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Executive Summary

The main objectives of this report are to assess the extent to which it is possible to differentiate among the management system panels of ARGOS farms/orchards and to assess how such difference is manifest in the social dimensions of farm life. The report is framed by a brief outline of the social dynamics of agricultural sustainability and the emerging significance of market audit systems as a key structuring feature of contemporary attempts to achieve more sustainable production systems. The findings are presented separately for the kiwifruit and sheep/beef sector. The report concludes with recommendations for transdisciplinary engagement among the ARGOS objectives.

Overall the current set of ARGOS social data for the kiwifruit sector suggests that, while there is great similarity among the panels, the Organic panel demonstrates the greatest number of distinctive characteristics. The assessment of difference among kiwifruit panels reflects survey results (six variables with statistically significant differences between the Organic and the other panels), qualitative data (more obviously distinctive characteristics attributed to the Organic panel) and causal map analysis (Organic orchardists listed a greater number of factors). The other surveyed data and the sketch maps do not show many panel differences. These kiwifruit results provided evidence of a number of key themes for which there was evidence of panel differences, including: breadth of view, good farming, environmental positioning, feedbacks, orchard management approaches, scope of control, and on- and off-farm relationships. While we have found that it is the Organic panel which is most distinctive, we also note that on some variables the Gold orchardists were closer to the Organic panel than the Kiwigreen panel (more double arrows and total connections in causal maps; a greater readiness to assume risk in the interviews).

The sheep/beef results show that, once the many similarities among sheep/beef farmers are taken into account, the Organic panel again demonstrated several distinctive characteristics compared to the Conventional and Integrated panels. This assessment similarly reflects survey results (14 variables with statistically significant differences between the Organic and the other panels), qualitative data (distinctive response of Organic panel to several topics of enquiry) and causal map analysis (Organic farmers had a greater number of important factors). In addition, both the sketch map and the causal map data indicated that location explained some of the variation among farmers. The sheep/beef results provided evidence of a number of key themes for which there was evidence of panel differences, including: breadth of view, good farming, environmental positioning, feedbacks, on- and off-farm relationships, production system management and responses to innovation and risk. While we have found that it is the Organic panel which is most distinctive, we also note that on some variables the Integrated farmers were more similar to the Organic than the Conventional ones.

Finally, the report interprets the findings in terms of their potential to differentiate the panels on the basis of social dimensions. While the literature shows at least 15 potential bases for social differentiation between panels, our results support 12 of these. Of these there is six (community; grower networks; craft orientation; sense of place; grower stress and wellbeing; identity) for which there evidence for subtle to moderate differentiation while the remaining six (commercial and economic orientation; learning and expertise; symbolic 'look' of the farmscape; indicators of on-farm processes; positioning towards nature/environment; farm management approaches) provide a stronger base for differentiation among panels. In its conclusion, the report identifies key indicated themes that have potential for transdisciplinary discussion, including: audit and market access, resilience, and intensification.

1. Introduction

The underlying objective of the ARGOS project is to develop greater understanding of and insight to the condition of sustainability in the New Zealand agricultural sector with the aim of contributing to the sector's environmental, economic and social resilience. This report takes a crucial step toward this objective by providing a synthesis of data from the Social Research Objective within the ARGOS research framework. These data – collected during the period of 2004-2007 – are the product of a range of interactions with the farmer and orchardist participants in the project, including two semi-structured qualitative interviews, a causal mapping exercise, and a national farm survey. More detailed analyses of the data collected by each method are available in a series of previous reports:

- First qualitative interview:
 - Qual 1 Kiwifruit (Hunt, et al. 2005)
 - Qual 1 Sheep/Beef (Hunt, et al. 2006)
 - Sketch Maps (Read, et al. 2005)
- Second qualitative interview:
 - Qual 2 Kiwifruit (Rosin, et al. 2007b)
 - Qual 2 Sheep/Beef (Rosin, et al. 2007a)
- Causal map study:
 - Kiwifruit (Fairweather, et al. 2006)
 - Sheep/Beef (Fairweather, et al. 2007a)
- National farmer survey:
 - Survey Panels Report (Fairweather, et al. 2007b)
- Multi-sourced report:
 - Wetlands review (McLeod, et al. 2006)

The intent of these earlier reports was to present and discuss the findings specific to each method and its research objectives.¹ In addition to a general discussion of the findings, each report addressed the null hypothesis at the basis of the ARGOS project's research:

H₀: There are no differences in the environmental, economic and social outcomes of the management systems on the participating farms/orchards.

In the following synthesis, we integrate the findings of these prior publications to provide a more robust explanation in relation to two central enquiries:

1. *Are there any differences between the panels of ARGOS farms/orchards?*
2. *If so, how are these differences manifested in the social dimensions of farm life?*

ARGOS Panels

In order to facilitate an evaluation of management systems that was pertinent to the contemporary situation of agricultural production in New Zealand, the ARGOS research has focused on the role of market-oriented audit schemes in promoting particular sets of appropriate or acceptable management practice. We have, therefore, identified three types of management in both the Kiwifruit and Sheep/Beef sectors, defined:

¹ Key themes included: farmer identity, vision, perspective on environment in Qual 1; constraints on farm management, especially in regard to farmer-industry relations in Qual 2; perceptions and knowledge of the farmscape in the sketch maps; important relationships in the farm management system in the causal maps; and demographic characteristics and attitudes about management practice, the environment and nature in the national survey.

- in the Kiwifruit sector by compliance with EurepGAP² audit, plus either organic certification for the 'Hayward' variety ('Green') or the KiwiGreen³ system for both the 'Hayward' and 'Hort 16A' varieties ('Green' and 'Gold' respectively);
- and in the Sheep/Beef sector by compliance with organic certification, 'quality assurance' audits⁴ and minimally audited conventional practice.

On the basis of these distinctions, twelve 'triplets' of farms/orchards (located within relative proximity to each other) have been selected to allow for the direct comparison of the contrasting management systems. As a result, the ARGOS research framework has been designed as a longitudinal study that consists of the comparative analysis of 111⁵ farms and orchards in both the Kiwifruit and Sheep/Beef sectors in New Zealand. For the purposes of social research, the owners and managers of the participating farms are grouped into *panels* of twelve properties corresponding to the respective management systems in each sector (Organic, Green and Gold for Kiwifruit; Organic, Integrated and Conventional for Sheep/Beef). Thus, the construction of the panels reflects aspects relevant to both environmental (distinguished by management system) as well as social (particular market audit pathways that define a given system for commercial purposes) differentiation.

The designation of panels relative to a farmer's/orchardist's compliance with externally defined best practices provides the means for comparison between markedly different approaches to agricultural production. The discussion of significant⁶ social differences among the ARGOS panels that follows suggests that conditions and factors related to the characteristics of individuals and their interactions with a wider society and with nature will vary with that individual's participation in a market audit scheme. The direction (causal or otherwise) of such associations may take several forms. In some cases, a difference indicates that a given audit scheme is more attractive to a particular group of farmers/orchardists. Alternatively, the social structures surrounding successful participation in any one of the schemes can be shown to create barriers to another group. Yet again, some of the differences reflect the farmers'/orchardists' perception that they must work with, rather than control, nature. Consequently, our presentation of the social findings will necessarily shift between the descriptive and the analytical, the general and the idiosyncratic. Furthermore, in this report, we have limited the scope of our discussion to

² EurepGAP is the acronym for an audit scheme designed by the Euro-Retailer Produce Working Group (EUREP, representing over 30 of the largest European food retailers) to accredit the produce of farms and orchards utilising environmentally and socially friendly management practices (**Good Agricultural Practice**). As such, compliance with the scheme has become required practice for export of horticultural products to the European market. ZESPRI, the single-desk exporter of New Zealand kiwifruit, has strongly encouraged its suppliers to comply with the EurepGAP audit in order to ensure greater flexibility as specific, higher value markets are targeted.

³ ZESPRI's KiwiGreen (and Organic) systems are intended to meet the legal requirements of export markets (such as maximum residue limits) as well as consumer requirements for safe fruit that is produced in an environmentally, socially and ethically responsible manner. Growers must comply with the Crop Protection Standard in order for their fruit to be accepted in to ZESPRI inventory.

⁴ In the case of the Sheep/Beef sector, these audits also enable access to higher value European markets, but are the product of the marketing strategies of individual UK retailers, Waitrose and Tesco.

⁵ The entire ARGOS programme currently involves 105 farms (36 kiwifruit, 36 Sheep/Beef, 24 Dairy, eight High Country and seven Maori properties (with new properties being recruited and some properties leaving the programme, this number tends to change). This report examines the panel differences in the two main ARGOS sectors – 72 properties in Kiwifruit and Sheep/Beef.

⁶ This term should not be understood to necessarily imply *statistical significance*, especially when used in reference to data from the qualitative interviews. The significance of many of the findings of the social objective involves the identification of a notable trait, characteristic or perspective that would be expected to affect the operation of the agricultural sector and the condition of its sustainability. As such, the concept is distinct from that of statistical significance, which would establish whether a value or measure is greater or less than that expected by chance.

the delineation of social differences without commenting on any associated ecological or economic features – the objective of a forthcoming report.

Sustainable Agriculture: The Social and Transdisciplinary Dynamics

As noted above, the foundational questions for the ARGOS project involve an enhanced examination of the condition of sustainability in the agricultural sector. Implicit to the development of this approach was the reference to an established and strengthening critique of both the existing state of agricultural science and the assessment of sustainability. These accounts of agricultural sustainability as a research focus identify several tenets that both inform the initial theoretical positioning of the project as a whole and establish the essential contribution of social science perspectives to its objectives:

- 1) Current approaches to agricultural science have overemphasised (in fact, reified) the technical bases of production and a related suite of scientifically derived technical inputs. This emphasis has been contested within a range of more integrative disciplines (including both rural sociology and rural geography) for many decades.
- 2) Prior studies of agricultural sustainability, by focusing on isolated spheres of action, failed to account for or develop an understanding of the dynamic interaction of technical, environmental, economic and social dimensions of farm activity.
- 3) There is, to date, a substantial dearth of suitable research, data and analysis on the social dynamics of farm households in relation to agricultural sustainability.
- 4) Social research on farm activities – in combination with technical, ecological and economic analyses – is a necessary and integral factor of a more comprehensive understanding of sustainability.

This early discussion in the ARGOS programme of the parameters of good practice in the study of agricultural sustainability not only positioned social research as an integral contributor to programme objectives; it also strongly oriented the project towards the pursuit of a more transdisciplinary approach oriented around the on-farm experiences of the farmers/orchardists.

Example: The 'Problem' of EcoN

The importance of the social science perspective can be demonstrated with the following example:

Agricultural scientists are occasionally surprised by the failure of farmers or orchardists to pursue new production approaches, adopt new market opportunities (e.g. certified organic production), or to incorporate win:win management techniques. A stark example in New Zealand of the latter involves the introduction of EcoN fertiliser for mitigating nitrogen overloading of pastures. The minimal uptake of this product suggests the presence of a 'social gap' at the heart of the sustainability crisis in Western agriculture. Put another way, farm activities are, at their core, socially constructed, negotiated within local networks, disciplined by a range of internal and external social constraints, and legitimated through a range of discourses and narratives. Put in these terms, adopting EcoN is a relatively simple matter compared to reconstructing the entire social architecture of productivist agriculture!

In the ensuing evolution of ARGOS approaches and ideas, the move into transdisciplinary engagement (in line with the experience of many other similar attempts around the world)

has been somewhat hesitant. The current status of the project is characterised by an emerging dialogue between established disciplinary approaches and the identification of key sites of transdisciplinary engagement around particular issues on the farms. In light of this situation, the project is reporting its findings in two stages:

- 1) Each disciplinary area within ARGOS that is directly studying the management systems of commercial farms in the panels (Social, Economic, Environmental) will report on the disciplinary insights that have accrued from examining the null hypothesis of ARGOS. This will entail a summary of the first four years of data collection on ARGOS farms – and forms something of a disciplinary benchmark against which future years of data gathering can be measured.⁷
- 2) For the final two years of the first ARGOS programme (2007-2009), key sites of activity or on-farm dynamics will be addressed across the disciplines to attempt to push forward into more transdisciplinary analysis of sustainability issues.

This report fulfils the first part of this process for the ARGOS Social Objective.

In order to create some context to the analysis in this report, a brief review will be undertaken of both the literature on social dynamics of agricultural sustainability and the emerging significance of market audit systems as a key structuring feature of contemporary attempts to achieve more sustainable production systems.

Positioning the ARGOS social science approach

In the introductory document to the Social Objective of ARGOS (Rationale document – Campbell, et al. 2004), a broad distinction was made between two styles of research into sustainable agriculture.

The first describes the reaction by a small group of scholars to the emerging and consolidating practices of industrial agriculture in modernity. This reaction and critique took shape over the whole course of the 20th Century (Stuart and Campbell 2004) and generally developed in the form of a critique of emerging industrial agricultural practices (focusing especially on new soil management techniques and fertiliser regimes in the first half of the century, and then shifting to include new pesticides post-WWII) and an aspirational set of prescriptions for what alternative agriculture *ought* to look like. These prescriptions for alternative agriculture included desirable social dimensions to farm activity and rural life.

The second research narrative into the social dimensions of sustainable agriculture took shape in the 1980s. This narrative emerged in response to the development of new production-consumption linkages creating commercial opportunities for the development of sustainable agriculture. Throughout the 20th Century, there had been a small number of growers, cooperative gardens and other small-scale ventures that directly sold produce grown under the principles of organic agriculture (see Campbell and Liepins 2001). This group sold to the wider public under an 'on trust' basis – usually in face-to-face interactions. Often these arrangements also endorsed alternative social arrangements and discourses.

Commencing with certified organic agriculture, a small, but growing, group of consumers began to pay premium prices to obtain food produced from farm management systems that were distinctly alternative to mainstream agricultural practices. Fueled by a series of food scares in the 1980s, and an increasing public acceptance of the negative consequences of industrial agriculture (both in health and environmental terms), a new niche market opened up for products claiming special qualities in counterdistinction to mainstream food products. Since the emergence of larger-scale commercial markets for

⁷ The other research Objective – He Whenua Whakatipu – is using a different structure to the panels and thus is not reporting in this framework. Rather, HWW acts as an important case-study based methodological check on the efficacy of the more structured, panels-based Objectives.

certified organic foods in the 1980s, a related body of social research has developed with the objective of examining the different dimensions of the new 'sustainable' food products as they are manifest in social reality (cf. how they *ought* to be configured – as per Narrative 1). This narrative has become even more complex with the parallel development of mainstream 'greening' of food supply chains – particularly through the use of Integrated farming systems as a desirable form of agricultural best practice by Japanese and European food retailers. More recently, this entire 'greening' trend has come under attack from writers like Michael Pollan who argues that the 'organic industrial complex' has ceased to have any particularly compelling points of difference to the mainstream industrial food system. Other scholars have claimed that while organic agriculture commenced as an alternative to mainstream practices, over time the commercialisation of organic production and trade has resulted in a parallel 'conventionalisation' of organic growers and systems. In short, apart from some technical differences in management systems, organics is increasingly indistinguishable from conventional production. Despite this challenge to the claims of alternative systems like organics, there has been little research into the social dimensions of the increasing prevalence of market audit schemes (and how these compare to claims of organic or Integrated approaches) at the farm and commodity level – precisely the focus of the ARGOS programme. The question is clear: are market audit differentiated Organic or Integrated growers actually different to their conventional peers?

Framing the Question of Social Difference in Market-Audit Demarcated Production Systems

Given the absence of any in-depth research into the social differentiation associated with market-audit compliance, the ARGOS programme occupies a unique position from which to provide greater understanding of the social dynamics of sustainable agriculture. The literature reviewed in developing the ARGOS research framework (see Campbell, et al. 2004) gives some indication as to the variety of social dimensions to agriculture that might, or might not, differ across audit-demarcated production systems:

- 1) *Demographic Characteristics.* Do the ARGOS panels differ in terms of basic demographics – age, gender, education, etc? Thus, is the tendency to move into a particular market audit framework characteristic of particular demographic groups? Claims that organic growers are more highly educated are often made in popular media. Is this kind of demographic claim supportable?
- 2) *Family Farming.* Most authors implicitly support a family-based farm unit (without articulating particularly compelling reasons why). Possible attributes include: the advantage of collective decision making; multiple points of view; offsetting of financial risk over multiple generations; greater integration with local communities; greater commitment to long term sustainability due to succession needs. Thus do market audits privilege or exclude family farming?
- 3) *Grower Identity.* Early literature on alternative agriculture suggested that organic and other alternative growers had different identity attributes around issues like gender and politics. There is little empirical evidence to validate this claim.
- 4) *Positioning Towards Nature/Environment.* Given a widespread attribution of a nature/culture binary operating in Western societies, and the potentially deleterious effects of operating with a worldview of 'separate nature' or a more utilitarian approach to natural resources, the potential for different positioning around nature and environment may be instructive.
- 5) *Commercial and Economic Orientation.* Do the representative panel members have different attitudes to their industry, governance structures, audit systems and consumers?

- 6) *Craft Orientation*. Given that some authors argue for a need for craft to triumph over industrialism in sustainable agriculture, are different attitudes and positioning towards the products, production techniques and product attributes evident among the participating farmers and orchardists?
- 7) *Sense of Place*. Are different panels characterised by greater 'nativeness to place', or a sense of their bond to the land, or identification with their particular locality?
- 8) *Grower Networks*. Prior literature has suggested that sustainable agriculture may be characterised by different styles of grower-grower interaction, different learning, benchmarking and flow of innovations.
- 9) *Learning and Expertise*. Prior literature strongly identifies the need for sustainable agriculture to break with mainstream expertise and learning systems. Is this the case? Do alternative farmers think in more systematic and less reductionist ways? Are they more 'ecologically literate' than conventional farmers? Do they rely more on 'local' or 'indigenous' knowledge in their production systems?
- 10) *Grower Stress and Wellbeing*. A possible ingredient to sustainable farming is the degree to which panel effects demonstrate differences around issues of stress and wellbeing among farm families.
- 11) *Community and Rural/Urban Dynamics*. Many authors have suggested that alternative agriculture could be better for the long term viability of rural communities. Given an identified point of tension emerging between intensifying agricultural systems and urban communities, do different panels experience rural/urban tensions differently?
- 12) *Symbolic 'Look' of Farmscape*. Following Egoz et al. (2001), do some growers manage their farms/orchards towards achieving a particular 'look' or level of 'tidiness' of their farmscape?
- 13) *Indicators of on-Farm processes*. Are the panels different in the kinds of indicators that growers use to signify environmental, economic or social health of their operation? How might such signifiers indicate a systems approach to farm management? Does it make a difference which feedbacks are being observed? Is the claim true that growers who observe more ecological feedbacks will be more sustainable?
- 14) *Farm Management Approaches*. Are they different on a range of farm management strategies, including: biodiversity management, risk evaluation, planning timelines, productivity and production strategies, and soil fertility?
- 15) *Social capital in relation to management system*. An alternative approach to the examination of the social networks (relations with other farmers, organisations, sources of information or other benefits, etc.) utilises the concept of social capital. The literature argues that greater social capital contributes to the sustainability and viability of a production system. Is there a marked difference in the social capital to which members of the various panels have access? Does a greater cognisance of sources of social capital contribute to the sustainability of a management system?

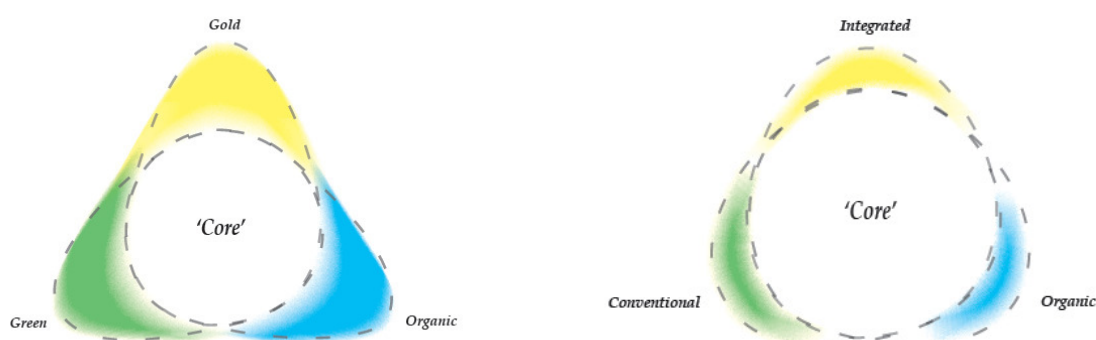
These possible social dimensions to farming activity and life will be addressed as themes of possible differentiation among ARGOS panels in this report. More specifically, we will evaluate the degree to which these are represented in differences between different market audit demarcated panels.

Preliminary ARGOS results and Ovoid Ideal Types

Having established the need to undertake comparisons between panels as the key guiding question of this report, an important clarification needs to be made. In an earlier report on qualitative interview data (Qual 1 Kiwifruit, Hunt, et al. 2005a), it was suggested that, in

order to understand the social characteristics of different panels of orchardists, it was important to recognise that in many cases the similarities between the panels were just as instructive as the differences. In that report, a heuristic device was developed to try and account for how the farms differ. This was termed the 'ovoid ideal type', deriving from Weberian use of ideal types.

The ovoid ideal type helped express one dynamic that was emerging from the data around the first qualitative interviews of farmers (see Qual 1 KF, Qual 1 S/B). Namely, was there a continuum of difference between panels, or were the panels connected and differentiated in multiple ways?



The significance of this is important in distinguishing between early hypothetical models of how the panels were structured and the later ovoid model:

Early Model- the Green 'Continuum': at the outset of the programme, it was generally hypothesised that the three panels would represent three different levels of 'green-ness'. For example, the Organic panel would represent the most environmentally engaged panel, the Gold (as holding the most similar position to the Sheep/Beef Conventional) panel the least, and the Green (as being comparable to Sheep/Beef Integrated) panel would mark a half-way point on this continuum.

Revised Model – Ovoid with Panel Warts: The above diagram suggests a revision to the original continuum model and has implications for the way in which panel difference is understood. The ovoid implies both that the panels have considerable shared practice and are indistinguishable across many criteria, but also that the continuum is better understood as a triangle. In other words, that in some cases Organic and Conventional are more closely associated than Organic and Conventional with Integrated. Integrated does not, therefore, sit in the middle of a continuum.

This point will be returned to in the conclusion of this report, once the findings of subsequent investigations have been evaluated in terms of their fit with the continuum or ovoid models. First, however, we will establish the integrity of the ARGOS panel distinctions (that is, provide justification for designating and assigning membership within the panels) based on the participants' responses to the Nation Farmer Survey.

Panel integrity

An early methodological question that arose was the extent to which the assigned ARGOS panels actually reflected the market audit schemes that defined each management system. While the detail of such observations and relationships rightly fits in the latter parts of this report, we did include a set of test questions into the National Survey to see if, for example, organic panel members reported undertaking organic activities. The survey results quickly showed that there was integrity to the selection of panel membership: the organic growers did report avoiding non-organic practices etc... The degree to which this

varied within the panel and compared to other panels is covered in the results sections of this report.

Methods of social data collection

The methods employed in the collection of social data for the ARGOS research objectives varied from those of a more qualitative, semi-structured interview to that of a formalised survey. The variety of methods were utilised in order to best collect different types of data and to facilitate the triangulation of findings within the social objective. Here, we will provide an overview of the methods employed in each study as an indication of the types of data and response that are available. The reports for each of the exercises provide a more detailed presentation and justification of the methods used in each specific case.

First qualitative interview (Qual 1): a semi-structured interview designed to gather baseline data across social dimensions of interest to the social, economic and environmental objectives of the ARGOS project. This included open-ended queries of participant identity, vision (for self and farm), wellbeing and indicators thereof (for self, family, community, economic and environmental condition) and expectations of participation in the project. Participants were also asked to create a map (referred to in this report as *sketch maps*) of their farm/orchard that included aspects important to their management practice. For both Qual 1 and Qual 2, the interviews were transcribed and then coded by themes using NVivo qualitative analysis software.

Second qualitative interview (Qual 2): also a semi-structured interview designed as a means to investigate participants' response to constraints (and enablers) on their management practice. This included open-ended questions that encouraged participants to describe constraints (grouped by their relationships to the environment, society, industry or inputs to management) and elaborate the effect of these on management strategies. The participants were also asked to identify the sources of information on which they relied and to indicate their response to innovation and change more generally.

Causal mapping: a more structured exercise in which participants mapped the relevant relationships between factors important to the management of the farm/orchard. Factors were listed and placed on a sheet. The relationships were then indicated by arrows (both uni and bi-directional) and weighted (on a scale of 1-10) as to their relative importance. The resulting maps were combined for each panel and assessed on the basis of number of factors and arrows included, the relative importance of factors (*centrality*, reflecting the number and weight of connections involving that factor) and the structure of the resulting maps.

National farmer survey: a survey including queries on various demographic characteristics and management intentions as well as attitudinal positions (using Likert scale responses) on a range of topics including assessments of the environment, farm practices and attitudes to nature.

From the data gathered and analysed in association with each of these methods, we have identified numerous panel differences as well as significant similarities. These findings are presented (by sector) in detail below and subsequently summarised in relation to themes that facilitate both an engagement with existing literature on the social dimensions of sustainable agriculture as well as a contribution to transdisciplinary reflection within the ARGOS project.

2. Identified ARGOS panel differences: kiwifruit sector

As noted above, members of the each of the kiwifruit panels employ a recognisably distinct suite of orchard management practices. While it is, as yet, not completely evident if such practices can be deemed either more or less sustainable or more or less resilient, we are able to distinguish between the panels based on a set of social features exhibited by their members. These differences are evident in the range of data sources, although the extent to which these contribute to panel differentiation varies as demonstrated for the kiwifruit sector in Table 1 showing the key panel effects across the methods used and across both sectors.⁸ The purpose of the table is to compare results across methods within each sector and then across sectors with an emphasis on patterns in the results rather than on the results themselves. Emphasis will be given to the actual findings in the text of the report. Throughout the process of design, implementation and analysis, the data have been grouped according to the various aspects of the orchardists' social life. In this report, we have structured our discussion to range from the personal characteristics of the participants to those elements defined through their interactions with wider social and physical environments, including their attitudes and subjectivity, the systems they manage, expressions of difference in their management practice and finally other differences that more directly involve off-farm and non-productive relationships.

Demographic characteristics

There is little to distinguish among the ARGOS kiwifruit panels based on the demographic characteristics of the participant orchardists.⁹ For example, each of the panels includes a statistically similar range of age and education. They also consist of a similar distribution of orchardists from the range of lifecycle stages, although there appears to be a perceptual difference noted in the qualitative data whereby the Green orchardists are more likely to emphasise the orchard's role in their retirement planning (discussed below). The data collected in the national survey do, by contrast, indicate some distinctions based on an orchardist's primary means of achieving ownership of the orchard. In this case, the distinctions correspond with qualitative data suggesting that the Organic orchardists include a larger number who are not from a farming background (less likely than Gold to rely on other agricultural income and more likely than Green to rely on non-farm earnings to obtain orchard). In addition, Green orchardists (being less dependent on inherited land) include a larger number who are not from an orcharding background than Gold. Interpretation of these differences is further influenced by the fact that (based on 2005 data) the Organic and Gold orchardists reported to have been on their current orchard for seven to eight years longer than their Green counterparts. The differences between the panels recorded in these latter characteristics provide some contextual explanation for the differences in the business orientations in the panels noted below. As a whole, however, any explanation of difference between panels will necessarily transcend the demographic characteristics of the panels.

⁸ NB: Not all panel effects have been included in the table. For the survey data and the causal maps only those differences that showed one panel as different from the other two were included. This simplifies the search for panel effects and emphasises the main effects. For the results from qualitative interviews, all the differences were included. Listed in the left hand column are the methods used along with a brief reference to variables for which panel effects were found. The remaining columns include the panels in each sector. The columns include values for ratio and interval data (e.g., age), ordinal data (e.g., more or less innovation) and nominal data (e.g., the qualitative characteristics of the variable).

⁹ This feature of the panel data is not dissimilar from data for similar groupings of orchardists in the National farmer survey – that is, the lack of differentiation likely holds for orchardists outside of the project as well.

Orchardist subjectivity and attitudes

In addition to demographic characteristics that describe the relative position of participating orchardists in recognised social categories, it is also relevant to the objectives of ARGOS to examine their more subjective self-assessments. Such assessments involve the construction of shared and emergent orcharding identities and the interactions of these identities with broader social and cultural structures (what social scientists would refer to as the orchardists' subjectivities). Such characteristics help to define the attitudes of the individual participants toward the environment, the orcharding practice, and other social actors. Due to the focus of the ARGOS project on the influence of factors associated with systems of food production, our observations of participants necessarily accentuate their roles as land managers operating within a system designed to produce a high quality food product. Furthermore, the existing emphasis within the project on orchard level factors has largely confined our analysis to the perspectives of orchardists without attributing comparable attention to the conditions and subjectivities located at the community or industry level. Despite this narrow focus, the data collected to date provide significant insight to the influence of the orchardists' subjectivity and attitudes on the sustainability and resilience of the sector. We will present aspects of these subjectivities that distinguish among the panels beginning with the orchardists' expressions of their sources of esteem or stress, their sense of place on the orchards, the symbolic qualities they attach to the fruit produced and the means through which these factors are used in comparing themselves with peers. This is followed by a discussion of the orchardists' representations of their relationship to a) the physical environment and nature; b) the kiwifruit industry; and c) the wider community.

KIWIFRUIT	Gold	Green	Organic
Survey			
Years on orchard	16	9	17
Intentions			Stronger intention to use organic methods
Farming position (Committed Conventional to Committed Organic)			Agree/disagree with appropriate farming position
Dependency			Less dependence on chemicals, manufactured fertilisers, more dependence on composts, org remedies
Other surveyed data			
Staff	High on contractors, and permanent	Medium on contractors and owner	Mainly casual, family and owner
Sketch maps			
Differences in features	Fewer houses	Prevailing wind	More streams and rivers
Causal maps			
Emphasise in farm systems:	Production expenditure Information More double arrows More connections	Quality and Quantity of Production Contractors/packhouse	Decision making. Regulations. Govt policies. Off farm activities. Orchard environment health. Community. More double arrows More connections
Qual 1 (all comparisons)			
Environmental pro-activity	Active	Passive	Pro-active
Innovation	More	Less	More
Desirability of biodiversity		Birds	Soil, landscape
Orchard look		More tidy	Untidy, diverse
Working with nature	Believe in tech. solutions		Recognise natural limits
Controlling nature	Vines out of control	Danger in nature	
Lifestyle	As commodity and amenity	Retirement objective	
Symbolic qualities of fruit	Imp. of taste and storability	Productivity	Health benefits, taste, storage
Relative performance	To be the best	As good as other Green	As good as Green
Urban rural tensions		Concern with visitors	Fewer issues but more subject to neighbours' actions
Qual 2 (all comparisons)			
Knowledge sources	Progressive		Location & proximity to others
Nature as constraint	More susceptible to wind damage, bird damage		Reliant on natural cooling,
Attitude to other orgs, connections	More role for ZESPRI in innovation	Conform to industry	Stronger connection to grower org. (COKA), want better marketing, product differentiation.

Table 1: Table of differences in kiwifruit sector.

Orchardist esteem, stress and satisfaction

The esteem that participants derived in their role as orchardists largely revolved around their participation in an industry with well-established standards for determining the acceptability of given management practices and the quality of the fruit produced. In many cases, compliance with the EurepGAP audit scheme provided a re-affirmation of the orchardist's identity as a producer of a premium product who employed practices which respected both environmental and social wellbeing. To the extent that the audit was perceived as testing the appropriateness of the individual orchardist's management, however, the audit was also a source of potential stress. A similarly double edged assessment of kiwifruit quality – the Taste ZESPRI programme, which offers premiums on payments for fruit with higher dry matter levels – alternatively rewards orchardists able to meet standards while frustrating those (often with orchards located in more marginal production regions) who bemoan the lack of proven technologies for increasing dry matter in their own fruit.¹⁰ Despite exhibiting a range of responses to both the EurepGAP audit and Taste ZESPRI in the interviews, however, the position of an individual orchardist was not associated with their panel membership. Thus, it is not possible to distinguish among the panels on the basis of the esteem or stress associated with external assessments of the orchardist's ability or the quality of their product.

A further aspect of the possible satisfaction that individuals draw from orcharding involves the lifestyle that they associate with the practice. While this lifestyle is often reflected in their visions of the future and business orientation (see below), here we refer to a more general feature of an orchardist's personal affinity with kiwifruit orcharding (both its practice and the social and environmental context of that practice). For example, it is possible to identify a positioning among the Gold orchardists that demonstrates a greater propensity to evaluate lifestyle as a commodity, largely valued in reference to the amenities it offers in regard to recreation and entertainment. The Gold orchardist would, thus, more likely identify the benefits of the climate for personal comfort, their proximity to the beach or the attributes of regional urban centres. For the Green orchardists, by contrast, the orchard and the practice of orcharding embodied a desirable lifestyle. Many in this panel engaged with orcharding as an aspect of their retirement objectives. For members of this panel, the orchard was viewed as holding both financial value (associated with land values) and the opportunity to remain active and choose the extent of their participation in orchard management. Finally the Organic orchardists approached orcharding as a means to have a positive influence on the environment and society. For members of this panel, the practice of orcharding was often a means of achieving wider goals. In this case it is, therefore, possible to distinguish among the panels in such a manner that would suggest that those who employ organic practices are more likely to consciously attribute value to and take account of the relationships with society and the environment. By contrast, the Gold orchardists appear to separate these relationships from the act of orcharding and the Green orchardists are more likely to subsume them to considerations of financial stability.

Sense of place; bond to orchard

Also related to the lifestyle of orcharding is the orchardists' sense of place. This refers to the attachment that the individual forms to the orchard as a place to live, to recreate and with which to interact as well as from which to extract a product. As expected, this aspect of the orchardists' subjectivity is strongly akin to the source of satisfaction they find in the orcharding lifestyle. Thus, members of the organic panel often characterise their sense of place by describing the orchard as a haven for themselves and other humans, domesticated and wild animals, as well as a variety of plants. The organic orchard is a place that they want to inhabit and, often, the organic orchardists have included their home

¹⁰ It is, furthermore, noteworthy that the orchardists with the strongest negative response to EurepGAP can also be those most excited about building their own capacity to raise dry matter on their orchards.

as an integral element of the orchard. The Green orchardists are more likely to emphasise their ability to enjoy a rural setting for their eventual retirement home. The majority do have their houses on the orchard, but they do not necessarily view the residential space of their property as integral to the productive spaces. Members of the Gold panel are the most likely to perceive of the orchard solely as a workspace. This attitude toward the orchard likely reflects the fact that almost half of the ARGOS participants in this panel are managers of the orchard being analysed. The relative parameters of the sense of place expressed by each of the panels were also evident in the sketch maps drawn of their orchards in the first qualitative interview. In that exercise, the Organic and Green orchardists tended to include a greater number of features on their maps and the Organic were the most likely to have included rivers or streams that either crossed the orchard or formed a property boundary. The maps of the Gold orchards, by contrast, were the least likely to include houses as a feature. Such differences may potentially contribute to explanations of variation among other aspects of the orchards (including both economic and environmental) to the extent that individuals incorporate a range of beneficial elements in their decisions regarding the management of an orchard.

Symbolic qualities of the product

In addition to imbuing orchards (as places) with meaning, the orchardists may also attach symbolic qualities to the kiwifruit that they produce. The application of symbolic qualities enables an alternative valorisation of their product that privileges it relative to similar ones. Thus, for the Organic orchardists, their kiwifruit embodies health and environmental benefits that are realised in distant markets as well as locally, regionally and nationally. They also claim that their fruit has a better taste profile than non-organic fruit whether or not this is confirmed by tests such as dry matter levels and storage life. The Gold orchardists are more likely to emphasise the importance of industry measures (dry matter, reject rates and storage quality) – qualities that are rewarded by means of payment incentives – as symbolic of their fruit's quality. Better performance relative to these measures is perceived to provide a higher quality, better tasting product for consumers. Among members of the Green panel, the capacity to produce large quantities of consistently good quality fruit assumes more emphasis in this regard. In comparison to the Organic panel, the symbolic qualities attributed to the kiwifruit produced by members of the other panels are more likely to reflect the level of an individual's capabilities (as opposed to those of a management system). These differences may again contribute to explanations of variation in the extent to which environmental considerations and individual competition on the basis of production criteria form an important aspect of management decisions.

Peer comparisons

As noted in the discussion of the symbolic qualities of kiwifruit production, peer comparisons are an important feature in the orchardists' subjectivity. The tendency to focus on relative performance is enhanced through the feedback orchardists receive from ZESPRI on production indicators within the sector. Orchardists from all the panels utilise this information as a means of benchmarking their management against that of their peers. The specific focus of such comparison does, however, vary among the panels. For instance, members of the Green panel generally expressed the desire to maintain production within the more productive band for all Green producers. By comparison, the Gold orchardists expected to be among the most productive and have the highest dry matter among their colleagues. The Organic orchardists again incorporated a different approach to such benchmarking by stating a desire to achieve production at levels comparable to their Green counterparts. This attitude reflected the intention of many of the Organic orchardists to prove the value of organic practice by demonstrating that it was capable of achieving similar productivity to more conventional practices.

Environment and nature

The panels of kiwifruit orchardists in the ARGOS project can be distinguished by various aspects of their positioning with regard to the physical environment of the orchard and nature more generally. A commonly recognised distinction in the social sciences involves the extent to which an individual or social group places itself either as a part of or separate from nature (i.e., the *nature/culture binary*). This binary is evident in the first qualitative interview in which orchardists either represent the activity of orchard management as an example of *working with nature* or an expression of the need to *control nature* as an actor separate from it. The former position is most commonly stated by members of the Organic panel who recognise and adapt to natural limits on production. This is also evident in their more limited use of external inputs and their aversion to the use of GMOs as indicated in the survey responses. The Gold orchardists, by contrast, express a stronger belief in the potential of technological solutions to problems associated with production. In discussing their approach to the orchard, they also represent their management objectives as involving the domestication of vines that threaten to become *out of control* relative to the Hayward variety. The Green orchardists also expressed a greater need to control nature. Their position was most evident in their emphasis on tidiness as an objective of orchard management. This practice suggested that nature that was not controlled was dangerous, an attitude that was also evident in their identification of gullies and bush as the source of unwanted and bad impacts on management. An interesting comparison between Organic and Green orchardists is found in the causal map data in which the former panel places more emphasis on the role of the decision maker in orchard management. This distinction suggests that the Organic panel feels less subject to influences that are beyond their capacity to negotiate.

Differences in additional aspects of the orchardists' perception of the role of nature and ecology in production discussed in the first qualitative interview are also noteworthy. For example, both Organic and Green orchardists indicated that enhanced biodiversity was a feature of good management practice. The Organic orchardists generally associated such benefits with diversity in the orcharding landscape as a whole, including surrounding areas of bush and waterways (noted in the sketch maps) as well as shelterbelts and wetlands on their orchards. They were also more likely to refer to soil as a biotic feature requiring management that encouraged macro- and micro-organisms. As a result of such attitudes, the Organic panel exhibited a greater acceptance of less tidy (and assumedly more diverse) orchards as indicators of appropriate management within the panel. The Green orchardists, by contrast, emphasised the increased presence of birds since adopting reduced spray regimes as an aspect of biodiversity on their orchards while maintaining a tidier orchard. Further evidence of these differences is found in the causal maps in which the Gold and Green orchardists were statistically less likely than their Organic counterparts to emphasise environmental health as an important influence on orchard management.

In order to develop an alternative classification of the orchardists on the basis of their interaction with the physical environment, each orchardist was assessed according to their relative level of *proactivity* toward nature as indicated within the first qualitative interview. Using this metric, orchardists were assigned a code from zero to three (corresponding to a range of no indication of environmental activity, to passive, active and proactive approaches, the latter defined as the pursuit of environmentally beneficial actions that extended beyond the boundaries of the orchard block and, in some cases, the property). The members of the Organic panel proved to be the most proactive with seven proactive, three active and two passive orchardists. By comparison, the Gold and Green orchardists were more likely to demonstrate active (six and four, respectively) or passive (three and six) responses.¹¹ This assessment reaffirms earlier findings that the Organic orchardists appear more likely to include concerns for the physical environment in their management decisions.

¹¹ The remaining orchards in each panel were proactive with none of the interviewed orchardists receiving a score of zero.

Further insight to the orchardists' engagement with nature emerged in the second qualitative interview in which nature was discussed as a possible constraint on orchard management. While differences were noted among the panels, these also reflected factors associated with the location of an orchard, its exposure to wind and frost and local edaphic conditions. The relevance of such variation may be more evident when compared with data collected by the ARGOS environmental objective. For example, the gold kiwifruit is more susceptible to wind damage and its buds are a more favoured target of birds during the spring. Such factors suggest that Gold orchardists may have a different approach to shelterbelt management (and, perhaps, a greater predilection toward the use of artificial shelter) and a distinct knowledge of bird species or types distinguished by their on-orchard activities. In the case of organic management practices, orchardists have more limited capacity to affect bud break on their vines and must source 'alternative' products to enhance soil fertility. Both of these factors may have more pronounced locational effects, providing greater resilience where environmental conditions favour kiwifruit production (sites with sufficient winter cooling or with more fertile soils) or severely limiting the viability of orcharding where climate or soil is a limiting factor of production.

A final aspect of the orchardists' relation to the environment by which the ARGOS panels can be differentiated involves an individual's perception of the potential consequences of management practice on the environment. The data for this comparison are taken from the orchardists' responses in the survey. Once again, the Organic panel proved to be distinct from the Green panel being statistically more likely to see human impacts as potentially harmful to the environment and less likely to believe that human ingenuity would provide solutions to negative impacts of human action. These attitudes closely correspond with many of the other differences noted in this section and suggest that positioning relative to the environment is a principal distinguishing characteristic of Organic orchardists.

Positioning relative to the kiwifruit industry

Among other influences on kiwifruit orcharding, the orchardists frequently referred to their relationship with ZESPRI and other actors in the kiwifruit industry. All of the orchardists demonstrated a good awareness of the consumers of their kiwifruit and the demands that these placed on their product, although a minimal number did question the validity of such standards and the uniformity of their application. At the time of the second qualitative interview, the orchardists' attitudes toward the industry largely involved their responses to the two programmes noted in the discussion of grower esteem – EurepGAP and Taste ZESPRI – both of which are designed to raise the quality of their fruit from the perspective of international markets. There were, however, additional vectors of difference among the panels. In regard to their relationship with ZESPRI, the Organic orchardists sought greater differentiation of their product from the non-organic kiwifruit marketed by the organisation. Several claimed that marketing of the latter as residue-free fruit limited the potential to market the health benefits of their own fruit. The slightly greater level of concern felt by the Organic orchardists is also demonstrated in a significantly lower rating of their future prospects in the national survey results. By contrast, the Gold orchardists were most likely to rely on ZESPRI as the driver of innovation in the sector, often referring to the development of additional kiwifruit varieties. The Green orchardists, except for those in marginal areas prone to low dry matter fruit, appeared the most comfortable with the conditions in the industry. A final difference is evident in the generally stronger connections with COKA (Certified Organic Kiwifruit Association) demonstrated by the Organic orchardists in comparison to that of the other panels with KGI (New Zealand Kiwifruit Growers Inc.). It is likely that the differences among the panels in regard to positioning relative to the industry will gain more relevance when combined with the economic data collected by the ARGOS economics objective.

Positioning relative to society

In addition to their respective positioning relative to the kiwifruit industry, the kiwifruit panels also demonstrated differences in regard to their relationships with a wider society. More specifically, in the qualitative interviews the Organic orchardists voiced fewer issues or concerns regarding their own impact on neighbours (e.g., in regard to the drift of sprays) but also indicated that they were more subject to the actions of orcharding neighbours whose actions might compromise their organic status. The Green orchardists, for their part, expressed greater concern over the potential negative impact of visitors to the orchard, including destruction of property or theft. This latter position likely reflects the fact that most of the Green orchardists had their place of residence on the orchard property.

Further differences were also evident in the causal maps drawn by the orchardists which showed the relative emphasis that individuals and the panels gave to aspects of management originating off the property. For example, the Organic orchardists placed more emphasis on the influence of regulations than the Green panel and more on government policies than either Green or Gold panels. In addition, the Green panel emphasised the effect of off-farm activities and the community less than the Organic panel. This factor may reflect the fact that many of the participating Green orchardists are *in-comers* to their local communities. Finally, the Green orchardists indicated a greater role than either the Organic or the Gold panels for contractors within their management system, confirming their current or expected reliance on hired labour as they moved more toward retirement.¹² While these differences point to varying levels of interaction, confidence and security within their communities among the orchardists, it is unclear the extent to which these will be related to economic or environmental aspects of sustainability.

Learning and networks

A group of factors that demonstrates significant variation among the panels involves the orchardists' positioning regarding innovation and learning as well as their preferred sources of information. Indicative of their position as less numerous and more recent alternative elements of the kiwifruit sector, both the Organic and Gold orchardists tend to be more innovative in their management practice. Both panels more frequently reported (in the second qualitative interview) their experimentation with alternative practices. Organic orchardists commonly tried alternative inputs in order to improve bud break and soil fertility while the Gold orchardists were more likely to seek out and test alternative pruning practices and experiment with artificial shelter. By comparison, the Green orchardists appear much more 'comfortable' with existing parameters and methods of production. (A similar distinction is noted in the discussion of risk below.)

The sources of knowledge which the orchardists utilise also provide some means for distinguishing between the kiwifruit panels. For all of the panels, neighbouring orchards or orchardists identified as good managers are seen as important sources of insight. Most also claimed to have attended field days or workshops held by ZESPRI or their packhouse. Access to these activities is potentially limited for Organic orchardists, especially those located further from established centres of production near Tauranga and Te Puke. Much as they engage in more innovation, the Gold orchardists are also more proactive in pursuing knowledge, encouraged both by the relatively weak understanding of gold kiwifruit production and the high payment incentives for dry matter. This trait is also evident in the causal maps in which the Gold panel placed greater emphasis on information than the Green panel.

¹² This emphasis contrasts with the limited data on the labour use characteristics of the orchards which indicate that the Organic panel has a greater reliance on casual and family labour, Gold on contracted and permanent labour and Green slightly more so on the owner's labour.

Expression in management actions

In addition to providing insight to the subjectivity and positioning of the orchardists, the data collected by the social research objective also identified variations in their management actions. While not including actual observation of management practice, the various social methods did extract indications of the effects of the orchardists' subjectivity on their approach to managing the orchard. Thus, the individual orchardists referred to overall objectives of their management that they used to justify particular sets of action. Considering the data collected to date, we are able to identify two axes of differentiation among the orchardists based on their relative emphasis on productivity as an outcome and their relative willingness to engage in the risks associated with alternative or innovative practice.

Productivity/productivism

The social science literature on sustainable agriculture in Europe includes a strong focus on the extent to which productivity objectives (or productivism) dominate the management orientation of agricultural producers. In this body of literature, those producers who more fully incorporate such goals are regarded as less likely to recognise or consider environmental constraints on production. In this regard, it is possible to distinguish between the causal maps of the Green panel, which place a greater emphasis on production, and those of the Gold and Organic panels, which are more likely to emphasise production expenditure. This suggests that the latter panels tend to acknowledge limitations on their pursuit of higher production. Similar differences were observed in the benchmarking incorporated by the various panels as noted in the first qualitative interview and discussed above. Further evidence of differences in the emphasis on production is found in the orchardists' strategies for improving the dry matter levels in their fruit, although panel differences here may reflect the incentive structure (higher for the product of the Gold and Organic panels in comparison to that of the Green panel) of the Taste ZESPRI programme. Finally, to the extent that adoption of organic practice involves an acceptance of lower production targets, the Organic panel is less likely to allow productivism to dominate their management decisions (as indicated by their significantly greater commitment to other management practices in the national survey).

Risk, innovation, and challenges

The relative tolerance for and willingness to engage in innovative or alternative practice expressed by members of the panels has already been discussed above. Here we interpret such responses through the lens of risk, noting that risk can involve a potential decline in social status or environmental wellbeing as well as the individual's financial situation. To the extent which individuals are risk averse in any of these aspects of risk, they may construct more brittle (less resilient) management systems. While alternative practices involve social risk (e.g., the association of organic practice with a 'green' political position), there appears to be a less marked assumption of risk in the kiwifruit compared to the sheep/beef sector (see below) in New Zealand. This likely reflects the fact that both organic and IPM practices have been normalised in the sector. Where orchardists indicated the limiting factor in their consideration of conversion to organic practices, they overwhelmingly identified lower production (due to the lack of access to chemicals such as HiCane and fertilisers) and associated financial risks. Thus, differentiation along a risk axis among the orchardists is limited to that between the more innovative Gold and Organic panels in comparison to the Green panel noted above. Between the Gold and Organic orchardists, the former would be more likely to pursue innovations requiring an investment of capital.

Summary

The panel differences identified among the kiwifruit orchardists participating in ARGOS indicate several avenues of inquiry that contribute to the analysis of the comparative

sustainability of the management practices they employ. We suggest that these avenues coalesce around broader themes, many of which parallel existing approaches to agricultural sustainability utilised in the social science literature. In contrast to the preceding presentation of specific differences between panels identified above, here we present the foundations of what may become more coherent explanatory frameworks, especially when eventually combined with research on the economic and environmental aspects of orchard management. The order in which the themes are presented follows a similar pattern to that used above beginning with factors involving the individual perspectives, attitudes and approaches of the orchardists and moving to relations with increasingly external influences on orchard management.

From the differences noted in the orchardists' subjectivities and attitudes, it is possible to designate two themes: *breadth of view* and *good farming*. The first theme involves the distinctions between the Organic and the other two panels – specifically their vision for the future and discussion of environmental and personal wellbeing in the first qualitative interview, the identification of intangible fruit qualities in both qualitative interviews and their reported participation in COKA from the survey. We argue that in each of these aspects, the Organic orchardists express greater awareness of and devote greater consideration to broader scale landscape and societal factors in developing their management systems. As such, the organic orchardists may be more likely to adopt alternative practices on the basis of their environmental or societal benefits. The theme of *good farming* is more common in the existing literature and refers to an individual's concept of acceptable practice and their justification of these practices. In this case, it is possible to identify distinguishing characteristics of good farming among the panels.¹³ The concept of good farming held by the Organic panel is distinguished by similar factors to that noted in their breadth of view. In addition, they are less committed to maintaining a tidy orchard, preferring to encourage biodiversity by means of more animal-friendly sward and shelterbelt environments. For the Green orchardists, by comparison, the tidiness of the orchard is a principal indicator of good farming as is production comparable to their peers and the presence of a numerous and diverse array of bird species. Environmental criteria are less evident in the representation of good farming found in the data from the Gold panel. For the latter group, the demonstration of innovative practice in pruning, shelter management and vine support structures is a more important indicator of good management. The expected reward for these efforts is increasing dry matter levels and production from their orchard, both of which are rewarded with incentives from ZESPRI.

Another avenue of notable differentiation among the kiwifruit panels involves their respective interactions with the environment. These avenues involve groups of responses relevant to the orchardists' positioning in regard to the environment, the environmental feedbacks to which they respond and the resultant features of their management systems. From the perspective of *environmental positioning*, the Organic panel consistently demonstrated a greater level of interaction with environmental features, being more proactive in their engagement with the environment, seeking to create a haven for diverse life forms on the orchard and stating greater awareness of their position as part of natural systems. It is more difficult to differentiate between the Green and Gold panels from this perspective, although the former is more passive and the latter more active in their engagement with the environment.

Further differentiation may be made between the panels with reference to the *feedbacks* to which they respond in their management systems. These feedbacks include a range of indicators to which the orchardists refer in assessing the current state of their properties. For example, the 'look' of the orchard signifies the wellbeing of its environmental, economic and social states. For the Green panel a tidier orchard (referring to all of its

¹³ As we have noted in previous reports, the participants in both the kiwifruit and sheep/beef sectors have a greater number of shared aspects than differences in the understandings of good farming. For the purposes of this report – identifying differences among panels – we focus only on those aspects of good farming that distinguish one panel from the other two.

elements: vines, structures, sward, shelter, buildings, etc.) provides evidence of the owner's attention to detail and capacity to control external impacts on production. The pursuit of a tidy orchard is reinforced by the increasing number of birds that inhabit it. The appearance of the orchard appears to be a stronger signifier of a healthy management system than its productivity, which is of secondary importance as long as targeted returns are achieved. By comparison, the Gold panel are more likely to refer to indicators that are more directly related to production: attention is more narrowly focused on the vines (pruning to combat the vigour of the vine), which contributes to fruit size and dry matter; achieving better production statistics than colleagues is an important endeavour; and biodiversity does not appear to enter assessments of management, except where birds are identified as pests that damage buds on the vines. Finally, the Organic panel respond to a unique set of feedbacks that privilege indicators of biodiversity – as is evident in a busy orchard (less tidy; more noisy; healthy smell) – over those of production (production indicators are only important in establishing competitive potential of organic relative to more conventional management practices).

Due in part to their varying attention to system features and feedbacks, orchardists in each of the panels identify and respond to distinct sets of incentives when developing their *farm (orchard) management approaches*. In this case we suggest that, despite the basic shared practices of orchard management, individual orchardists will strategically employ practices that conform to their management objectives. Thus this theme incorporates such differences as: a) the greater emphasis on the importance of the decision maker in the causal maps, the greater reliance on family and casual labour and the cooperative development of knowledge and skills among the Organic orchardists; b) the greater production orientation, the propensity to live on the orchard and reliance on proven practices among Green orchardists; and c) the stronger business orientation, greater involvement of managed orchards and tendency towards self-driven innovation in vine management among the Gold orchardists. The differences between the panels indicate several areas of greater or weaker flexibility of management, including dependence on positive labour relations, potential creativity in responding to system shocks and the capacity to incorporate environmental concerns within management decisions. As a whole, such management differences also define a distinct, but difficult to elaborate, *scope of control* realised by each panel: a) the Green orchardists appear to assume that the kiwifruit orchard is subject to almost absolute control (there is or should be a management solution for any problem); b) the Gold orchardists demonstrate a perception that, by creatively controlling the gold vines, they can achieve desired ends; and c) the Organic orchardists engage in a controlled proliferation of biodiversity that is capable of enduring wilder actions by the 'accepted' elements of the system.

The final avenue of variation among the kiwifruit panels consists of their interactions with a wider society. Here we refer to differences in the *on and off-farm relationships* of the orchardists, including the orchardists' responses to innovation and risk. Again, in their relationships with society, the Organic panel differs somewhat from the other panels taking both a broader view of community (noted above) and perceiving themselves as providing a beneficial environment for their neighbours. On the other hand, they tend more toward self-reliance with higher levels of owner and family labour in the management system. The greatest contrast to the Organic panel from this perspective appears to be the Gold panel which includes more managed properties, relies more heavily on contracted and permanent labour and has a stronger business orientation. These differences (as well as those noted in the feedbacks above) do not, however, result in strong panel effects in regard to the orchardists' approaches to innovation and risk taking.

3. Identified ARGOS panel differences: sheep/beef sector

As in the kiwifruit sector, it is possible to identify a range of differences among the ARGOS panels for the sheep/beef sector as demonstrated in Table 2.¹⁴

Demographic characteristics

The data collected on a range of demographic characteristics for the sheep/beef farmers indicates a similarly limited capacity to differentiate among panels as found in the kiwifruit sector. Overall, the Integrated panel is younger but not at a statistically significant level (mean of 45 compared with 48 for Conventional and Organic). The more variable range in ages reported for the Integrated panel (from 27 to 57 years of age, compared with 40 to 56 for Conventional and 38 to 57 for Organic) largely accounts for this age difference. In regard to their respective lifecycle stages, all except one household included married couples or partners, and nearly all had children living with them. Organic farmers had spent slightly less (but not significantly so) time on the farm (18 years cf. 21 for Conventional and 24 for Integrated). Each panel included a similar range of educational attainment and nearly all of the farmers were from a farming background, with at least half in all panels living on the family farm. The one significant difference here was that the Organic farmers were more likely to have moved a further distance to the farm (31% more than 100 km away) than members of the other panels. As with the kiwifruit sector, it is likely that demographic characteristics will contribute minimally to the explanation of differences among the management panels.

Farmer subjectivity and attitudes

The sheep/beef farmers demonstrated a similar range of subjectivities and attitudes relative to their social and physical environments to those of the kiwifruit orchardists. Similar to the reporting on the latter sector, differences in this section are elaborated in order of the extent and scale of interaction with external management factors, both on and off the farms. In addition, the available data are similarly limited to the perspective of the farm households without comparable input from other social actors.

Farmer esteem, stress, satisfaction, identity

Among the sheep/beef farmers (and in comparison to the kiwifruit orchardists) esteem was less uniformly associated with the relationship of an individual to the processing industry, often relying more explicitly on their role within the New Zealand society and economy. For example, while all of the panels demonstrated a tendency to benchmark the production of individual farmers with that of colleagues, the Conventional farmers were more likely to compare their performance with that of other sectors of society. As such, farmer esteem is subject to public assessments of farming and the influence of non-farmers' perceptions of observed practices. All of the farmers also shared a strong identity as pastoral farmers, with many of them sharply demarcating their sector from that of dairying. Furthermore, because the sheep/beef panels are the result of more voluntary assignment criteria (i.e., compliance with non-mandatory market audit schemes) in comparison to the kiwifruit panels, an individual's membership in a panel more strongly reflects the state of their relationship with the industry and the sense of satisfaction they are able to derive in reference to such relationships. Thus, as is evident in the second qualitative interview, the Organic and the Integrated farmers overwhelmingly include those with a demonstrated capacity to meet the timing, weight and fat cover stipulations of procurement contracts. This is especially true of the latter group who have often been selected by stock agents as preferred clients based on such history. Because meeting the tighter timing demands often requires greater management control, these farmers appear more willing to test the

¹⁴ See footnote 7 for an explanation of the table and the nature and structure of its content.

environmental limitations on production in their efforts to meet contract demands. The Conventional farmers, by contrast, tend to emphasise the extent to which they farm within such constraints and attribute weaknesses in the sector to low international prices, the high exchange rate and in some cases abuses within the industry. These attitudes are similarly reflected in the farmers' approach to audit schemes attached to the contracts with the Organic and Integrated panels less likely to perceive the audits to be excessive impositions.

Besides differentiating among the farmers on the basis of their positioning within the sheep/beef industry, the more stringent audit schemes (organic certification and quality assurance programmes) appear to influence the relative sense of empowerment held by each panel. In other words, the extent to which farmers have been able to successfully pursue management strategies that involve a more active engagement with the market appears to affect the levels of stress to which they are exposed. Both Organic and Integrated farmers associate the price premiums earned through their audit compliance with a stronger position vis-à-vis the market. This perception is reinforced by the positive public recognition (albeit that of a market niche) of the 'higher' quality of their products. By committing only a portion of their production to more demanding contracts, the Integrated farmers appear to employ these as a means of strategically diversifying their income streams and production objectives. The Conventional panel, by comparison, has a greater tendency to feel besieged by changing public perceptions of their role in the New Zealand society and economy, including questions about the environmental and animal welfare practices of the sector. The latter also identify perseverance – as opposed to creativity or adaptability – as their greatest asset in the face of difficult conditions, whether environmental, social or economic.

Data from the first qualitative interview suggest that differences between panels extend to issues of lifestyle as well. Similar to their response to the industry and society, members of the Conventional panel are more likely to feel trapped by their role as farmers. As such, they were most likely to represent themselves as burdened by problems of farming, which inhibited their capacity to commit time to their families or to take holidays. While such issues were a source of conflict for farm households in each of the panels, they appeared more consistently among the Conventional farmers. The Integrated farmers, in particular, were more likely to take time off from farming. Finally, the interviews also indicated that there was more emphasis on and worries about the process of succession (both current and, in some cases, future) in the Conventional panel.

SHEEP/BEEF	Conventional	Integrated	Organic
Survey			
Intentions			Stronger intention to use organic methods, integrated methods, any of the listed management systems and not to use GMO's
Farming position (Committed Conventional to committed Organic)			Agree/disagree with appropriate farming position
Dependency			Less dependence on chemicals, manufactured fertilisers, more dependence on org. remedies
Evaluation of environment			Lower rating of condition of native species five years ago
Organic practices			More importance to two organic practices
Other surveyed data	Not available yet		
Sketch maps	No panel difference	Location differences	
Causal maps			
Emphasise in farm systems: Location differences	Customer requirements, marketing and processing organisation, weed & pest management	Advisors/consultants, farm working expenses, Quality and quantity of production	Customer requirements, off-farm product quality, farm environment health, fertiliser and soil fertility health. Higher map density (connections/variables ²) (cf. Integrated only) Higher hierarchy (cf. Integrated only)
Qual 1 (all comparisons)			
Environmental pro-activity	Active	Active	Proactive
Identity, stress and coping	Feel more trapped	More likely to take time off	
Emphasis on succession	More	Less	Less
Sense of place	Farm as lifestyle	Farm as space	Farm as space
Sense of distinction (elite)	Lower	Higher	Lower
Urban-rural tensions	Concerned about deterioration	Public service commitment	Broader sense of community, stronger commitment
Emphasis on environmental indicators of good farming	Low	Medium	High Emphasise soil biota. Avoid chemicals
Economic indicators of good farming (non strong)	High	Medium	Low
Qual 2 (all comparisons)			
Incorporation of paperwork into idea of good farming	Low	High	High
Coping with contracts	(Medium)	High	(Medium)
Soil			Greater emphasis on soil and soil biota
Attitude to other orgs, connections	Stronger references to community	Better than conventional	Cognisant of consumer preferences
Risk/challenge	Familiarity of practice	Pursuit of challenge	Pursuit of challenge

Table 2: Table of differences in the Sheep/Beef sector.

Sense of place; bond to land

As a whole, the sheep/beef farmers across the panels demonstrate a similar sense of place. Nearly all of them, in some form, expressed their belonging to and interacting with the land and none demonstrated a state of placelessness. A subtle difference involving the farmers' representations of their farms did, however, emerge in the first qualitative interview. Within the Organic and Integrated panels the farm is conceived as a particular locale, occupying a given space. The Conventional farmers, by contrast, were more likely to emphasise social factors of farming, presenting farming as a lifestyle. For all of the panels, however, the farmers' attachment to their farm is often translated into a capacity to sense when all is well with the land, although data from the national farmer survey suggest that this relationship to the land is not understood to assume mystic or mysterious qualities. In the second qualitative interview, several farmers also acknowledged the essential role of the continued interaction with a particular landscape in increasing the depth of their sense of place. This latter factor is more likely to differentiate among farmers on the basis of the duration of residence on a given farm than according to panel membership.

Symbolic qualities of the product

Reference to the symbolic qualities of their product reflects the positioning of the farmers relative to the sector more generally. The Conventional farmers are prone to view their production as a pillar of the New Zealand economy rather than incorporating particular characteristics. From their perspective, New Zealand meat embodies their contribution to a thriving society, but seldom involves direct references to its qualities as a marketed item. Both the Organic and the Integrated farmers, in comparison, attach additional qualities to the meat from their farms that are the direct result of their personal efforts and skill – they are able to taste the difference between their product and that of other farmers. As with the kiwifruit sector, the Organic farmers also attach social and environmental attributes to their product that contribute to the overall quality of the product from the perspective of the consumer. For the latter two groups, the value of these qualities is reinforced through positive interactions with retailers and consumers.

Peer comparisons

Comparisons – with peers, other farming sectors, other professions, other countries, etc. – represent a very prominent feature of the farmers' subjectivities as expressed in the first qualitative interview. Similar to the kiwifruit panels, most of the farmers benchmark their own performance against that of other farms. Their ability to engage in such comparisons is more limited, however, as the farmers have less access to production information than the orchardists. It appears, however, that benchmarking is a very important element of the farmers' self-worth, the better farmer being able to encourage greater production from the property. It is noteworthy in this regard that most of the farmers are reported to consider themselves among the top ten percent of producers in the sector. The logic of these claims is facilitated by the farmers' reference to environmental, capital or land constraints that limit an individual's production capacity. Differences between panels are evident with the Integrated farmers assuming an (self-ascribed) elite status among suppliers to a given processing firm as a result of increased interactions with firm representatives. The Organic panel generally emphasises its lower costs, the symbolic qualities of the organic product and their environmental practices when comparing themselves to non-organic peers. The Conventional panel is more prone to direct comparisons of production and returns without reference to costs.

Environment and nature

Several features that distinguish among the sheep/beef panels are evident in the farmers' positioning relative to the physical environment both on and surrounding their farms. The extent to which they separate themselves from nature (as in the kiwifruit sector) provides an initial focus for such differentiation. For the sheep/beef farmers, the panel differences are

more a matter of degree than approach. That is, all of the farmers expressed the objective of taking nature into account when making management decisions; the manner in which this was pursued, however, differed among the panels. In the first qualitative interview, discussions of environmental wellbeing indicated that the Organic farmers were less likely to see their farm management as exerting control over nature. The farmers' approaches to environmental constraints in the second interview demonstrated a more uniform concept of farming within the parameters of the physical environment, although such activity may not necessarily be understood as *working with nature*. Often, the intent was to mitigate the negative impacts associated with commonly occurring climatic or topographic features of the farm. The survey also suggested that managing in a way that is compatible with natural cycles was more important (a greater number ranked this as *very important* cf. *important*) for the Integrated and Organic panels. Some contradiction to these general positions has already been noted in specific management actions of the Integrated panel: their willingness to challenge environmental constraints that limit their ability to meet contract deadlines and their greater desire to control weeds as noted in the weed management survey.

Much as in their positioning relative to nature, the sheep/beef panels demonstrate few differences in their discussion of the role of nature and ecology in production in the first qualitative interview. Attention to biodiversity varies more by location (that is, it is highest in locations where the landscape encourages a wider diversity of wildlife) than by panel. Where they are present, the sightings of native birds (especially bellbirds, tuis and wood pigeons) are seen as indicative of appropriate management practices. A notable exception to the uniformity among panels, which mirrors the response among kiwifruit orchardists, involves the more frequent references to the biotic nature of soil by the Organic farmers. The causal map data provide further evidence that the Organic panel differs from the others in this regard: the Organic panel gave greater emphasis to 'fertiliser/soil fertility and health' and 'farm environmental health'.

Assessments of environmental proactivity were also applied to the data from the first interview in the sheep/beef sector. As with the kiwifruit data, the members of the Organic panel proved to be the most proactive with eight proactive, three active and two passive farmers. By comparison, the Integrated and Conventional farmers both more strongly reflected active (eight and five, respectively) or passive (three and four) responses.¹⁵ This assessment again confirms that the Organic farmers are more likely to include concerns for the physical environment in their management decisions. The remaining panels were equally active in their response, neither differentiating itself as a more passive group similar to the Green orchardists. Further insight to this aspect of the farmers' environmental positioning can be drawn from the national farmer survey in which the Integrated farmers valued the recreational qualities (waterfowl shooting and fishing in wetlands) of these features more than the Organic farmers.

Finally, differences between the perceived consequences of management practice on the environment provide additional understanding of the farmers' interaction with the environment. The national survey data show that the Organic farmers believe that humans have a greater impact on the environment, rating both past on-farm species diversity and soil health lower than their counterparts. All of the farmers think, however, that they are having beneficial affects on such environmental indicators. In addition, the Integrated panel is more prone to think that humans do not have a disastrous impact on nature (40% agree) and that human ingenuity can solve such problems (50% agree). Conventional and Organic farmers, on the other hand, are more likely to agree that humans can affect nature disastrously with Organic farmers feeling more strongly than Conventional farmers about

¹⁵ The remaining two farms in the Conventional panel were proactive with none of the interviewed farmers receiving a score of zero.

this.¹⁶ As a whole, these survey findings point to a similar differentiation of degree among the sheep/beef sector panels in their response to nature.

Positioning relative to the sheep/beef industry

The positioning of the sheep/beef farmers relative to that sector's industry has already been discussed as a factor of farmer esteem. Here, we only reiterate the strong apparent difference between the Integrated and Conventional panels, with the former enjoying a more positive and collaborative relationship with the processing firms based on their capacity to meet contract demands. The Conventional panel also demonstrates a less well developed understanding of their customers (retailers and consumers in export markets) largely due their limited engagement with these actors. (This characteristic of the Conventional panel is likely changing as the emergence of a farmers' movement in response to low lamb prices has publicised the importance of meeting consumer demands in order to better position the lamb industry as a whole.) This finding is contradicted to some extent by the lower emphasis on 'customer requirements' and 'marketing/processing organisation' in the Integrated causal maps. None of the farmers claimed to have an active role with their self-identified political interest group, Federated Farmers, eliminating any possible differentiation among panels in this regard.

Positioning relative to society

The farmers' conceptions of community as articulated during the first qualitative interview provide a further means of differentiating among the panels. Community and participation in the working of that community are an important aspect of their lives for members of each of the panels. Once again, the differences that have emerged are more the result of a different focus or degree of emphasis. For example, the Conventional farmers placed the greatest emphasis on the role of the farming community as part of the farming lifestyle (see comparison with sense of place above). Often, this reference to the importance of the community involved a concern for its deterioration in the face of a poor farming economy and the encroachment of dairy farms in traditional sheep/beef producing regions. For both the Conventional and Integrated farmers, contributions to the community were viewed as a public service commitment; whereas Organic farmers were as likely to engage in such activities without framing their actions as 'public service'. Finally, and in a manner similar to that demonstrated in the kiwifruit sector, the Organic panel placed greater emphasis on their engagement with a broader community that extended beyond the immediate locality. In part, this likely reflects the spatially dispersed distribution of similar (organic) farms on the South Island, which effectively creates a more dispersed social network in the form of national and international relationships related to their alternative management practices. Furthermore the Organic farmers are more likely to be directly involved in the marketing of their product to distant locations, both domestically and internationally.

Learning and networks

Based on data from the second qualitative interview on the farmers' learning processes and pursuit of innovation, it is possible to undertake a limited differentiation of the panels. For the most part, all of the farmers identified journals received by post and neighbouring and 'successful' farmers as their primary sources of information. A small number utilised farm consultants, although it is not possible to distinguish among panels on this basis. It is, however, possible to make subtle distinctions among panels in regard to the most important aspects of their own knowledge development. For example, the data from the national survey indicate that the use of local knowledge and maintenance of good relations with

¹⁶ Among Conventional farmers 64% agree, with no-one strongly agreeing; whereas 31% agree and 46% strongly agree among Organic farmers. When tested statistically (Likert scales as valid rational numbers) this shows up as a statistically significant difference between Integrated and Organic panels.

neighbours as sources of feedback¹⁷, while considered valuable across the panels, is more important to the Integrated farmers (significantly different from Conventional farmers only); developing knowledge about the ecosystem, by contrast, is most important for the Organic farmers (significantly different from Integrated only). A final difference relates to those already noted as features of farmer stress, whereby the Organic panel is more prepared to try alternative management systems with the exception of GMOs. This is further evidence of a greater propensity to pursue and engage in innovations (outside the standard realm of chemical or mechanical inputs) among the Organic and Integrated panels.

Expression in management actions

Our examination of the explanations of management actions provided in the qualitative interviews (and sometimes reinforced by the mapping exercises and the surveys) identifies three axes of differentiation among the sheep/beef panels. Similar caveats to those raised for the kiwifruit sector (above) should be placed on these findings.

Signifiers of good farming

Based on the discussion and comparison of data of farmers' positioning relative to the environment, it is possible to distinguish a trend in the utilisation of environmental indicators of good practice from Organic (being the strongest) to Integrated and then Conventional. For the Organic panel, their avoidance of agrichemicals was a principal component of good farming relative to their non-organic peers. Survey findings also indicate that they place more emphasis on soil microbes (92% very important) and biological pest control (54% very important) – although the latter are also valued by the Integrated panel. A similar trend in the opposite direction appears to involve the application of financial indicators of good farming. In this case, the Conventional panel is prone to employ financial returns as a means of benchmarking; whereas the Integrated panel is more likely to emphasise farm working expenses according to the causal maps. These two trends appear to define a good farming continuum in the sheep/beef sector.

Productivity/productivism

Similar to many of the other distinctions in the sheep/beef sector, the relative emphasis on productivism among the interviewed farmers is fairly uniform. As such, all comparison of the panels involves identifying differences among farmers who recognise limitations on their capacity to increase production. Thus, for all of the panels, respecting the needs of their livestock is important; but the survey results suggest an even greater emphasis on this in the Organic panel compared to Integrated only. A similar finding can be reported for relative efforts to reduce dependency on external inputs (compared with Conventional). The latter characteristic is exemplified by the willingness to reject chemical solutions for pest control or soil fertility maintenance among the Organic farmers. Finally, to differentiate among the Integrated and Conventional farmers, the apparent confidence of the former in being able to meet the demands of contracts despite potential environmental constraints and their preference for more complete weed control suggests that the Integrated panel may have a stronger inclination to productivism. Thus, this second axis extends from a strong awareness of environmental constraints at one end (exemplified by the Organic panel) to the desire to exert somewhat greater control of the management system at the other (Integrated).

Risk, innovation and challenge

The farmers in each of the sheep/beef sector panels demonstrate distinct responses to risk and innovation. Of the three panels, the Conventional farmers maintain the most traditional form of sheep/beef farming. Many have experienced the crises of the 1970s through 1980s

¹⁷ In the survey this feedback involved the capacity “to discuss farming issues, practices, problems or projects with [neighbours]”.

and successfully adapted to a shift from carcass to cuts in the processing of their products. They appear more conservative, however, in responding to the demands of an increasingly retail and consumer-oriented market. By comparison, both the Integrated (in complying with the external gaze and timing demands of the audit-governed contracts) and the Organic (in submitting to the social risk of a contested alternative practice) panels demonstrate a willingness to assume additional risk in order to actively approach the challenge of this market. In a further distinction, the Organic panel seeks to reduce risk by increasing crop diversity. The national survey data show that the Organic (77%) panel places more emphasis on maintaining and promoting diversity by increasing the number of crop and plant varieties and/or animal breeds compared to the Integrated (50%) and Conventional (36%) panels. This axis can be defined by endpoints represented by the willingness to engage challenges and pursue alternatives and by the preference to retain familiar practices.

Summary of Sheep/Beef:

As was the case with the kiwifruit sector, we will summarise the differences identified among the sheep/beef panels on the basis of several unifying themes. We also suggest that these themes – many of which are very similar to those identified for the orchardists – will likewise form the basis for a more comprehensive assessment of the farms, facilitating a transdisciplinary perspective.

Perhaps among the more noteworthy findings in the ARGOS research is the confirmation of the distinctive character of Organic farmers relative to their non-organic counterparts (both traditional and alternative). This difference is nowhere more evident than in the *breadth of view* expressed across the research instruments. As with the kiwifruit orchardists, it is the Organic farmers who demonstrate the broadest perspective on nature and society, placing themselves and their farms within a larger landscape and less localised community. They also placed the greatest emphasis on off-farm product quality in the causal maps. By comparison, the Conventional and Integrated panels demonstrated a more narrow focus on the processes and conditions that they recognised within the boundaries of their own farms.

The concept of *good farming* as a cohering theme for the social data does not, to the same extent, mirror the panel differences evident in the kiwifruit sector. Most notably, none of the sheep/beef panels place an emphasis on tidiness comparable to that exhibited by the Green orchardists. As such, there are no readily apparent visual distinctions among the farms of the respective panels. This relative uniformity in understandings of good farming likely reflects the enduring traditional approaches to pastoral production. The subtle distinctions which do emerge largely involve the greater extent to which the Integrated and Organic farmers are willing to push and/or adjust their management systems to meet the standards of their respective niche markets. In other words, for these two panels, the pursuit of quality includes direct references to the necessities of meeting the demands of the market, especially retailers and consumers; whereas the emphasis on a high quality product indicated in the Conventional panel involves an affirmation of the intrinsic value of the New Zealand pastoral sector and its contribution to that country's society and economy – features that become symbolic qualities of their product. Thus, in the case of the former two panels, the symbolic qualities of the product involve more narrowly defined characteristics of the product that result from an alternative method of production. The fact that the Organic and Integrated farmers have directed their production toward a specifically defined market appears to be associated with their greater willingness to comply with auditing structures and to conform to contract stipulations. The management practices associated with good farming remain, however, relatively uniform among the panels as demonstrated by the fact that audits are described invoking minimal changes in practice beyond the attention to paperwork and documentation. Here again, the Organic panel is more distinctive as their concept of good farming involves a stronger emphasis on environmental conditions and health especially in regard to the soil.

As noted in reference to the Organic panel's concept of good farming, the sheep/beef farmers' perceptions of and engagement with the environment (their *environmental positioning*) provide a further theoretically significant means of differentiating among the panels. Again, in similar fashion to the kiwifruit sector, the environment themes provide a principal axis along which the Organic panel can be distinguished from the rest. For example, the Organic farmers were consistently more proactive in their engagements with the environment, were the most insistent on working with nature and the least convinced of technological fixes for the remediation of human-induced environmental problems. By comparison, the responses of the Integrated and Conventional panels more closely emulated each other suggesting that the proclivity to adopt organic practice can be associated with a greater concern for one's impact on the environment. The causality is not clear from the existing data, however, given that it does not indicate whether the environmental positioning of the Organic farmers preceded their conversion or emerged thereafter.

Despite the panel differences in their environmental positioning, the farmers appear to share relatively similar responses to *feedbacks* within their production systems. For example, all of the panels provided comparable references to the importance of the state of the paddocks and of stock health as indicators of environmental wellbeing, with the Organic panel expressing greater emphasis on the soil and soil biota in this regard. The indicators of economic wellbeing identified by the farmers were also overwhelmingly similar. Here the emphasis was on returns as the most important gauge, although many in the Integrated panel also included costs in their assessment. In earlier reports we suggested that this characteristic reflected a sense among the farmers that their costs were essentially set and proper management in the context of numerous influences (such as low market prices and variable weather conditions) involved achieving sufficient returns to realise some profit, or at least pay the bills. This suggests that the greater reference to costs among the Integrated panel reflects their stronger tendency to employ technologies that involve costs (and are considered optional by the other panels) in order to more effectively meet the contract stipulations.

The final avenue of differentiation among the sheep/beef panels involves the farmers' social positioning. These distinctions coalesce around themes – including *on and off-farm relationships*, *production system management* and responses to *innovation and risk*, – in which the more conservative orientation of the Conventional panel distinguishes it from the others. In regard to the first theme, the Conventional panel maintains a perception of community that borders on nostalgia by referring to more coherent and interactive rural communities of the past. These more traditional social relations remain strongest in regions not disturbed by increasing urban/ex-urban pressures nor targeted as the site of rapid farm conversions to dairy. By comparison, the other panels demonstrate the capacity to expand their conceptions of community to include relationships with the processing industry (especially within the Integrated panel) as well as both local and more distant consumers. In reference to production system management the Conventional panel appears less willing both to diverge from more traditional metrics and indicators and to accept and comply with the external gaze of audit schemes (as is evident with the Integrated panel) or to give precedence to mitigating their impact on the environment (cf. Organic panel). A similar situation is evident in the varying responses to innovation and risk in the panels, with both Integrated and Organic farmers showing a greater predilection to new or alternative methods or approaches. In contrast, the Conventional panel appears much more risk averse. As a result, the latter group expresses a more limited scope of control that narrowly focuses on the practice of growing grass and producing meat; whereas the Integrated and Organic farmers have taken (at least the initial) steps to strategically reposition themselves within a wider scope relative to the contemporary marketplace. These differences are potentially indicative of variation in the resilience of the panels with the Conventional panel being the least resilient.

4. Conclusion

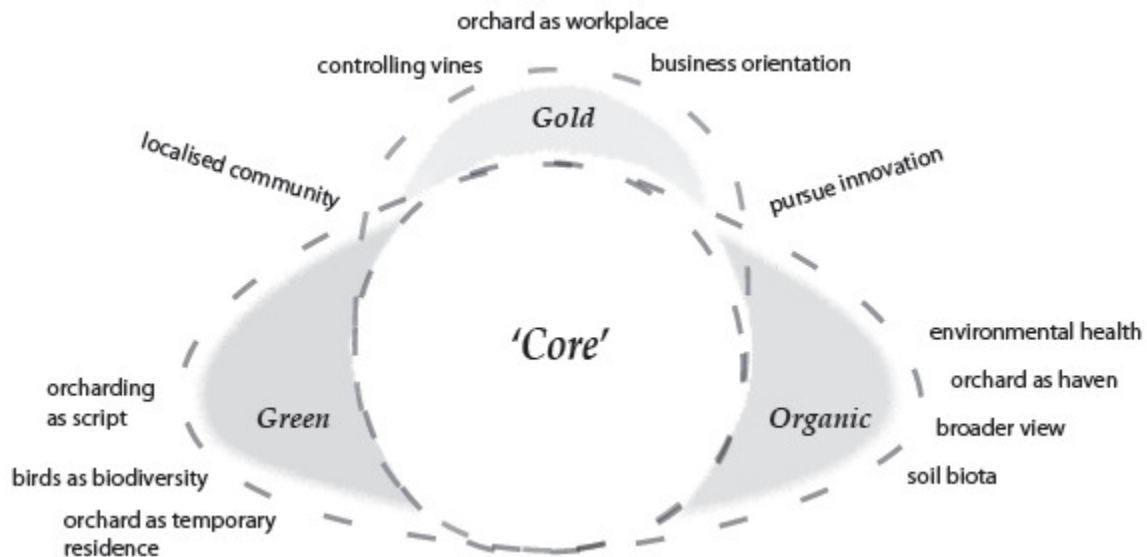
The preceding review of the data collected and analyses performed to date by the ARGOS social research objective provides the basis for three categories of conclusions. First, we can establish the extent to which the designated panels in both the kiwifruit and sheep/beef sectors act as explanatory variables for the analysis of sustainable farming practice within the ARGOS research framework. Such conclusions involve the relatively straightforward listing of significant differences among the panels and provide the building blocks for grounded comparisons with data from the remaining ARGOS objectives (economic, environmental and farm management). A further set of conclusions to be drawn from the reported findings involves a dialogue with the existing social science literature on sustainable agriculture. In this case, we examine the extent to which ARGOS data either confirms or contradicts the claims associating specific social dynamics with more sustainable outcomes (see pp. 6-7 above). Finally, and in a slightly less grounded manner, the findings encourage a set of conclusions regarding the objectives and research goals of the social analysis in furthering the understanding of sustainable agriculture within the framework of the ARGOS project. Here, we endeavour to identify potential alternative means of differentiating among the participating orchardists and farmers that are expected to provide greater insight than the current panel structure to the condition of sustainability in New Zealand agricultural practice. More specifically, we indicate the most likely sites of transdisciplinary collaboration in which the social research might inform and engage with that completed in the project as a whole.

Overview table of social objective results

Kiwifruit: Overall, the current set of ARGOS social data for the kiwifruit sector suggests that the Organic panel is the most distinctive. The survey results found six variables for which there were statistically significant differences between the organic panel and both of the other panels. A full account of the qualitative data clearly leads to the conclusion that it is the organic panel which is distinctive. The causal maps showed that organic orchardists had a greater number of important factors. The other surveyed data and the sketch maps do not show many panel differences.

There was some small difference in emphasis across the methods. The causal maps showed that to some extent the Gold orchardists shared some similarities to the Organic panel. Both had maps with more double arrows and had more connections. They were both doing different things on their orchards compared to Green. The qualitative data showed the Organic panel to be clearly distinctive, with the Gold panel having only some attributes in common with the Organic panel.

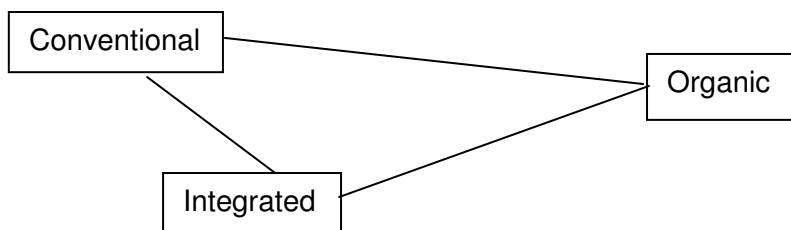
While we have found that it is the organic panel which is most distinctive, we also note that on some variables, the gold orchardists were closer to the organic panel than the Kiwigreen panel. Accordingly, we would portray the spatial relationship between panels as follows.



The detailed account of the panel differences has indicated a number of key themes. Each theme was supported by evidence from a number of data sources and few contradictory results were encountered. That is, the panel effects shown in the results of different methods, applied by different researchers, have showed up in a modest number of themes. This overall result supports the claim that the methods were deployed in a satisfactory way and that the orchardists were consistent in what they were telling us.

Sheep/beef: Again the Organic panel was distinctive compared to conventional and integrated panels. The survey results found 14 variables for which there were statistically significant differences between the Organic panel and both of the other panels. The full account of the qualitative data clearly leads to the conclusion that it is the Organic panel which is distinctive. The causal maps showed that Organic farmers had a greater number of important factors. Both the sketch map data and the causal map data showed that location explained some of the variation in the data.

While we have found that it is the organic panel which is most distinctive, we also note that on some variables the Integrated farmers were closer to the Organic panel than the Conventional panel. Accordingly, we would portray the spatial relationship between panels as follows.



The combined social research results for the sheep/beef sector facilitate a similar range of themes as that identified in the kiwifruit sector. As with the kiwifruit sector, the consistency with which these themes appear across the research methods employed underpins their relevance to the data and the participants in the project.

Relevance to potential dimensions of social differentiation

In the introduction, we identified fifteen potential bases for social differentiation that have gained some common currency within the social science literature on sustainable agriculture. Given the frequent and often shared references to the social dimensions included in this literature, it was expected that differentiation among the ARGOS panels – to the extent that these represented production systems with distinct sustainability and resilience pathways – would likely align with them as well. Based on the social data collected to date and reviewed in this report, it is possible to make clear statements about the relative condition of panels in respect to twelve of these dimensions. While there are some notable features of the data on demographic characteristics, family farming and social capital, these do not establish significant panel differences. The differences in these dimensions appear more likely to identify distinguishing characteristics of and influences on individuals than to establish the criteria for differentiation among groups of orchardists or farmers. Among the remaining dimensions, half (six) establish the basis for subtle to moderate differentiation among the panels, often acting as the distinguishing characteristic of a particular panel as opposed to providing the basis for a continuum among the three. The remaining six provide stronger means of differentiation among panels, albeit for only one of the two sectors in some cases. Below each of the dimensions are discussed in the order in which they appear in the introduction, thus not reflecting any ordering of strength of difference. Several dimensions (community and grower networks; craft orientation and commercial and economic orientation; and sense of place and the symbolic ‘look’ of the farmscape) have been combined in the sections below as they refer to related aspects of a particular feature of the social world of agriculture.

Community and Grower Networks:

The cases in which a given social dimension distinguishes subtle variations among the panels demonstrate aspects of the research to date that weakly supports several identified dimensions of differentiation. In regard to the community interactions (including grower networks) and rural/urban dynamics of the various panels, for example, it is apparent that all ARGOS participants express some interest in maintaining good and active community relations. The importance of community in regard to farming practice and sustainability has, however, been well established in rural sociology literature. A common strand in the literature including authors such as Bell (2004) argues that community – and the peer pressure it exerts – is a key constraint to the contemplation of alternative practices by some farmers. There is, moreover, a further body of literature from the likes of Flora et al. (2001; 2003) and Lyson (2004) that represents the relationship as influential in the other direction. That is, ‘sustainable’ agriculture is seen as having potential benefits for the viability of rural communities. These claims suggest several avenues of interest that might emerge in discussions of community relative to the ARGOS panels.

First, differences among the panels emerge in both the relative scale of the community recognised (broadest for both Organic panels and more narrowly focused for the Green kiwifruit and Conventional sheep/beef panels) and the understood basis of engagement with the community (more public service oriented as compared to a more universally applicable orientation among the Conventional and Integrated sheep/beef panels). Thus, it is possible to conclude that members of the Organic panels would acknowledge greater responsibility for non-local impacts of their orcharding practice. The Conventional and Integrated panels, by contrast, would be strongly committed to community participation that they viewed as a part of their role as farmers.

Both of these positions (broad or narrow) tend to not conform to the expectation of Flora et al. (2001; 2003) and Lyson (2004) that sustainable agriculture will have positive effects on local communities. Leaving aside any assumptions that the panels strongly indicate differences in ‘sustainable agriculture’, the fact that all the panels had quite strong relations to community suggests that this is not a strong point of differentiation – making the normative claim of community benefits unsubstantiated. The argument around peer-pressure from communities is more interesting. The organic panel does have slightly

weaker ties to local communities, perhaps indicating their positioning slightly outside dominant local expectations about farming. The causality of such a configuration is, however, not apparent from this data.

Second, the variation in panel participation with grower networks provides a good demonstration of the differentiation in approaches to community. For the Organic kiwifruit panel, COKA assumes the role of a more active community within which participants not only exchange information related to management practice, but also promote the social and environmental agenda of the organic movement. The size and structure of COKA facilitate the emergence of a community that pursues the objectives of a social movement that is not attached to a given locality. By comparison, the KGI and Federated Farmers are largely confined by ARGOS participants to positions as communicative and representative bodies. These growers' networks do not promote similar interaction among those who rely on their services (except in rare occasions with strong and uniform outrage in reference to policy, e.g. per animal tax on methane emissions or mandatory dog chipping). The latter role is performed by other groups, including those organised by the packhouses, through HortResearch, etc, that are more narrowly focused on specific aspects of production. As a result, there is a general sense of belonging to a community as defined by occupation. This community does not, however, act as consistently as a group relative to the Organic kiwifruit orchardists.

All these insights around community and networks – albeit comprising fairly weak differences between the panels – will be worth pursuing in greater depth around issues like knowledge networks and the influence of networks and community linkages on farm/community resilience.

Craft vs. commercial and economic orientations

A craft orientation has been posed in the literature as a viable alternative for sustaining small scale agricultural production in the face of competition with more industrial forms of production (see Hinrichs 1998; 2000). The analysis of the social objective data indicate, however, that the concept of craft orientation becomes very ambiguous when applied to a varied set of land managers. Because we are not able to extract a particular panel as engaging in a more craft oriented production (all the participants appear to respond to technological and economic rationales as well as those of the craft of farming), any differences in the craft orientation involve a distinction of degree as opposed to an absolute difference. For example, within the interviews as a whole, it is possible to identify both farmers and orchardists who more strongly associate the quality of their product with their own craftsmanship as compared to the technologies or established management packages that they employ. For others, their product reflects the marketing capacity of processors or exporters, the superiority of their management system or the characteristics of the place of production. Thus, we conclude that, where craft involves exploratory engagement with management system, it does not emerge as a distinctive panel difference. Rather, it is more evident as a characteristic of select individuals.

A common assertion in the social literature on agricultural sustainability insists that, among land managers, a strong commercial or economic orientation is likely to involve a reduced commitment to environmental or social concerns and responsibilities. There appears to be some support for this assertion in the ARGOS social data, especially in relation to the approach of the Integrated and Gold panels each of which demonstrated higher emphases on business orientations as well as relatively lower concerns (at least in comparison with the respective Organic panels) for environmental or social issues. The willingness to pursue potentially risky but greater rewards of a more demanding market audit (in the case of the Integrated panel) or a less established product (in the case of Gold) does, on the other hand, contribute to a greater sense of empowerment among these panels. In this case, the Organic panels perhaps demonstrate a more tractable alternative in assuming both a riskier and potentially more rewarding product while privileging a commitment to environmental or social responsibilities, or both. The fact that claims to better quality (and to justifications of greater rewards) among the Organic growers necessarily involves an

alternative treatment of the environment (and, for some, their social relations) likely contributes to the importance of both aspects for these panels. The Green and Conventional panels, in contrast, do not have room, by necessity and approach, within their perspectives of farming to assume the risks or pursue the potential rewards of the alternative practices. These contrasting responses suggest that members of the Organic panel would be more likely to adopt alternative management strategies which challenged existing social representations of good farming as long as these promised measurable environmental or social benefits.

Learning and Expertise

In contrast to our analysis of the participants' craft orientation, we argue that it is possible to distinguish among the varying approaches to learning and expertise among the panels and sectors. All of the participants expressed a willingness to pursue more information and increase their knowledge by means of literature received through journals and from the industry and most indicated that they selectively participated in field days. Few in either sector consistently conferred with professional consultants. For many in the sheep/beef sector, expertise resides in the craft of their practice – the skill of farming is developed by experience and, to some extent, the affinity of the practitioner for the job. This position strongly reflected the importance of their knowledge of local conditions (climate, aspect, slope and edaphic conditions on their farms, etc.) in enabling them to conform to the timing and weight demands of their contracts with the meat processing firms. For the Integrated panel, this also involved developing strategies to mitigate the limitations posed by such environmental constraints; whereas the Organic panel were more likely to privilege the pursuit of improved environmental health, with an emphasis on the soil. In the kiwifruit sector, differentiation on the basis of learning and expertise is more distinct – perhaps reflecting the distinctions in craft orientation among its practitioners. Thus, the Green panel distinguishes itself as orchardists who are more comfortable following the successful and established script of green kiwifruit production. As a result, they also are challenged by references to dry matter as an alternative means of assessing their practice largely because it is not addressed within the script. By comparison, the remaining kiwifruit panels demonstrate a greater propensity to expand their expertise through experimentation. For the Gold panel, this appears to result from the relative youth of their crop – the gold kiwifruit script is still in preliminary draft form and Gold orchardists appear to be more comfortable with this situation. Similarly, organic kiwifruit production remains an emerging skill and Organic orchardists demonstrate a capacity to allow best practice to develop as opposed to being pre-determined.

Sense of Place and the Symbolic 'Look' of Farmscape

The term 'sense of place' has been most strongly developed in a literature produced by geographers employing phenomenological (see Relph 1976) and humanistic (see Tuan 1974) approaches. These representations of 'sense of place' reflect on the individual's and society's interpretations of the spaces they inhabit. A common conclusion is that a greater sense of identity and belonging incorporated within this understanding would contribute to an enhanced sense of place. The means of realising such a sense of place and the relative accessibility and uniformity of the process within given societies is more widely contested in this literature. In reference to human use of natural resources, and to agriculture more specifically, several authors have identified a more appropriate – i.e. more sustainable – sense of place that involves *becoming native to place* (see Jackson 1994). This process involves the growing awareness of the biophysical environment and its opportunities and constraints for a given locality such that more appropriate practices are developed and employed in human interactions with nature. With the data available and the differentiations established above, it is difficult to distinguish panel differences in the participants' expressions of their sense of place. Differences that are evident often reflect a generational attachment to a particular place rather than management criteria.

The differentiation in sense of place also appears to be related to the symbolic 'look' that the participants seek to invoke on their respective farmscapes. There appears to be

relatively little differentiation in the look which the sheep/beef farmers impose on their farms. This may reflect a more embedded sense of what a pastoral farm should look like, involving in many cases the historical construction of place performed by ancestors. That said, certain elements of the farm's appearance are more subject to change than others especially as they influence productive aspects of farming. (For example: the value of shelterbelts appears to change according to farmers' experience with climatic extremes, public perceptions of animal welfare and the relative importance of cropping practices, with response showing some regional differentiation especially where irrigation is option). Because there is a more active sense of place creation on the orchards (they are not the product of several generations of place building already), differences between the panels which have developed simultaneously with the orchards are more in evidence. On the typical Green orchard, emphasis is placed on projecting a sense of order and ease of management as displayed in the tidiness of the orchard including the height of the sward and the sharp distinction between productive and non-productive elements of the orchard. The home is also a frequent element of place construction among the Green orchardists. They do not, however, generally view it as an integral part of the orchard but as a separate place dedicated to personal and family life. For the Gold orchardists, the focus on control of nature shifts more narrowly to the state of the vines themselves. Because of the relatively unruly and wild nature of the gold variety's vines, more time is dedicated to management of the vine relative to the rest of the orchard. This practice is rewarded by the apparent relationship between good vine management and better fruit returns. They also have more innovative technologies on show, such as alternative pruning and support structures, girdling and artificial shelter placement. Finally, on the Organic orchard the emphasis on tidiness is replaced with that of promoting diversity. As such, order and preciseness of form are de-emphasised and the broken textures and colours are deemed appropriate, allowing for a wider engagement with the orchard that involves senses of hearing and smell as well as sight. The resulting situation should not be interpreted as a lack of organisation, but rather the acceptance of 'natural' deviations in the state of the plants and animals that form part of the farmscape.

Grower Stress and Wellbeing

It would be difficult to argue that the relative stress and wellbeing experienced by growers did not affect the sustainability of their practice. It does, however, appear evident in the ARGOS data that the relative influence of these factors on farmers (both as individuals and as groups) is heightened during periods of relative uncertainty and potential crisis in the respective production sectors. Thus the kiwifruit sector, which has experienced a period of relatively secure economic returns, exhibits little differentiation in the stress and wellbeing among the ARGOS panels. While the panels may project differing assessments of wellbeing (for example, the emphasis on profit in the Gold panel, that on balancing financial with environmental and social returns in Organic and the sustaining of a return on investment among the Green), this does not appear to affect the relative sense of stress or wellbeing more generally. The Organic orchardists do, however, express greater concern over the capacity for their sector to persevere if the premium for organic fruit was reduced. In the sheep/beef sector, the existing low market prices for their product exert greater amounts of stress and threaten wellbeing to a greater extent. Under these conditions, differentiation between panels becomes more credible. Thus, we are able to determine that the Organic and Integrated farmers appear to have developed means of engaging with the economic factors which impose an external source of stress on their practice. Both practices involve a more active engagement with their customers and with consumers that offers potential rewards in the form of price premiums. Given the particular form of market stress to which the sheep/beef farmers are exposed, it is possible to suggest that the response of the Organic and Integrated panel is more sustainable and, possibly, resilient. It is more difficult, however, to extend these claims to other forms of external stress or shock. (For example, which panel would be most resilient in a market dominated by a general and severe economic downturn resulting in revived demand for low-cost production and the elimination of existing price premiums?)

Identity and change

Identity is an important facet of any study of sustainability as farmers seek to live meaningful lives by acting in ways that reinforce and maintain their identities. This can be thought of as a moral economy; that is, behaving as a 'good farmer' should produce in exchange a decent livelihood and social status. The good farmer literature (e.g., Setten 2004, Silvasti 2003, Burton 2004) suggests that productivist behaviour is very closely associated with good farming, and hence schemes and programmes that attempt to alter this behaviour are unlikely to be successful because it is so ingrained in farming culture. Another way in which this topic can be approached is via Bourdieu's Theory of Practice (1998, 1977), in which a farmer seeks to gain economic and symbolic capital through 'playing the game' within the community and sectors in which he/she operates using the knowledge gained through life experiences, family (habitus), education (cultural capital) and networks (social capital). This theoretical positioning helps to not only explain farmers and what reinforces and maintains their identities but also opens up potential ways of changing some of the practices associated with those identities by considering how farmers operate in their different farming sectors and how these sectors in turn can constrain or enable certain practices.

Among the orchardists and farmers in the ARGOS programme there appears to be firstly a difference between certain aspects of orchardists' identity and farmers' identity, and secondly, different kinds of people/identities operating within each sector. While in both sectors they all appear to be essentially productivists there are other aspects to their identities which are of interest in terms of sustainable practices. For example, orchardists appear to need to justify the way in which they impact on their orchard, particularly in how it 'looks' but also in the other ways it impacts on the senses. No one way of producing kiwifruit appears to be dominant even though a lot of the practices are the same they can still result in 'different' orchards which are loosely associated with the different management practices of interest to the ARGOS programme. Farmers, on the other hand, appear to have no need to justify the way they treat their land. There are no apparent visual differences to us as lay people between the farms resulting from different management practices but there do appear to be many different kinds of farmer identities in action and these may also be loosely associated with Conventional, Integrated or Organic management systems. It is important to be aware of these because they present the availability of different models with the potential to incorporate sustainable practices.

Indicators of on-Farm processes

Feedbacks – provide indication of the relative emphasis placed on various elements of the orchard or farm environment. Do these involve recognition of the interaction of the elements – a sort of systems thinking – or do they focus on unidirectional processes and flows? What are the potential points of concern, the signals of excess, which may act as limiting factors on growers' actions? Are these largely related to economic, social, or environmental factors? The first bodies of data (particularly in Qual 1) certainly indicate that feedbacks are operating, and that growers do observe and respond to different aspects of their operation. However, there is a need to drill deeper in this area of data collection to see how these are operating in terms of different approaches to farm management. Early data suggest that the Organic panel differs from the other two: with soil biota and health likely to operate as an important signifier of overall farm/orchard health, whereas the Integrated (Gold and Green) orchardists mentioned birds as their key indicator of environmental health. The Organic panel saw a 'messy' orchard as being good for biodiversity, whereas the Green kiwifruit panel sought to achieve a tidy orchard look as an indicator of good control over nature. Meanwhile, the Gold orchardists didn't care, as long as productivity was maximised.

These differences were not as pronounced among Sheep/Beef farmers. All farmers named animal health as an important indicator of overall health of the farm, and believed that the impact of their management practices on the environment were minimal. As was the case

in the kiwifruit sector, the key difference among panels was a greater emphasis on soil biota by Organic farmers.

Positioning Towards Nature/Environment

Of all the social dimensions recognised in the social science literature on agricultural sustainability, the participants' positioning towards nature and the environment provides some of the most distinctive differences among the ARGOS panels. More specifically, this feature of the social aspects of land management provides definitive proof of differentiation between the Organic and the remaining panels. Members of the two Organic panels demonstrate a much greater capacity to privilege nature – including their environmental responsibilities and impacts, the importance of maintaining and improving environmental health and the locating of their management within a broader landscape – as an element of farm management, both in its objectives and immediate practice. This suggests that the practices associated with organic production appeal more to those who consciously attempt to do well by the environment or to those with the capacity to uphold justifications of practice outside more conventional emphases on financial return or productivity. Thus, such perspectives appear to facilitate the adoption of alternative practices based on the assessment of environmental (and possibly social) returns as opposed to purely financial benefits. (This should not be taken to imply that Organic growers would commit financial suicide in order to maintain their organic principles; rather the Organic panels are more likely to forego some of the certainty and productivity associated with non-organic production while pursuing what they perceive to be more environmentally sustainable management.) These findings do not necessarily exclude the remaining farmers from the adoption of alternative management practices. They do suggest, however, that the non-organic participants would be less accepting of environmental justifications and would likely engage in further assessments (financial, labour cost, time commitment, etc) to gauge the relative value of alternative practices.

Farm Management Approaches

Finally, it is possible to distinguish among all of the ARGOS panels on the basis of their farm management approaches. This differentiation largely reflects the extent to which farm management practices and the justification of that practice were important elements in the discussion of the first fourteen social dimensions. In other words, it is possible to begin assembling shared understandings and approaches to proper (or good) management based on the various features of farmers and orchardists positioning relative to society, nature and production orientation. In the social science literature such assemblages are commonly referred to as farming styles (see van der Ploeg 1994, 2000; Vanclay et al. 2006; Shadbolt and Martin 2005). Often, these styles were employed as an explanatory mechanism through which differences in uptake of innovation or alternative practice could be assessed. As such, to the extent that membership in a given ARGOS panel can be equated with a designated approach to farming, it was expected that the panel structure would contribute to the analysis of sustainability. Given the lack of consistent panel differences across the social dynamics assessed in this report, we would find it difficult to argue that the panels represented distinctive approaches to farming, let alone farming styles. A more accurate claim would suggest that the ARGOS participants employ a variety of approaches to farming, some of which have greater affinity to a particular management system (for example, a strong concern for the health of the environment and organic practices) or set of management systems. An individual's approach to farming is, however, influenced by or subject to a variety of social, environmental and economic factors that contribute to the choice of management system. For example, even for the most conservative user of inputs, organic management may remain unthinkable because of its political associations. Thus, the categorisation of farmers and orchardists according to their approaches to management offers good indications of tendencies toward preferred practices. Because the individual's approach to management does not effectively explain the choice of management system, however, it can only become a part of the ultimate goals for the social research objective.

Potential for facilitating transdisciplinary discussion

This final set of conclusions drawn from the findings over the first three years of the ARGOS project undertakes two major diversions from the remainder of the report. First, in this section we engage in discussion of the research implications of the initial body of social analysis conducted with respect to the participating orchardists and farmers. In other words, we will progress beyond the documentation of both the social characteristics of the participants in the ARGOS project and the social dynamics within which they operate and to which they respond, to examine what our existing analyses indicate for the direction and focus of future research – especially as this relates to transdisciplinary discussion. Second, we also abandon the concerted focus on panel differences to suggest possible alternative means of differentiating among participants based on social criteria. This relaxation of emphasis allows us to respond to the ovoid features of our orchardist and farmer types (utilising the panel designations) while continuing to engage with and inform the emerging analysis within ARGOS of the condition of sustainability in the New Zealand agricultural sector.

Initial transdisciplinary discussions across the ARGOS data (including environmental, economic and farm management as well as social) have coalesced around several themes that have been identified within the project. These themes involve dynamics which are expected both to correspond with aspects of agricultural sustainability and to reflect permutations of factors across the disciplinary approaches. As such, they involve topics and issues that are relevant both to the overall objective of the project (promoting more sustainable management practice) as well as the intention to provide a more systems and process oriented approach to the analysis. Here we will focus our discussion on three of the themes – market audit schemes, resilience and intensification – that have gained more traction to date within the project. More detailed engagement with each of these themes can be found in a series of ‘in progress’ working papers dedicated to each.

Audit and Market Access

As a transdisciplinary theme in ARGOS, the issues of *audit* and *market access* speak to the key governance pathway that is currently available to growers/industries wishing to pursue more environmentally ‘sustainable’ production options (in contrast to the *regulatory* pathway and the *voluntary* pathway). The parameters of this theme are closely related to the existing panel distinctions. As such, it reiterates the expectation that the designation of good management practice in the form of audit schemes will affect both environmental and social impacts of food and fibre production as well as the expectations and understandings of management held by producers and other participants in agri-food systems. A more exclusive focus on market audits as a transdisciplinary theme, however, enables us to address additional, and possibly more relevant, emphases beyond panel differences including: a) Do producers assume the regulated practices as features of best practice and incorporate them within concepts of good farming?; b) Do the audits promote the intended outcomes (as opposed, for example, to creative ‘cheating’ or the reinforcement of bad practice)?; c) How do participants differ in their enthusiasm for compliance – and how does this reflect on their practice and positioning?; d) Is it possible to differentiate among the actions of the ‘merely compliant’ and those with more pronounced and endogenously generated attitudes of social and environmental responsibility?

Resilience

As a transdisciplinary theme, the concept of resilience has been suggested as a preferred alternative to sustainability. Within the literature on socio-ecological resilience, the emphasis shifts from the identification of steady state target conditions (sustained balances in the social, economic and environmental systems) to developing the capacity to withstand shocks and maintain system function through both flexibility and redundancy in systems. In developing this theme, the objective of ARGOS research would involve not so much the designation of productivity goals and mitigation practices as it would the proliferation of

potential responses, feedback mechanisms and alternative practices with which to increase the management options available to the orchardists and farmers as well as their understanding of the impacts of their practices. The ARGOS social objective can contribute substantially to the development of this theme through further examination that emphasises differences among participants relative to variations in: a) their sense of empowerment, on the one hand, and the agency and value of both human and non-human actors on the other; b) their proclivity to acknowledge a variety of social, economic and environmental factors as indicators of feedback loops in the management system; c) their tendency to display and react upon a growing 'sense of place' or nativeness to that place; d) traits that demonstrate greater flexibility and reflection in response to problems, crises or shocks; and e) their capacity to recognise alternatives (allow them to be 'thinkable').

Intensification

The final transdisciplinary theme assumes great importance and immediacy given the evidence of increasing application of ecological and social subsidies to New Zealand's management systems (see MacLeod and Moller 2006; Parliamentary Commissioner for the Environment 2004). Such subsidies, by opening the production system and increasing its dependence on externally sourced inputs, threaten the resilience of these systems. Despite the apparent drawbacks, however, the tendency to intensify continues and appears to be inevitable. From existing social analysis we can suggest several characteristics of the project's participants (again, not necessarily conforming to the panel designations) that either promote or discourage the pursuit of intensification, including concepts of good farming and productivism, the extent to which intensification is seen as positive innovation, and the relative thinkability of feedbacks and alternatives. Similarly these findings indicate several areas of emphasis for the further development of this theme: a) Is there an equivalent productivist element among New Zealand orchardists and farmers to that found in Europe (see Burton 2004)?; b) What justifications do producers give for the adoption of more intensive practices?; c) What justifications do producers refer to when they choose not to adopt more intensive practices?; d) Are the latter set of justifications affected by an individual's sense of place or level of engagement with a more broadly defined social and environmental system?; e) Are farmers with specific social traits or in specific (social) structural situations more prone to pursue intensification trajectories? Finally, given that none of the farmers participating in the ARGOS project appear to be the most fervent proponents of intensification, the collection of data more relevant to this theme may require selecting additional participants to fit this criteria.

As a whole, the conclusions presented in this report indicate both the value of the analyses of the existing data as well as the imperative for a more expansive focus in future research undertaken by the social objective. While it is possible to distinguish several significant social differences within the existing panel framework, these provide only partial insight to the wider objectives of the ARGOS project. For example, we can identify characteristics and attitudes of Organic orchardists and farmers that contribute to their willingness and capacity to adopt organic management practices. These do not necessarily inform us, however, as to the expected response to and uptake of socially and environmentally more responsible measures by means of market audit regulation among the whole of the New Zealand agricultural population. Nor can the exclusive focus on panel differences provide sufficiently comprehensive and nuanced explanations of the relative resilience of farmers or their propensity to pursue intensification trajectories. As indicated above, the process for achieving more adequate explanations of the condition of sustainability in the New Zealand agricultural sector will involve more substantial transdisciplinary interactions and discussions as well as further research targeted more specifically at the transdisciplinary themes.

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Appendix 1: Notable Factors for Social Differentiation

A primary advantage to the structure of the ARGOS programme involves its emphasis on elaborating transdisciplinary assessments of agricultural sustainability and recommendations for more resilient practice. In order to facilitate the process of transdisciplinarity, data must often be transformed to make it more accessible to a wider range of approaches and methods. For example, whereas the forgoing analysis of social data within the ARGOS programme provides substantial insight to the social dynamics which differentiate among the participating farmers and orchardists (whether or not these corresponded with panel membership), it does not offer a means to engage in linear modeling that is a more accepted approach among ecologists and economists. The intent of this appendix is both to identify likely social factors of sustainability to which quantitative measures can be applied and to elaborate the basis for their transformation.

The most readily applicable data for a linear modeling exercise involve those already subject to quantitative treatment – namely the data from the causal maps and the national farmer survey. From the causal mapping we can turn to two types of differentiation in the data: differences between ARGOS panels and Q-sort types in the centrality scores for specific factors (an indicator of the relative importance of that factor) included in the maps. Those factors found to have significant differences across the panels and Q-sort types are listed in the table below. In survey data, the selected factors include those which demonstrate a significant difference between members of the organic panels relative to the other panels in the respective sectors. As such, these are high likely to be associated with the stronger environmental positioning of the former panels. The list of relevant factors from the survey results are in the table on the following page.

Table A: All the factors (variables) found to have significant differences across panels and across Q-sort types from causal mapping.

Centrality score differences	
ARGOS Panel	Q-sort Type
Contractors	Marketing or processing organisation/ produce buyers
Customer requirements	Customer satisfaction
Exchange rate, macro economy	Family needs
Farm environment as a place to live	Customer requirements
Farm environmental health	Off-farm product quality
Fertiliser and soil fertility/health	Farmer decision maker
Future generations/succession	Off-farm activities
Improve equity/land size	Off-farm work
Increasing plant & animal biodiversity	Farm working expenses
Marketing or processing organisation	Contractors
Net profit before tax	This location
Off-farm activities	Exchange rate, macro economy
Satisfaction	Government policies
Stream health	Number of connections
Weather/climate	
Number of connections	
Centrality for decision maker/ total centrality	
Q-sort score for decision maker	

Table B: Factors with significant differences in the national farmer survey data.

Intention to use organic methods.
Agreement with the Committed Conventional position.
Dependency on chemicals for the control of pests or parasites.
Dependency on chemicals for the control of weeds.
Dependency on manufactured fertilisers.
Agreement with the Pragmatic Conventional position.
Rating of the general condition of native species diversity (either at present or five years ago).
Importance assigned to returning microbial plant or animal material to the soil to improve it.
Importance assigned to maintaining and promoting diversity by increasing the number of crop and plant varieties and/or animal breeds.

The remainder of the data requires a transformation of existing qualitative data (as presented in the main body of the report) to relative quantitative assessments of each participating farmer or farm household. Here we have developed a list of eight characteristics that: 1) vary among the participants (not necessarily relative to panel membership); 2) reflect data that is present in the grand majority of the interviews and can be confined to responses to a limited set of questions; and 3) are expected to significantly affect either the participants' responses to alternative management practices or their resilience to shocks. Unless otherwise noted, the transformation of the data involves a ranking of individuals according to a five point scale as noted below.

The current set of social indicators (subject to both the availability and type of data), in no particular order, include:

- breadth of social view – as expressed in Qual1 (especially in regards to the participant's and their property's contributions to the well-being of society) assessed relative to a range from global to national to regional to locality to personal;
- breadth of environmental view – Qual1 (discussions of well-being of environment as impacted by management practices) assessed relative to a range from global to national to landscape to farm to productive areas;
- representation of industry – largely Qual2 (discussions of constraints associated with industry) assessed relative to a range from strongly positive to strongly negative with 'not emphasized' as a midpoint;
- representation of production intensity – both Qual1 (explanation of management as a practice) and Qual2 (discussion of environmental constraints) assessed relative to a range from strong production output orientation to a strong craft orientation and reflecting the relative commitment to managing within natural boundaries;
- age and/or lifecycle – from farm management and survey data and reported as actual age or a numerical ranking of lifecycles from earlier/younger to later/older;
- diversity of feedbacks – largely Qual1 and possibly the causal maps (discussion of environmental well-being and indicators) assessment? real number (number of feedbacks recognised? relevant to diversity of landscape?) or range from very diverse to very specific?
- response to innovation/risk – Qual2 (explanation of learning process and summary statement of response to new constraints) assessed by categories (pursuit of challenge, avoidance, etc.);

- environmental proactivity – Qual1 and general observation assessed relative to a four point scale (proactive – active – passive – none).