their dependence on organic remedies for the control of pests and parasites. Further, they assigned less importance to waterfowl shooting as a recreational activity and less importance to not having expertise for wetland development. They slightly agreed with the idea that their farm is more an extension of natural systems as opposed to a human made system while sector farmers were neutral, and they were neutral (cf. some agreement) that the farm is mainly human made. This is evidence of support for the pure nature position rather than the cultured nature position on human relationships to nature. Finally, the size of farm and the average age for the panel was lower than the sector. Overall, there is a mix of results here with no clear indication of a pattern in the differences. There is a theme of younger farmers, smaller sized farms, and a suggestion of a stronger or supportive view of nature, perhaps as part of being smaller in size and therefore emphasising nature rather than production.

There were very few differences between the organic panel farms and their sector counterparts. The panel farmers slightly disagreed with the Environmentally Conscious but not Organic position while sector farmers disagreed, suggesting that the latter have a stronger commitment to organic farming or at least, greater acceptance of the importance of registration. Similarly, sector organic farmers agreed with the Committed Organic position while panel farmers were neutral. Clearly in terms of these statements about management position, panel farmers are not as strongly committed to organic farming as the sector

farmers. These results are suggesting that the panel is not such a strong version of organic farming compared to the sector.

Panels compared to each other
Overall, these results show that even with the small numbers in the panels there are still some statistically significant differences between them. This is especially true of the organic panels in each sector, suggesting that farmers engaging in organic production may be distinguished from their non-organic peers on the basis of the attitudes addressed by the survey. Such differences contribute to the objectives of the ARGOS research by indicating potential explanatory factors for any rejection of the null hypothesis (no differences between management system).

Sheep/beef
Most of the differences relate to the distinctiveness of the organic panel. This panel includes farmers who express intentions and have views about alternative management systems which are entirely consistent with being organic. They expressed views on dependency on inputs that fit their organic viewpoint and they rated two organic practices as more important. The organic panel was also different to the integrated panel on nine variables and different to the conventional panel on three variables. One unusual result was that the organic panel had a stronger intention to use integrated management than the integrated panel. The conventional panel compared to the integrated panel was different on only two variables.

Kiwifruit
The results show again that most of the differences relate to the organic panel. The organic panel shows differences as expected about intentions, alternative management positions and dependencies. However, they saw future prospects as less optimistic perhaps because they are aware of the limitations of the organic system on production or that they are responding to the reduction to the premium for organic kiwifruit. The green differences are modest in number. They have been on their orchard for less time.

Dairy
The results show that the organic panel has a stronger intention to use organic methods and takes positions on alternative management system which are consistent with being organic. They expressed little dependency on chemicals or manufactured fertilisers but expressed dependency on composts, organic remedies, and produced more household food from the farm, and they were more negative about soil health five years ago and less positive about native species diversity at present. Further, they rated three organic practices as important. Finally, the organic panel was neutral about the farm being an extension of natural systems, a result that does not appear to fit with their organic orientation. Despite the dairy panel being new to organic farming, they hold beliefs entirely consistent with organic farming.

3.3   Discussion

The results from the earlier tables are summarised in Table 59 by showing the number of variables for which there is a significant difference. Of most importance to the objectives of this research are the results for the panels compared to the sectors. In general, the main finding is that the panels are generally representative of their sectors. There are more differences for sheep/beef than for kiwifruit or for dairy: the sheep/beef organic panel has 17 differences, the conventional panel has eight differences and the integrated panel has eight differences. For Kiwifruit, the gold panel had six variables with significant difference, the organic panel has six variables with significant differences while the green panel has three differences. For dairy, the conventional panel has eight differences and the organic panel has three differences.

The table also summarises the differences between panels. For the sheep/beef sector, most of the differences relate to the organic panel being different from the other two. Of the total of 28 differences, 12 are between organic and one other panel, and 14 are between organic and both panels. Clearly, the organic panel is distinctive in comparison to the other two panels. The conventional and integrated panels are not greatly different from each other. For the kiwifruit sector, most of the differences relate to the organic panel and they have a total of 14 differences, six of which occur between organic and both gold and green. Beyond the Organic panel differences are a total of three differences, two of which relate to green and one to gold. There were also a comparatively high number of differences (17) between the organic and conventional dairy panels. Overall then, the between panel comparisons show that the organic panels are most distinctive. We would expect members of the organic panel to have distinctive attitudes and characteristics, consistent with their use of a distinctive management system.

Table 59: Data summary - number of variables with significant differences

Panels compared to sectors		
Sheep/beef	Conventional	8
	Integrated	8
	Organic	17
Kiwifruit	Gold	6
	Green	3
	Organic	7
Dairy	Conventional	8
	Organic	3
Between panels		
Sheep/beef	Org cf. IM + CV	14
	Org cf. CV	3
	Org cf. IM	9
	CV cf. IM	2
Kiwifruit	Org cf. Gold + Green	6
	Org cf. Gold	2
	Org cf. Green	6
	Green cf. Gold + Org	1
	Green cf. Gold	2
Dairy	Org cf. CV	17

Note: the total number of questionnaire variables was 145 but not all were able to be tested for differences.

Taking a broad view of the results for sheep/beef, kiwifruit and dairy panels compared to sectors, the majority of variables received similar scores by the panel and by the sector and this sustains a conclusion that the panels are generally representative of their sectors. Taking a narrow view, and focusing on differences, the results show that the sheep/beef conventional and integrated panels, the three kiwifruit panels and the two dairy panels are good representatives of their sectors while the sheep/beef organic panel is a moderately good representative of its sector.

There are some patterns in the sheep/beef results. The sheep/beef conventional, integrated and organic panels are younger than their corresponding sectors. Both the conventional and

organic panels have higher revenue and more people in their households. Both the integrated and organic panels disagreed more with the Pragmatic Conventional and Pragmatic Organic positions and rate as more important the development of practical farming skills. While the penultimate result is hard to interpret, the consistent finding of younger age, the partially consistent finding of higher revenue, more people and emphasis on practical farming skills indicate that generally the ARGOS panels contain farmers who are at an earlier stage in their life cycle and the emphasis on revenue suggests that they are more focused on production.

Some specific results for the sheep/beef organic panel suggest that it is not as ideologically driven as the sector. The sheep/beef organic panel is not so strongly supportive of the two positions on alternative management systems that refer to organic production (Pragmatic Organic and Committed Organic). The panel perhaps is more serious about organic production in an economic sense rather than an ideological sense, and have taken it up as a commercial endeavour meaning to make a financial success of it in the long term. This finding is consistent with the finding that the farmers are younger.

Similarly, the kiwifruit organic panel has a slightly more commercial approach to organic farming compared to the sector in that they have less household food sourced from the orchard, less dependence on chemicals and less interest in waterfowl shooting.

Note that both sheep/beef and kiwifruit organic panels rated the importance of bank borrowing as higher than the sectors. This again supports the view that the sheep/beef and kiwifruit organic panels are more serious about commercial organic production. It appears from these data that these farmers put more emphasis on production rather than producing household food from their land. Bear in mind that the balance of the organic sector contains small-scale farmers or orchardists, many of whom are able to adopt a strong philosophical position. Smaller-scale (life-style) farmers may be less influenced by the financial bottom line, or have alternative sources of income, and therefore financial concerns are less likely to flavour the farmer's position on organics. However, this comparison did not show up in farm or orchard size and revenue comparisons.

For the dairy sector there are some results similar to those just mentioned for sheep/beef and kiwifruit. Farmers on the dairy conventional panel are younger but their farms are smaller in size and their incomes are not higher than the sector. There is some evidence that the dairy organic panel is not as strongly committed to organic principles as the sector.

The results strongly suggest that some of the organic panels are a more commercial version of organic production and may reflect a bias during the farm selection process. First, farmers or orchardists with a favourable disposition to ARGOS or to research on alternative management systems would have been more likely to participate in the ARGOS research. The ARGOS selection process started with organic farms since they were the limiting factor in terms of farm numbers. Presumably, many were approached and asked to participate and there would be a tendency for those favourably disposed to the aims of ARGOS to respond positively to the request to participate. In addition, ARGOS researchers may have favoured farmers who were positive about research on organic management systems. Second, a similar process has occurred in that ARGOS panel farmers are younger and more commercially oriented than the sector. It is likely that this kind of farmer would have responded positively to a request to join ARGOS seeing the research as a way to help achieve their production goals. Third, organic farming is a relatively new production system among commercial farmers for which there are fewer sources of information or guidance on how to farm, so farmers may have been keen to join ARGOS to get much needed information or support. A similar process may have occurred for the conventional sheep/beef panel and the conventional dairy panel as these farmers are not as conventional as their sector counterparts. While there may have been some sources of bias, it remains true that

for the sheep/beef sector there were only a small number of organic farms involved at a scale that was similar to conventional farming.

The occurrence of selection bias means that in some cases the panels are not a perfect representation of the sectors. Does this matter? Strictly speaking, the selection bias means that any differences found between panels on any variable measured by other ARGOS researchers may not apply to the farm population. This is especially the case for the organic panels. However, the bias may be helpful in that it makes for a strong experimental effect – effects that would otherwise be hard to pick up may be observable with our organic panel. It is also helpful in that as the organic sector matures and more farmers take up organic production in a commercial way they will have characteristics like those of the ARGOS panel. In effect, our panel data will better represent the future development of the sector. In other words, the selection bias is favourable with this longer view in mind.

It must be remembered that during the selection process good descriptive data on farmer characteristics were not available to assist in selection and matching farms. The criteria that were used were mainly simple descriptive farm data such as farm size and soil type. Given the lack of information on farmers available at the time, the selection of the farms for the respective panels was good in terms of finding farms which were similar to their sectors, and different from the management systems in the other panels. Of course, with the data which ARGOS now has it is possible to overcome this initial limitation by analysing data for different groupings of farmers based on emergent results.

3.4   Conclusion

In terms of assessing how well the ARGOS panels match their respective sectors, we have to conclude that the sheep/beef conventional and integrated panels, all the kiwifruit panels and the dairy panels are good representatives of their sectors while the sheep/beef organic panel is a moderately good representative of its sector.

In terms of between panel comparisons, the distinctiveness of the organic panels suggests that for all the measured variables produced by ARGOS, it is more likely that significant differences will occur in comparisons of organic with either conventional or integrated production, or for kiwifruit with gold or green production. Given these results we predict that rejections of the null hypothesis are more likely to occur for the organic panel. The conventional and integrated panels are broadly similar so it is likely that they will be similar on other characteristics measured by ARGOS researchers. The general pattern is likely to be that the conventional and integrated panels will contrast with the organic panels.

Lincoln University

Te Whare Wānaka o Aoraki

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   but less than 100 kilometres

        50 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

Mainly the spouse or partner of the principal farm/orchard operator

Both the spouse or partner and the principal farm/orchard operator together

The farm/orchard family, including parents or children

The farm or orchard manager

Other, please specify_____

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   (4) Important
    (2) Unimportant   (5) Very important
    (3) Neither unimportant nor 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
- (2) Slightly dependent
- (3) Moderately dependent
- (4) Very dependent
- (5) Extremely dependent

Chemicals for the control of pests or parasites ☐

Chemicals for the control of weeds ☐

Manufactured fertilisers ☐

Composts ☐

Manures (other than directly applied by animals) ☐

Organic remedies for the control of pests or parasites ☐

Organic remedies for the control of weeds ☐

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
- (2) Dissatisfied
- (3) Neither satisfied nor unsatisfied
- (4) Satisfied
- (5) Very satisfied

☐

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

- (1) Very bleak
- (2) Bleak
- (3) Neither bleak nor bright
- (4) Bright
- (5) Very bright

☐

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

- (1) Still farming, with most income from farm work
- (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	(4) Neither good nor poor
(2) Very good	(5) Poor
(3) Good	(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	(4) Important
(2) Unimportant	(5) Very important
(3) Neither unimportant nor 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	
Using varieties and species adapted to local conditions	
Using skills and knowledge to avoid dependency on external inputs such as fertilisers, chemicals, or expertise	
Supporting local and regional markets with the produce from my farm or orchard	
Supporting and enhancing the things that positively influence ecosystem quality	
Keeping good relations with neighbouring farmers so as to discuss farming issues, practices, problems or projects with them	

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   (3) Neither negative nor positive
(2) Negative   (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 pä 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   (4) Important
      (2) Unimportant   (5) Very important
      (3) Neither unimportant nor 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   (4) Important
      (2) Unimportant   (5) Very important
      (3) Neither unimportant nor 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 <u>predominant</u> 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   (6) Agnostic
    (2) Christian   (7) Atheist
    (3) Hindu   (8) Spiritual but not religious
    (4) Islam/Moslem   (9) No religious beliefs
    (5) Jewish   (10) Other, please specify

_____

4. To which ethnic group do you most identify? ☐

    (1) NZ Maori   (5) Chinese
    (2) NZ European/European   (6) Indian
    (3) Tongan   (7) Other Asian
    (4) Samoan   (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, (5) Undergraduate diploma or certificate
    without qualifications (6) University
(3) Attended secondary school,
    with qualifications

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

(1) Yes   (2) No

Occasional short course

Apprenticeship

Certificate/diploma

University degree

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:

_____
_____
_____
_____
_____

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.