Landcare Research
Manaaki Whenua
POLICY BRIEF

Survey of Rural Decision Makers: understanding decision makers in primary industry

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KEY FACTS

The 2015 Survey of Rural Decision Makers (2015 SRDM) covers both commercial production and lifestyle farming across all primary industries and all 16 regions in New Zealand. The survey contains the responses of nearly 3000 farmers to 288 questions that include detailed information on demographics; values; land use, and land-use change; farm management; objectives; and network size and composition. The 2015 SRDM builds on an earlier survey conducted in 2013.

The information from the 2015 SRDM is used by industry, policy makers, and researchers to build a better picture of New Zealand's current primary industry and what it might look like 10, 20, and even 50 years in the future.

Summaries of the results from the 2015 SRDM are available at www.landcareresearch.co.nz/srdm2015

2015 SRDM DETAILS

The 2015 SRDM is a large, Internet-based survey consisting of 288 questions, including detailed information on demographics; values; land use, and land-use change; farm management; objectives; and network size, and composition. The survey uses smart survey logic to ensure that only relevant questions are asked of individual respondents. It was conducted in late 2015.

The sampling strategy relied primarily on contacting farmers via email through the National Animal Identification and Tracing database, industry and sector group membership lists, and a list of individuals who responded to the 2013 SRDM. Industry and sector groups that circulated information about the survey among their members included Beef + Lamb New Zealand, the Farm Forestry Association, Federated Farmers, the Foundation for Arable Research, Horticulture New Zealand, New Zealand Wine, the QEII Charitable Trust, and Rural Women. In addition, invitations were posted by mail to approximately 40% of all commercial farmers in the Statistics New Zealand business registry to invite them to participate in the survey. A $10 donation was made to charity for each completed survey. The survey took 27 minutes to complete, on average.

In total, 2,839 respondents completed the survey, including 1,984 commercial farmers. The sample of commercial farmers closely approximates the population reported in the 2012 agricultural census by both geography and industry.

Figure 1 and Figure 2 contain summaries of selected data from the 2015 SRDM and exemplify how these data can be presented. Figure 1 shows the proportions of farms that were either profitable, break even, or unprofitable over the last two years. Differences in profitability across primary land use are immediately identifiable, such as forestry having the lowest level of profitability since 2013.

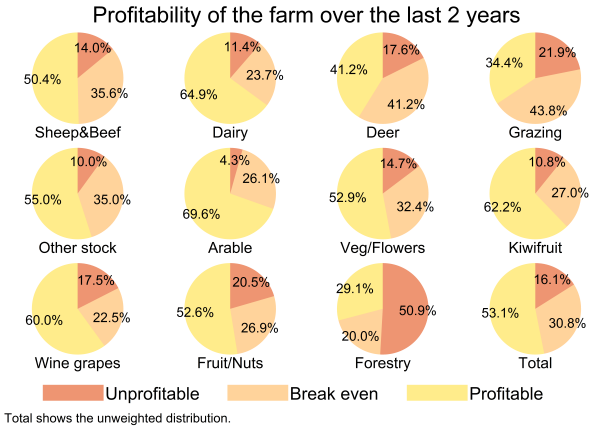

Figure 1 Profitability by primary land use.

Figure 2 presents data across region rather than land use. For example, Marlborough has the highest proportion of farmers with consents for taking water, while Taranaki has the lowest.

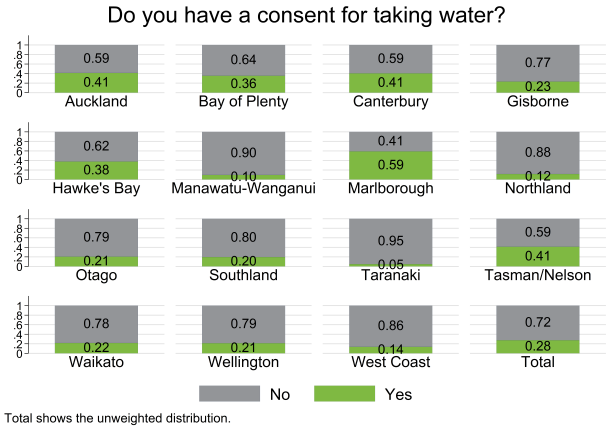

Figure 2 Proportion of farms with consents for taking water by region.

While the summary results provide an overview, more detailed analysis is often required to explore specific questions and to improve understanding of the complex factors influencing farm management and decision making. Landcare Research is able to analyse and interpret survey data to benefit industry, policy makers, and other researchers. The remainder of this document looks at four in-depth analyses that utilise the data from the 2015 SRDM.

If you would like to discuss how Landcare Research can help your agency gain insights from the 2015 SRDM, please contact Christine Harper, Business Development Manager, on 04 382 6644 or harperc@landcareresearch.co.nz.

KEY FINDINGS

This analysis focuses on which livestock farmers are more innovative (as measured by the number of good environmental practices undertaken on their farms and by the number of specific novel technologies that they have adopted) and have larger networks (connections) for discussing environmental and financial performance. We also analyse the composition of professional farming networks.

Innovative farmers are more prevalent in the dairy industry and innovation is strongly associated with higher education levels and stronger environmental norms within farmers' families. Farming experience increases innovation through faster adoption of practices and technologies. Men adopt a greater number of novel technologies than women. Moreover, network size increases with innovative ability and network composition becomes more cosmopolitan as this ability increases.

Innovators may be the key to increasing the adoption of novel practices and technologies among farmers as they have a greater understanding of these practices and technologies. Innovators also have the largest networks through which these practices and technologies can be spread.

BACKGROUND

Regional councils and industry both champion the implementation of desirable management practices and the adoption of new technologies for farm management. Understanding how best to encourage farmers to undertake desirable management practices and to adopt new technologies is important if regional councils and industry are to succeed in this regard.

Regional councils may promote accelerated adoption of good practices and new farming technologies by encouraging diffusion through professional networks in which innovative individuals find new approaches and those with strong social networks encourage widespread uptake. The 2015 SRDM provides data that confirm demonstration spurs adoption. Through the use of inferential analysis, characteristics of innovators and connectors can be identified and the composition of farming networks among different types of farmers can be subsequently analysed.

RESULTS

Innovative farmers were identified using two distinct measures of innovation – implementation of desirable management practices such as managing nutrients, and adoption of novel technologies such as windmills for generating electricity. Moreover, innovative ability is evaluated not only by counting the number of practices implemented and the number of technologies adopted, but also by evaluating the timing of those decisions, with early adopters argued to be the more innovative farmers.

Farmers report being more likely to adopt new practices and technologies after seeing them successfully demonstrated by other farmers. This implies that regional councils may be able to increase adoption rates through encouraging farmers to give successful demonstrations of the practices and technologies they use to other farmers in their networks. Innovative and well-connected farmers are the most likely candidates to fulfil this role.

Dairy farmers are more innovative than their counterparts in sheep and beef farming, deer farming, and farming of other livestock. Male decision makers are more likely to adopt novel technologies than female decision makers. Higher education levels and stronger environmental norms within the family are strongly associated with innovative ability. In contrast, environmental expectations of the farming community and the New Zealand public are not strongly associated with innovation. Table 1 summarises characteristics strongly associated with innovation.

Table 1 Effect of selected farm characteristics on the implementation of desirable management practices and novel technologies

Characteristics	Number of desirable management practices	Number of novel technologies
Male[a]		↑
Certificate[b]		↑
Diploma[b]		↑
Bachelor's/postgraduate[b]	↑	↑
Master's or above[b]	↑	↑
Sheep/beef[c]	↓	↓
Deer[c]	↓	
Other stock[c]	↓	
Family environmental expectations	↑	↑

a. Relative to female.
b. Relative to a high school certificate.
c. Relative to dairy.
An upward (downward) arrow indicates the characteristic increases (decreases) the likelihood of adoption of a greater number of practices/technologies.

Innovators and early adopters have larger networks than other farmers, including networks in which farm finances are discussed as well as those in which environmental performance is discussed. This result differs from previous findings in the literature that suggest innovators have comparatively small networks.[15] At the same time, innovators have more cosmopolitan networks than other New Zealand farmers, including more individuals from the scientific and government communities (Fig. 3).

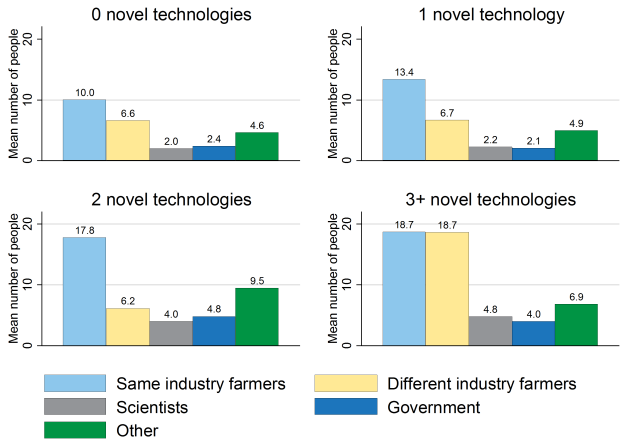

Figure 3 Network composition by number of novel technologies adopted.

These findings imply that innovative farmers in New Zealand are not only positioned to find, adopt, and demonstrate novel technologies and practices but can also act as connectors to link other farmers to new ideas.

KEY FINDINGS

The average farmer in New Zealand is 56 years old. This analysis finds that age strongly influences farmers' values, farming practices, and future planning. Older farmers are more risk averse, less experimental, and feel less pressure from the public to farm in environmentally sustainable ways.

The relative importance of financial considerations vis-à-vis environmental and lifestyle considerations also varies with age, where financial considerations become increasingly important until age 58, after which the importance of lifestyle considerations increases.

The younger generation of farmers is more willing to meet heightened environmental and production goals, a promising sign for the future. While encouraging all farmers to increase production and engage in better environmental practices is desirable, it may be more efficient to engage younger farmers first.

BACKGROUND

The New Zealand government seeks to raise the value of exports in GDP from 30% to 40%. Achieving these targets will require the value of primary industries to grow at an annual rate of 5.5% in real terms.[12] Concurrently, the New Zealand government has also set targets of reducing greenhouse gas emissions to 30% below 2005 levels by 2030.[9] New Zealand farmers are thus effectively being asked to convert land to higher value production and to intensify existing farming operations, all while meeting increasingly strict environmental standards. Whether farmers are willing to convert land and/or to intensify activities, or implement practices to reduce environmental impacts depends largely on their values and farming objectives. Risk tolerant farmers are more likely to implement Good Management Practices (GMPs),[7] as are farmers who show greater willingness to experiment with new practices.[2] Farmers who are environmentally driven are the most active adopters of GMPs, while farmers who are financially driven often require financial incentives to adopt these practices.[10] Farmers' perceptions of the public's environmental expectations, and the extent to which they choose to farm due to family traditions may influence adoption of desirable practices.[16]

Values and farming objectives may depend on demographics, particularly age. This implies that a willingness to adopt GMPs and to change land use is influenced by age. Despite extensive research on the relationship between age and values, however, consensus on the existence of a relationship has not been reached in the academic literature.[3, 11, 14] The 2015 SRDM remedies a traditional lack of evidence, particularly in New Zealand, for drawing conclusions about age and values.

RESULTS

Age strongly influences farmers' values: as they age, farmers grow more risk averse and less experimental. Older farmers generally feel less pressure from the public to farm in environmentally sustainable ways and are less likely to farm out of a commitment to family tradition, relative to younger farmers. Figure 4 shows how the importance of financial, lifestyle, and environmental objectives change as farmers age. Financial objectives become increasingly important for farmers until 58 years of age, after which the importance of finance falls and lifestyle considerations increase in importance. Age is not, however, statistically correlated with prioritising environmental considerations in on-farm decisions.

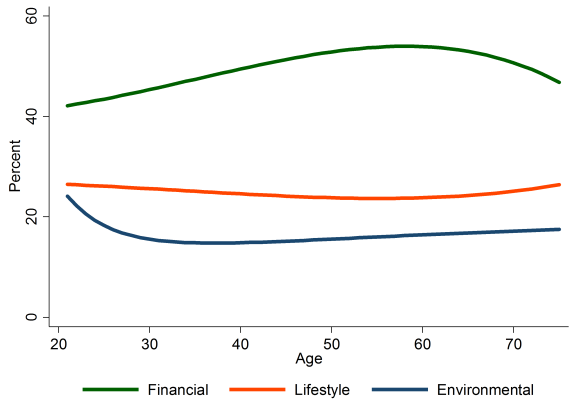

Figure 4 Importance of financial, lifestyle, and environmental objectives across age.

Figure 5 shows how the adoption of novel technologies and intensified land use changes as farmers age. A clear downward trend for both indicates that younger farmers are more willing to adopt novel technologies and to intensify land use than their older counterparts.

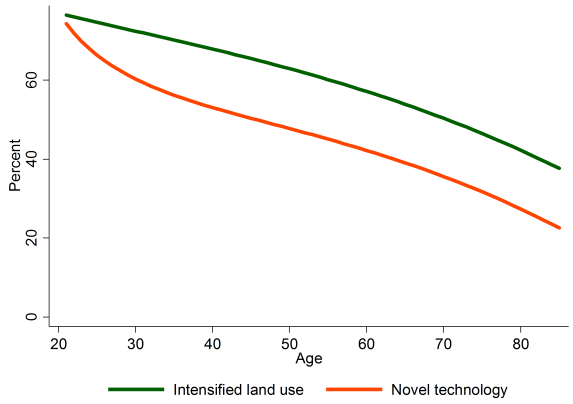

Figure 5 Novel technology adoption and intensified land-use change across age.

In terms of farming practices and future plans, farmers aged 50 and above are very distinct from those aged 49 and below. Specifically, older farmers are less likely to have converted land to more productive uses in the preceding decade. While age is not correlated with current adoption of certain GMPs – namely, implementing plans to manage nutrients and soils – older farmers have lower intentions of adopting GMPs in the near future. Finally, older farmers are more likely than younger farmers to plan on selling, subdividing, or leasing out land in the near future.

The younger generation of farmers (aged 49 and below) is not only more willing to adopt practices and technologies to help meet more stringent environmental standards, but is also more willing to convert land and/or to intensify activities to increase production. These attitudes are underpinned by greater risk tolerance and willingness to experiment as well as a sense of obligation both to their families and to the New Zealand public to manage their land sustainably. From a policy perspective, regional councils who are wanting to promote economic growth while protecting the environment should focus their efforts on younger (and thus more adaptable) farmers.

KEY FINDINGS

A farm's financial position, the degree to which land is prone to pugging, and the decision maker's gender all influence the likelihood of the decision maker adopting soil management practices. Profitable or break-even farms are more likely to adopt sediment management practices and farms with low debt in relation to all assets are more likely to adopt soil conservation practices. Farms with land that is prone to pugging and farms with a female decision maker are both more likely to adopt several types of soil management practices.

Of the soil management practices adopted by farmers, water management and soil conservation, water management and sediment management, soil conservation and sediment management, tree planting and soil conservation, and land retirement and sediment management are practices that are likely to be undertaken in conjunction with one another.

Greater reductions in soil erosion are more easily achieved when policy makers know the likelihood of practices being adopted and in what combinations. Hence, it is important to understand the characteristics of farmers who adopt certain management practices and which of these practices are adopted together.

BACKGROUND

New Zealand loses 96 million tonnes of soil annually to erosion; a rate 10 times higher than the world average.[8, 13] A tenth of New Zealand's total land is categorised as suffering from severe and extreme erosion[4] and only 32% is capable of sustainable agricultural uses without the need for soil conservation measures.[6]

The economic cost of erosion in New Zealand is approximately US$122.9 million per annum in 2013, which corresponded to 1.31% of the national agricultural production, and highlights why controlling erosion is important to New Zealand's economy. This cost included direct effects (e.g. farm infrastructure damage, agricultural production lost, and residential damage) and indirect effects (e.g. increased flood severity, reduced water quality, and biological degradation).[5]

Using the 2015 SRDM, both the joint adoption of management practices and the relationships between adoption of certain management practices and farmers' characteristics may be analysed. The management practices assessed include water management (e.g. effective drains and culverts), soil conservation (e.g. cover crops), sediment management (e.g. sediment traps), tree planting, and land retirement.

RESULTS

Adoption of water management, soil conservation, sediment management, and tree planting are all more likely to occur on farms with land prone to pugging. The pugging can significantly affect productivity and infrastructure, providing an incentive for the adoption of management practices to reduce pugging.

Male farmers are less likely to adopt water management and land retirement practices, and farmers who live on the farm are more likely to adopt tree planting. Farms that are profitable or that break even are more likely to adopt sediment management; however, as debt in relation to all assets increases, the likelihood of adopting soil conservation practices decreases. Also, farmers who do not own their land are less likely to adopt soil conservation practices or tree planting. Table 2 summarises these relationships.

Table 2 Effect of selected farm characteristics on the adoption of soil management practices

Characteristic	Water management	Soil conservation	Sediment management	Tree planting	Land retirement
Pugging[a]	↑	↑	↑	↑	
Male[b]	↓				↓
Lives on farm[c]				↑	
Profitable[d]			↑		
Break-even[d]			↑		
Debt		↓			

a. Relative to no pugging.
b. Relative to female.
c. Relative to living off farm.
d. Relative to unprofitable.
An upward (downward) arrow indicates the characteristic increases (decreases) the likelihood of adoption

Figure 6 shows the correlation between management practices. Several management practices are often adopted together, e.g.

- Water management and soil conservation practices are designed to manage the passage of water to avoid soil loss and retain the soil's structure.
- Sediment management and soil conservation practices involve the use of traps and buffers to divert water into sediment control devices.
- Water management and sediment management practices control stream-bank erosion. In particular, riparian or vegetation buffers are adopted along with drainage at seepage sites to reduce bank undercutting and lateral migration.

Water and sediment management practices have higher investment costs relative to other practices. However, it may be less expensive to adopt both practices simultaneously rather than separately, and simultaneous adoption may provide greater overall benefits to farmers over other management practices, an incentive for their joint adoption.

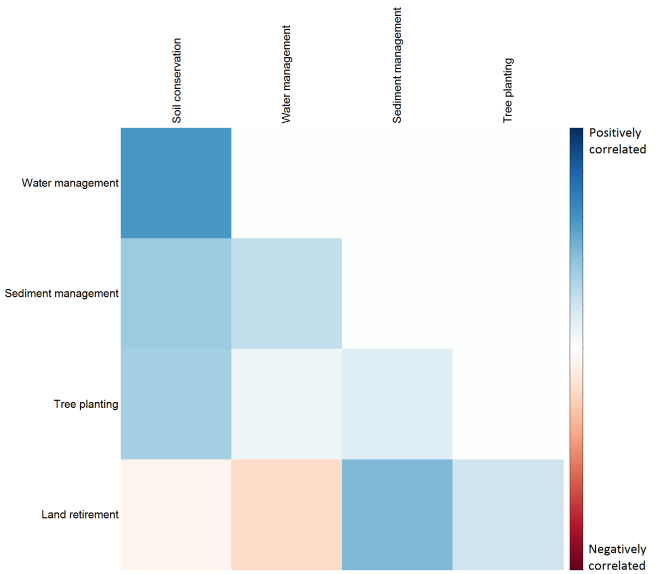

Figure 6 Correlation matrix of management practices.

Adoption of multiple management practices is often more effective at preventing soil erosion than adoption of any one practice. Knowing which management practices are normally undertaken in conjunction can help policy makers craft policy that encourages the adoption of a greater number of management practices.

KEY FINDINGS

Farms with an identified successor are more likely to incur more debt and have greater on-farm investment, even after controlling for associated factors such as primary industry, region, total farm area, age of the decision maker, and gender, than farmers with no identified successor.

Dairy farms, larger farms, and farms with female decision makers are all more likely to have made significant on farm investments.

BACKGROUND

Many farm operations in New Zealand are run as family businesses in which land and capital are handed down from one family generation to the next. For such family businesses, the identification of successors encourages long-term planning that farms without successors cannot justify. Having an identified successor motivates investment even as farmers near retirement. In contrast, older farmers without successors typically underinvest and consume their material assets as they approach retirement.[1]

The 2015 SRDM finds that only 30% of New Zealand farms have identified successors, which has implications for the New Zealand agricultural sector because farms without successors are likely to be undercapitalised as current farmers approach retirement. This undercapitalisation is likely to have negative effects on farms' efficiency and environmental performance, with reductions in environmental performance as a result of underinvestment in environmental management practices.

Unfortunately, isolating the effect of succession planning on farm investment is difficult due to the existence of factors that influence both succession planning and farm investment decisions, such as age. Using the 2015 SRDM and inferential analysis, the question of whether or not succession planning has a causal relationship on farm investment can be convincingly answered. Additional analysis of the relationships between farm investment and other farm characteristics gives a complete description of the factors influencing farm investment.

RESULTS

Two indicators of investment can be derived from the 2015 SRDM. The first is debt as a percentage of farm value, which is a good indicator of recent investment because on-farm investment in New Zealand is typically debt financed. The second is a binary indicator of 'a recent sizeable investment' having been made on the farm, constructed from a series of questions asking whether land-use change, land-use intensification, or some other capital-intensive land management change has been made recently on the farm. Changes to, or intensification of, a land use, as well as adoption of a capital-intensive land-management practice were considered to be recent sizeable investments.

The presence of a successor has a significant and positive effect on debt relative to farm value, supporting the idea that the presence of a successor has a causal effect on farm investment. Dairy farming is positively associated with both debt relative to farm value and the probability that a recent sizeable investment has been made, consistent with the claim that investment will be higher in capital-intensive industries.

Farm size has a positive effect on debt and supports the idea that larger farms experience economies of scale and therefore invest in more capital. The age of the farmer has a negative effect on debt in relation to farm value.

Controlling for the presence of a successor, older decision makers invest less in productive capital as their expected returns from investment are lower compared with younger farmers. Table 3 summarises which characteristics are strongly associated with debt and sizeable investment.

Table 3 Effect of selected farm characteristics on both debt and the likelihood of making a recent sizeable investment for recent sizeable investment

Characteristic	Debt (% of total farm value)	Recent sizable investment
Successor identified[a]	↑	↑
Dairy[b]	↑	↑
Farm size	↑	↑
Age	↓	↓
Male[c]		↓

a. Relative to no successor identified.
b. Relative to sheep and beef.
c. Relative to female.
An upward (downward) arrow indicates the characteristic increases (decreases) the likelihood of a recent sizeable investment.

The results imply that farms without successors will have periods of underinvestment as farm managers approach retirement and wind their farms down. Such underinvestment has implications for the productive capacity of New Zealand's land resource as undercapitalised farms will not operate efficiently and will therefore experience a period of reduced output. This behaviour may also negatively impact environmental performance if environmental management practices are also underinvested in. These practices are important both to protect soil and reduce pugging, soil damage and runoff to waterways. The findings suggest a role for central or local government to provide support for succession planning in New Zealand agriculture to ensure efficient farm management.

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