

# Decisions, decisions ...



**LANDCARE RESEARCH**  
MANAAKI WHENUA



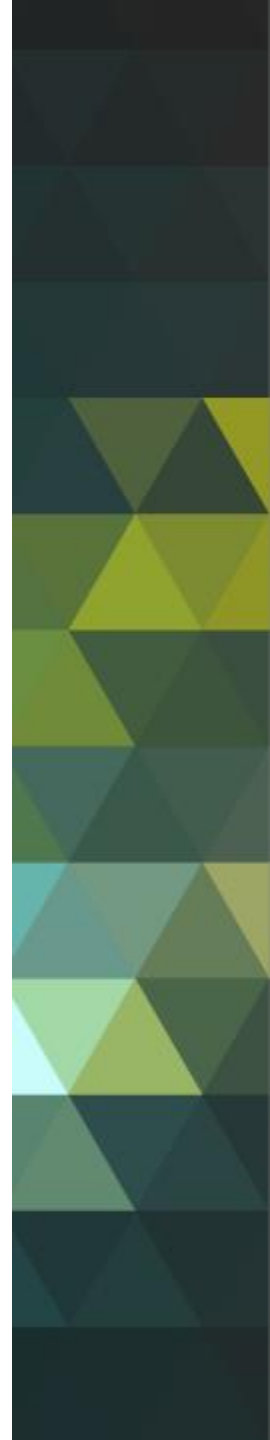
# Decisions, decisions ...



## Rural Decision Makers SUR✓EY2015



LANDCARE RESEARCH  
MANAAKI WENUA

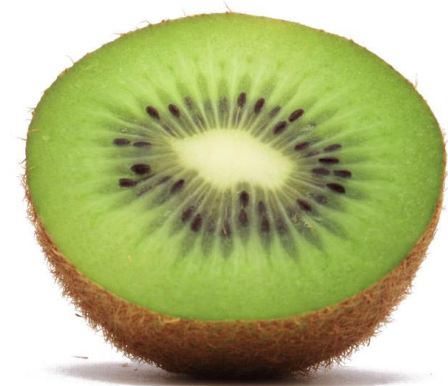


# Landcare Research

- Provides research and advice for organisations that develop and implement policies for land and water
- Integrates economic, social, & environmental data across industries and land uses
- Builds a better picture of decision making to shape New Zealand's future

# Rural Decision Makers SUR✓EY2015

- Developed in winter 2013 to inform agent-based models of land use in 3 regions
- Usefulness extends beyond models
  - Evidence base
  - Facilitates complex data analysis
  - Evaluate questions of interest to government, industry, and researchers
- Extended to 16 regions
- Conducted in winter 2015
  - To be conducted every 2 years



# Questionnaire

- Refinement of 2013 Survey of Rural Decision Makers
- Questionnaire design
  - Central government: MPI and MfE
  - Regional councils
  - Industry/sector groups – Federated Farmers, Dairy NZ, Beef + Lamb NZ, Horticulture NZ, QEII Charitable Trust
  - 40+ scientists from CRIs, research groups
  - Faculty/students from NZ, Australia, UK, US, France
- Federated Farmers focus group

# Questionnaire

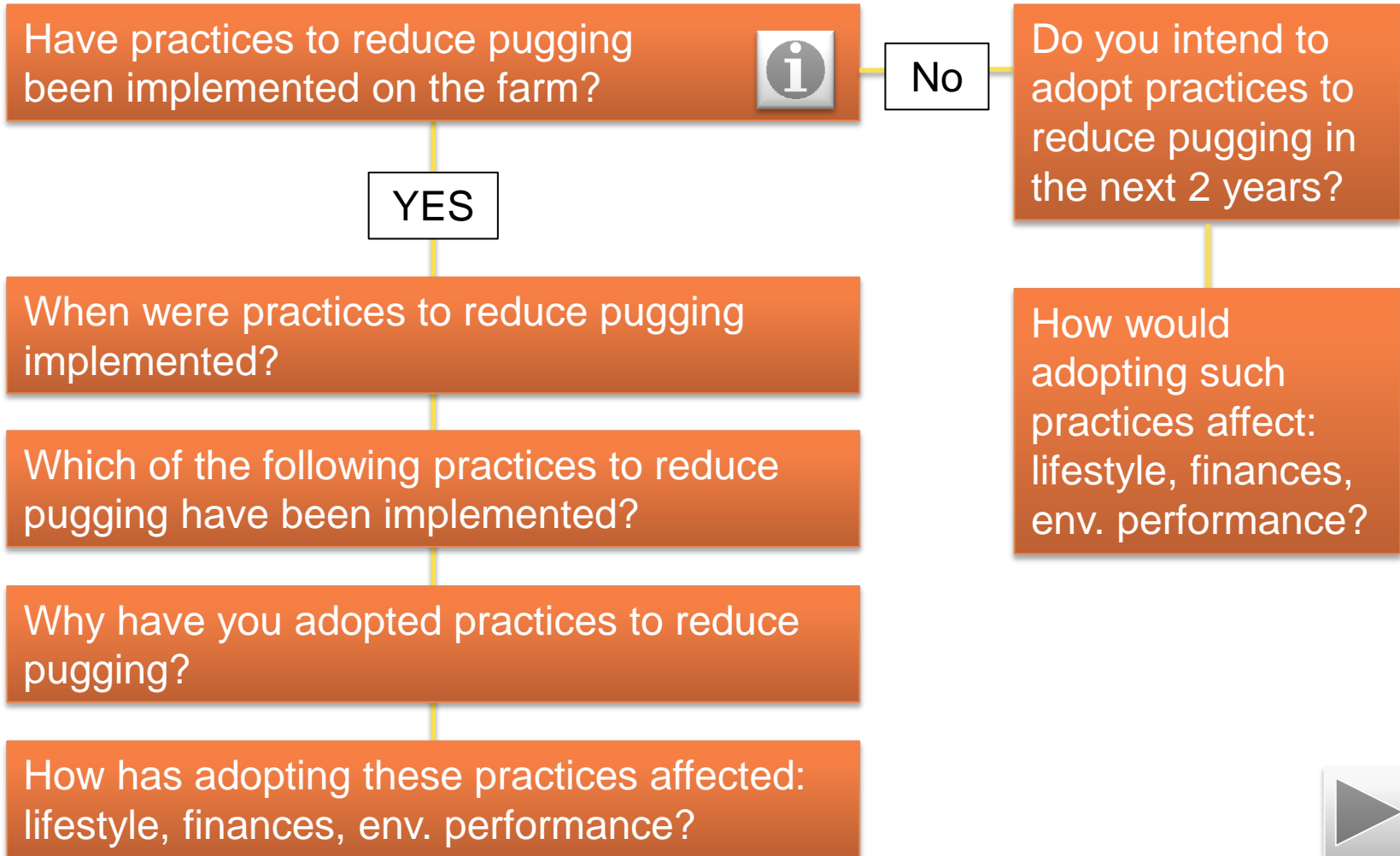
- Ownership and structure
- Land use, land-use change
- Livestock
- Forestry practice
- Water and irrigation
- Land management
- Technology adoption
- Climate
- Vertebrate, plant pests
- Networks, farming support
- Values, norms, preferences
- Farming objectives, profits
- Labour
- Demographics, education
- Community participation
- Opportunities, challenges
- Future planning

288 questions

# On-line Delivery

- Disadvantage:  
lower response rates
- Advantages:  
lower cost,  
no data entry error,  
complex logic

# Complex Logic





# Complex Logic

Show when: (((Question "Which of the following land uses apply to the land that you farm in [question("option value"), id="171", option="10298"] ([question("option value"), id="171", option="10297"]) during the previous 12 months? Tick all that apply." #15 is one of the following answers ("Grazing livestock that are NOT OWNED by the farming business (e.g. **dairy support**)", "Farming **sheep and/or beef**", "Raising and/or finishing **prime cattle**, including bull beef", "Operating a **dairy platform**", "Operating a **dairy run off**", "Raising **deer**", "Raising **pigs**") OR Question "Which of the following land uses apply to the land that you farm in [question("option value"), id="187", option="10383"] ([question("option value"), id="187", option="10382"]) during the previous 12 months? Tick all that apply." #21 is one of the following answers ("Grazing livestock that are NOT OWNED by the farming business (e.g. **dairy support**)", "Farming **sheep and/or beef**", "Raising and/or finishing **prime cattle**, including bull beef", "Operating a **dairy platform**", "Operating a **dairy run off**", "Raising **deer**", "Raising **pigs**") OR Question "Among the [question("value"), id="260"] hectares located elsewhere in New Zealand [apart from [question("option value"), id="171", option="10298"] ([question("option value"), id="171", option="10297"]) and [question("option value"), id="187", option="10383"] ([question("option value"), id="187", option="10382"])], which of the following land uses apply during the previous 12 months? Tick all that apply." #27 is one of the following answers ("Grazing livestock that are NOT OWNED by the farming business (e.g. **dairy support**)", "Farming **sheep and/or beef**", "Raising and/or finishing **prime cattle**, including bull beef", "Operating a **dairy platform**", "Operating a **dairy run off**", "Raising **deer**", "Raising **pigs**") AND Question "How prone to pugging is your pasture?" #38 is one of the following answers ("**Not very prone**", "**Prone**", "**Very prone**") AND Which situation applies to your land? " is one of the following answers ("**Commercial farming** (in which the primary purpose is selling farm outputs)"))



# Survey Sample

- 2013 respondents (permission to re-contact)
- Statistics New Zealand
- NAIT
- Industry / sector groups
  - Federated Farmers
  - Beef + Lamb NZ
  - QEII Charitable Trust
  - Rural Women
  - Horticulture NZ
  - NZWine
  - Farm Forestry Association
  - Foundation for Arable Research

E-mail contact is critical  
Personalised emails are best  
Reminders are very effective

# Survey Sample

- Survey results shared with respondents
- \$10 donation to charity



- Prize draw for one of 5 Prezzy® cards

# Survey Sample

## SRDM 2015

- 288 questions (commercial)
- 3,264 responses  
2,849 complete
- Average completion time =  
27 minutes

## SRDM 2013

- 192 questions
- 2000+ responses  
1,564 complete
- Average completion time =  
25 minutes



# Survey Sample

- Sheep & beef = 49.9%
- Dairy = 21.7%
- Dairy grazing = 5.9%
- Fruit/nuts = 5.0%
- Arable = 3.2%
- Forestry = 3.1%
- Kiwifruit = 2.5%
- Other stock = 2.4%
- Derr = 2.3%
- Wine grapes = 2.2%
- Veg/flowers = 2.0%

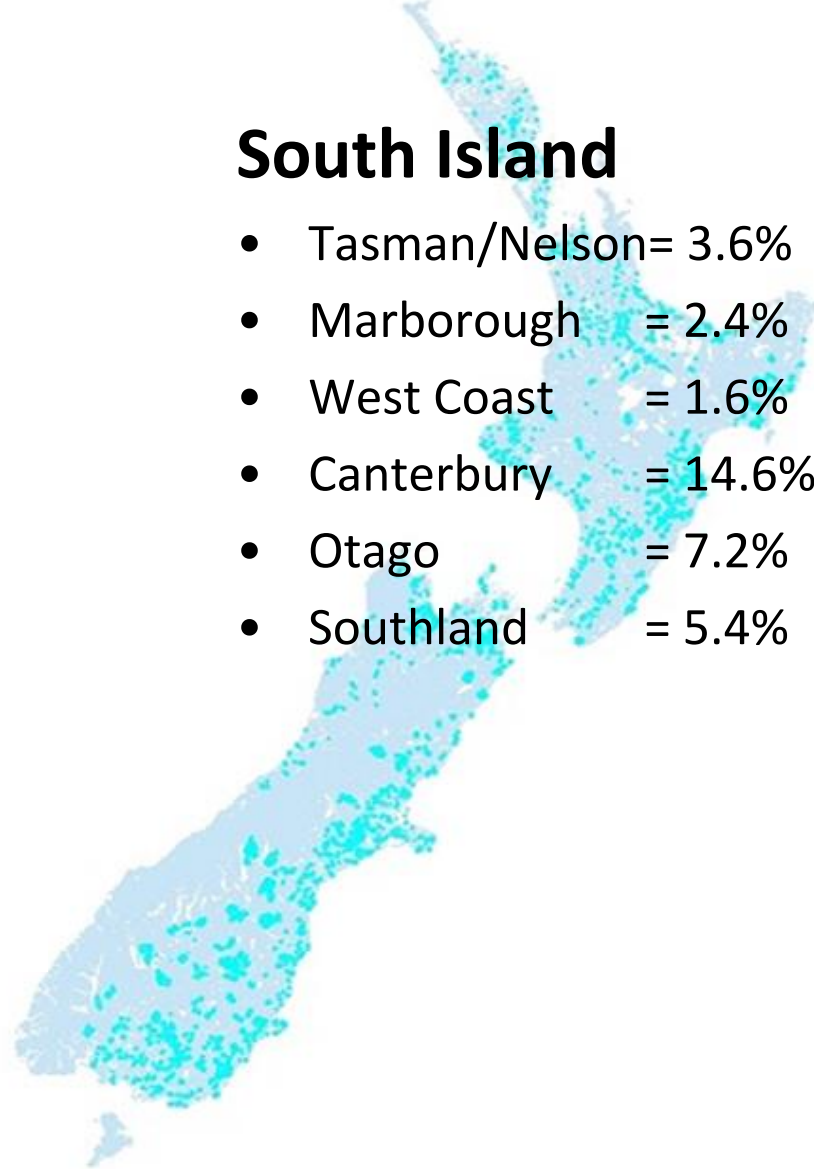
# Survey Sample

## North Island

- Northland = 8.6%
- Auckland = 7.4%
- Waikato = 13.8%
- Bay of Plenty = 7.0%
- Gisborne = 1.8%
- Hawke's Bay = 6.2%
- Manawatu-Wanganui = 10.0%
- Taranaki = 4.6%
- Wellington = 5.9%

## South Island

- Tasman/Nelson = 3.6%
- Marlborough = 2.4%
- West Coast = 1.6%
- Canterbury = 14.6%
- Otago = 7.2%
- Southland = 5.4%

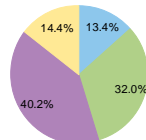


# Presentation of Results

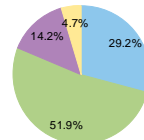
[www.landcareresearch.co.nz/srdm2015](http://www.landcareresearch.co.nz/srdm2015)

## 1. Pie charts

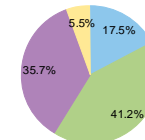
### Proneness to pugging



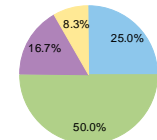
Auckland



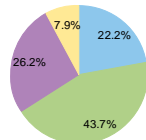
Bay of Plenty



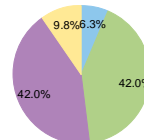
Canterbury



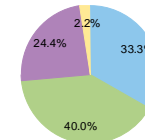
Gisborne



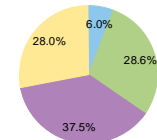
Hawke's Bay



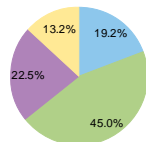
Manawatu-Wanganui



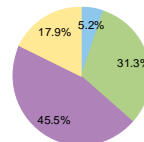
Marlborough



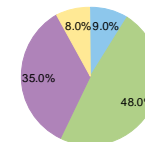
Northland



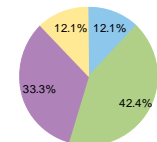
Otago



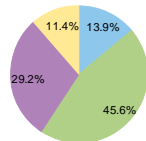
Southland



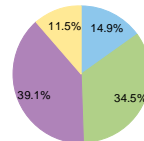
Taranaki



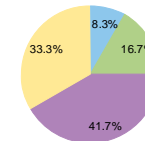
Tasman/Nelson



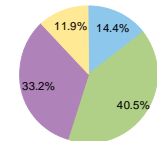
Waikato



Wellington



West Coast



Total

Not at all prone

Not very prone

Prone

Very prone

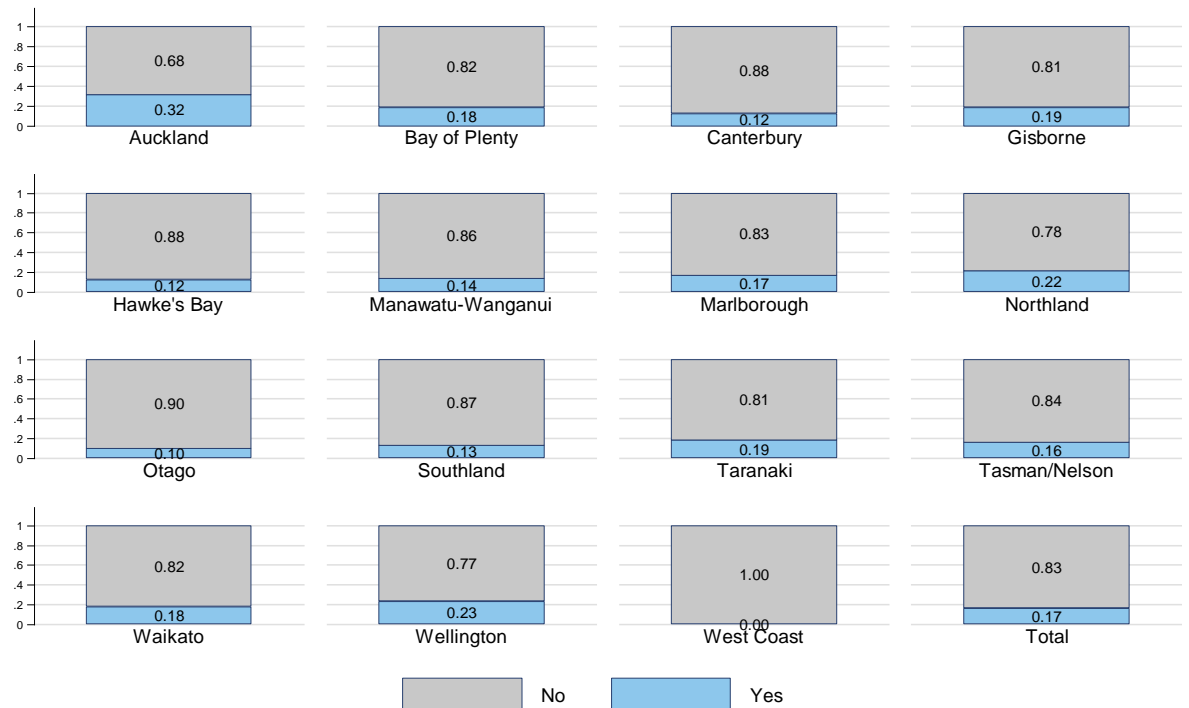
Total shows the unweighted distribution.

# Presentation of Results

[www.landcareresearch.co.nz/srdm2015](http://www.landcareresearch.co.nz/srdm2015)

1. Pie charts
2. Bar Charts

Have you entered into a covenant to permanently protect all or part of your land?



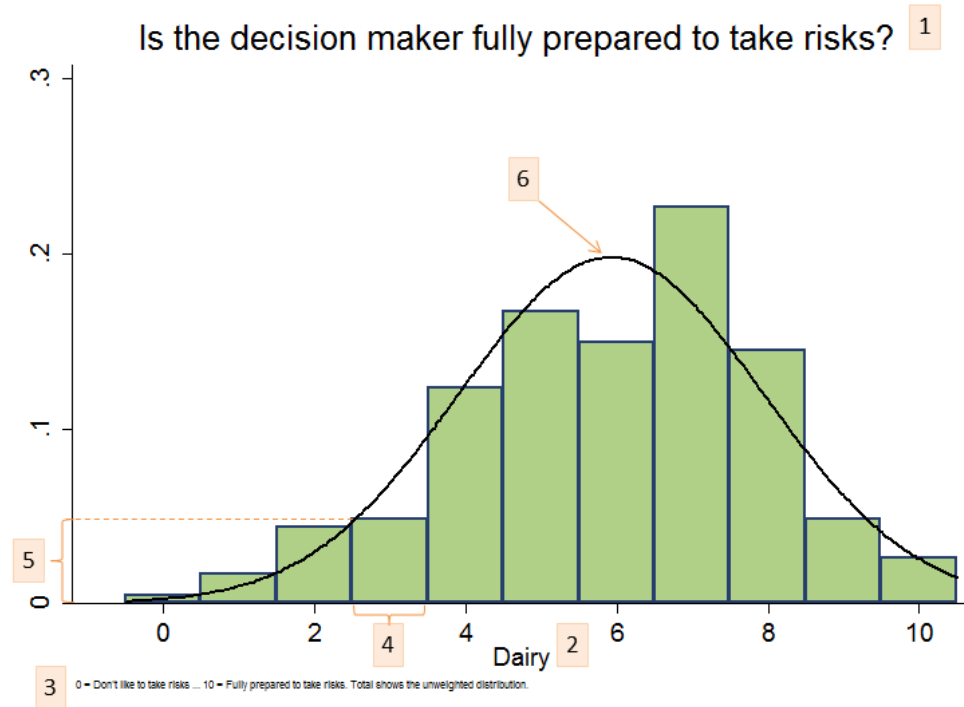
Among individuals who respond 6-10 on the question 'I personally believe that private land owners should protect habitat for native plants and animals on private land'. Total shows unweighted distribution.



# Presentation of Results

[www.landcareresearch.co.nz/srdm2015](http://www.landcareresearch.co.nz/srdm2015)

1. Pie charts
2. Bar Charts
3. Histograms

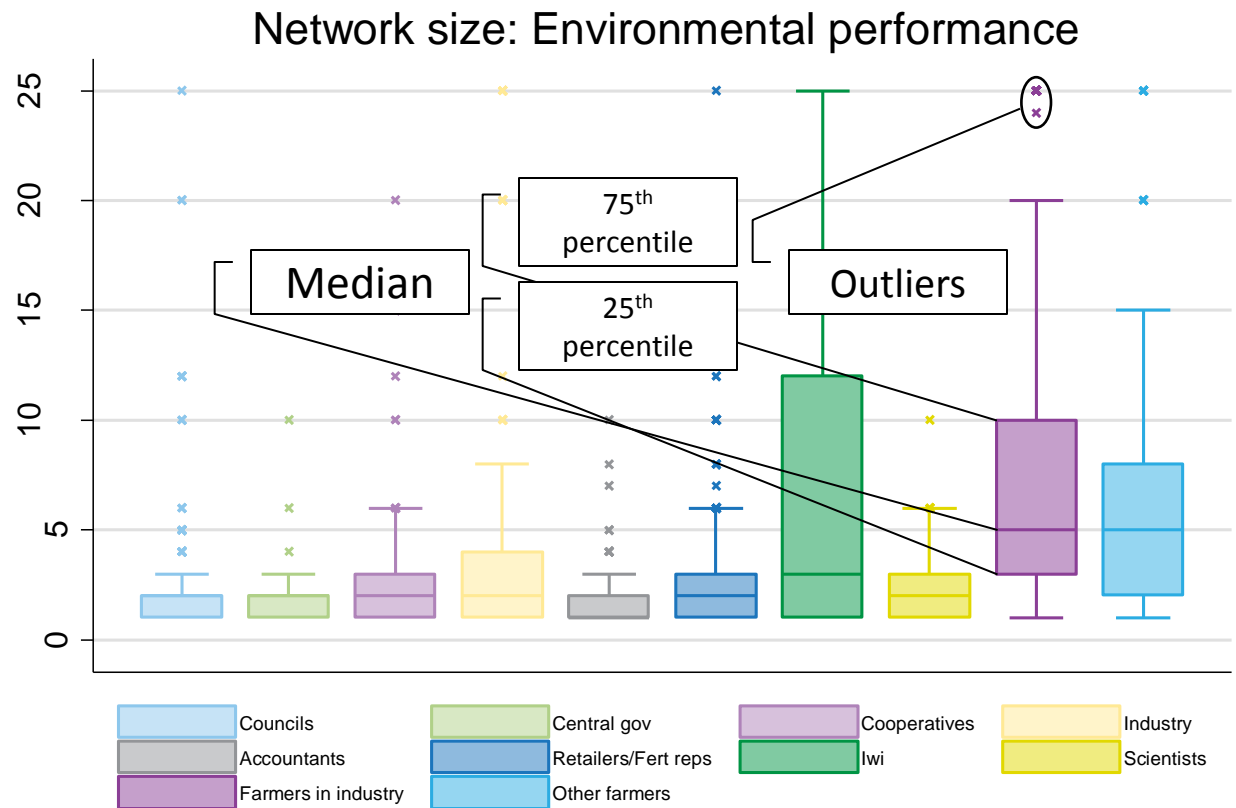


1. This figure shows responses to the question "Are you fully prepared to take risks?"...
2. ... among dairy farmers who responded to the survey.
3. Notes help to interpret answers. 0 means "don't like to take risks" while 10 means "fully prepared to take risks".
4. The *x-axis* shows the range different answers: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10.
5. ... and the *y-axis* shows the share of respondents who gave each response.  
**Thus, about 5% of the dairy farmers in the survey responded "3" to the question "Are you fully prepared to take risks?"**
6. The *normal distribution curve* highlights the average: The peak of the curve is about 5.9, indicating that...  
**... The average response among dairy farmers in the survey is 5.9.**

# Presentation of Results

[www.landcareresearch.co.nz/srdm2015](http://www.landcareresearch.co.nz/srdm2015)

1. Pie charts
2. Bar Charts
3. Histograms
4. Box & Whisker Plots



# Current Research

- Who are the risk-taking innovators? Who are in their professional networks?
- Developing typologies to predict adoption and timing of good management practices
- How does ownership structure influence environmental practice?
- Where do farmers winter off stock?

# Current Research

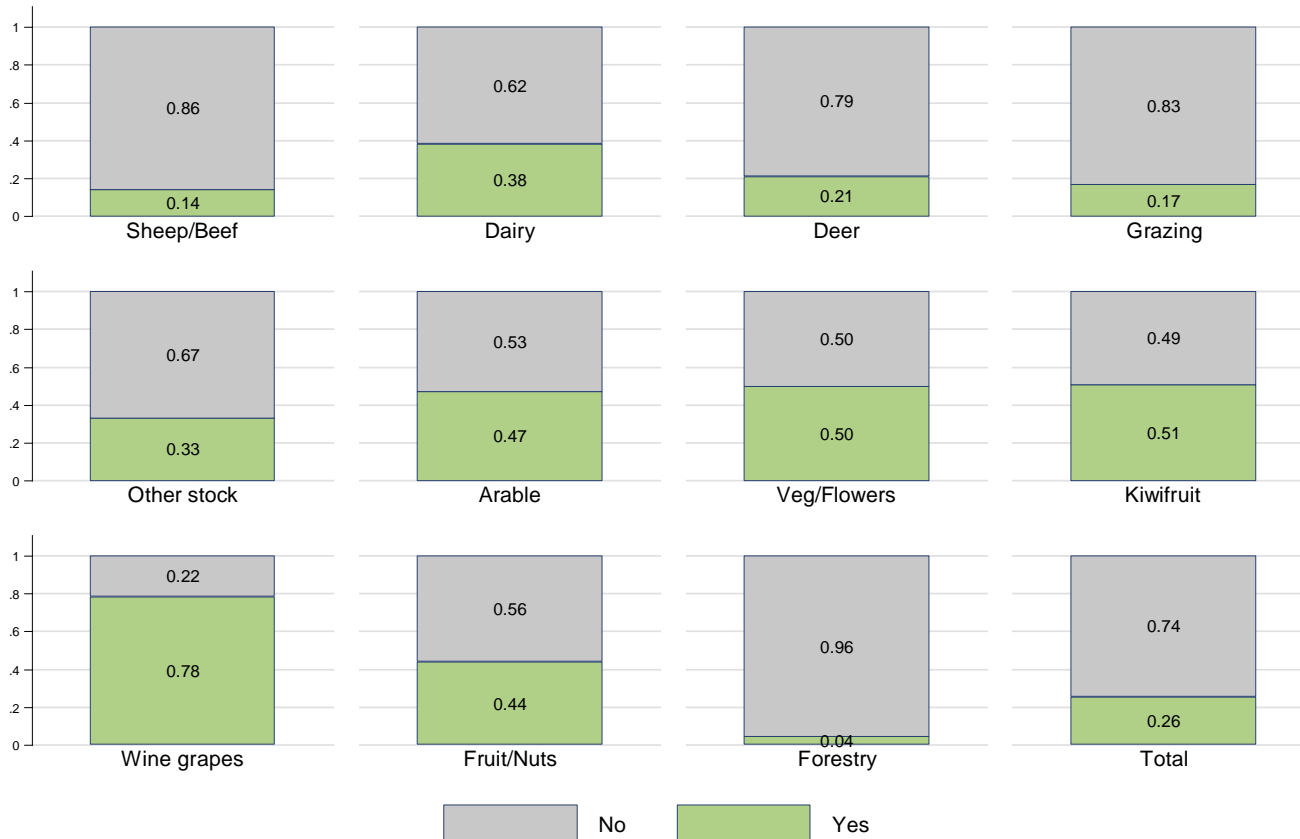
- How does proximity to the conservation estate influence farmer values and management?
- Which practices for managing soil are complements? Which are substitutes?
- How does belief about future climate affect current practice?
- Understanding future land use through agent-based models
- How does age affect on-farm decision making?

# Data Exploration

- **Water use and irrigation**
- **Stock exclusion**
- **Age and decision making**

# Water Use and Irrigation

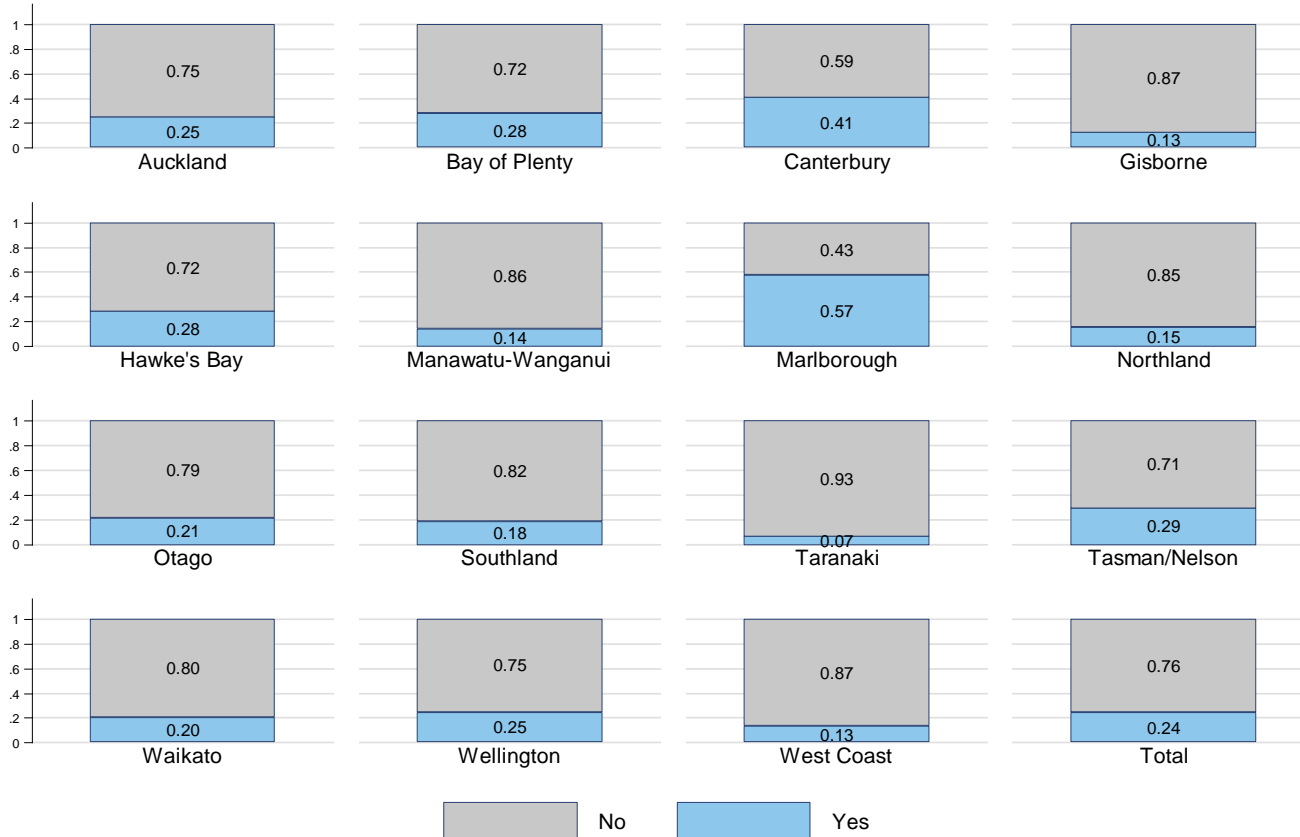
Do you have a consent for taking water?



Total shows the unweighted distribution.

# Water Use and Irrigation

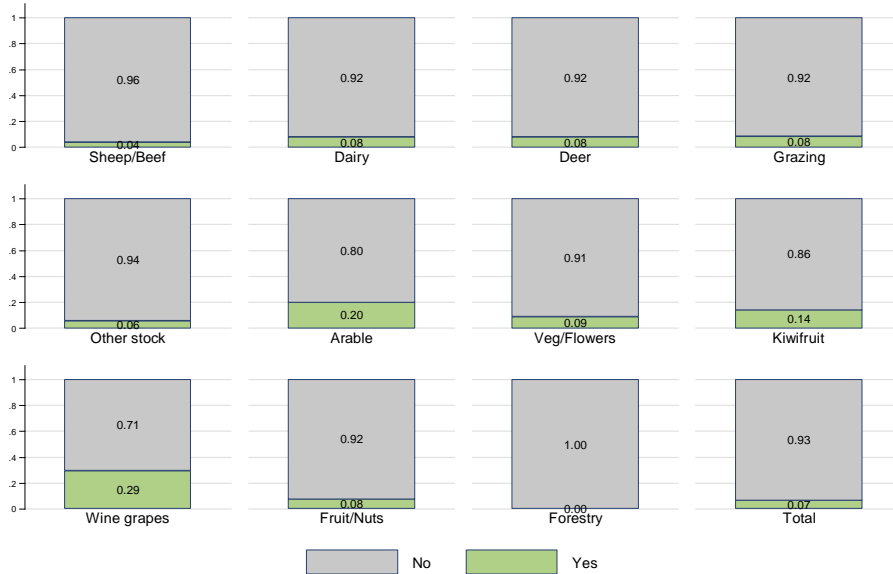
Do you have a consent for taking water?



Total shows the unweighted distribution.

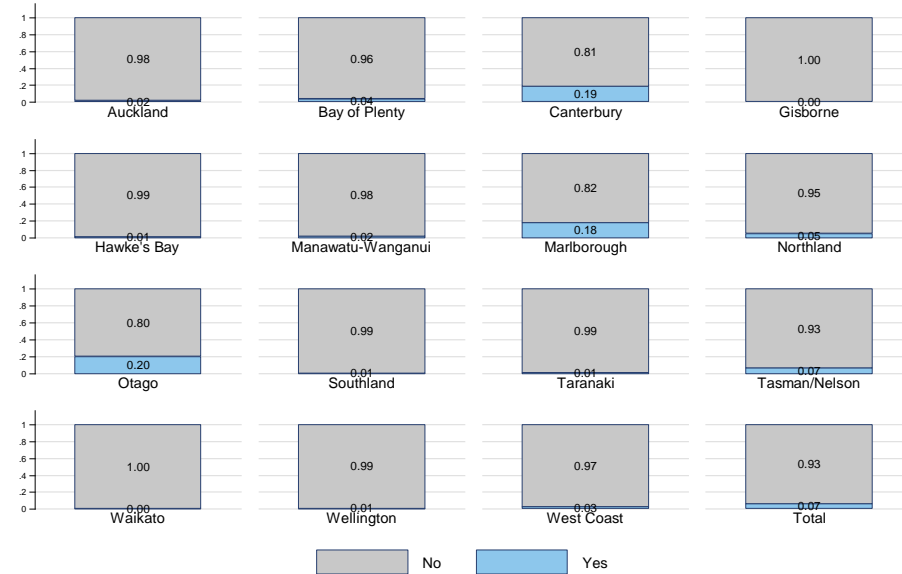
# Water Use and Irrigation

Do you participate in an irrigation scheme?



Total shows the unweighted distribution.

Do you participate in an irrigation scheme?

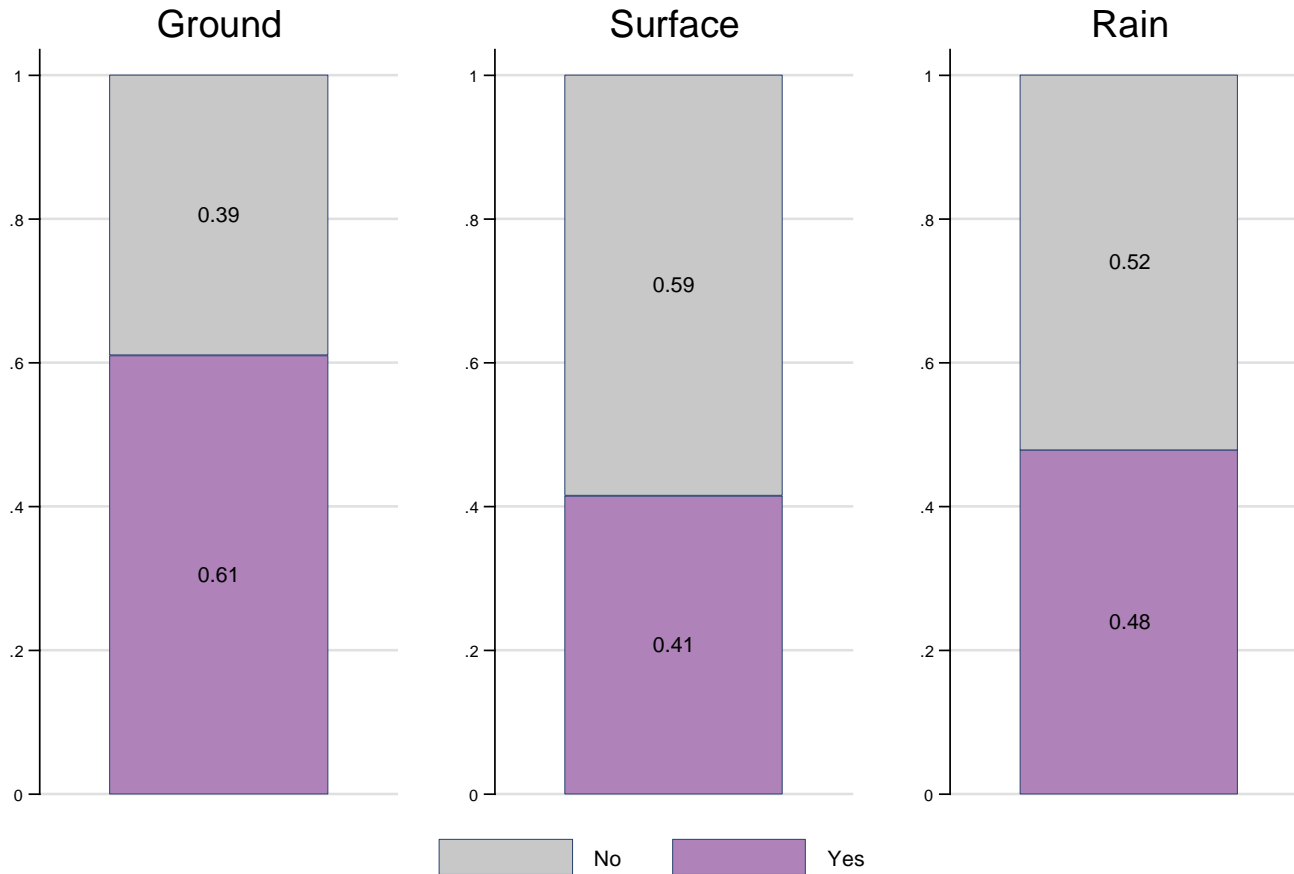


Total shows the unweighted distribution.



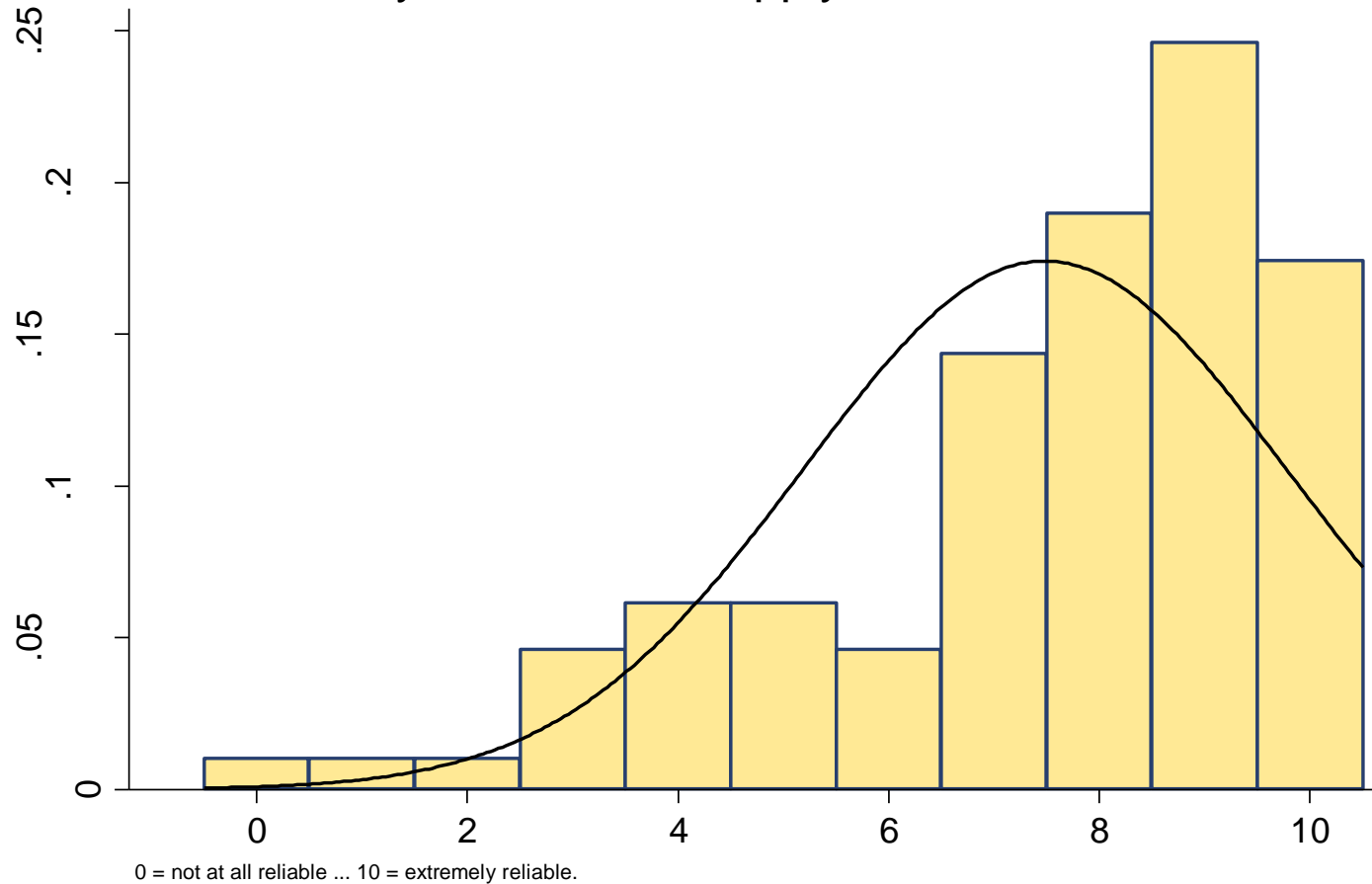
# Water Use and Irrigation

## Sources of water



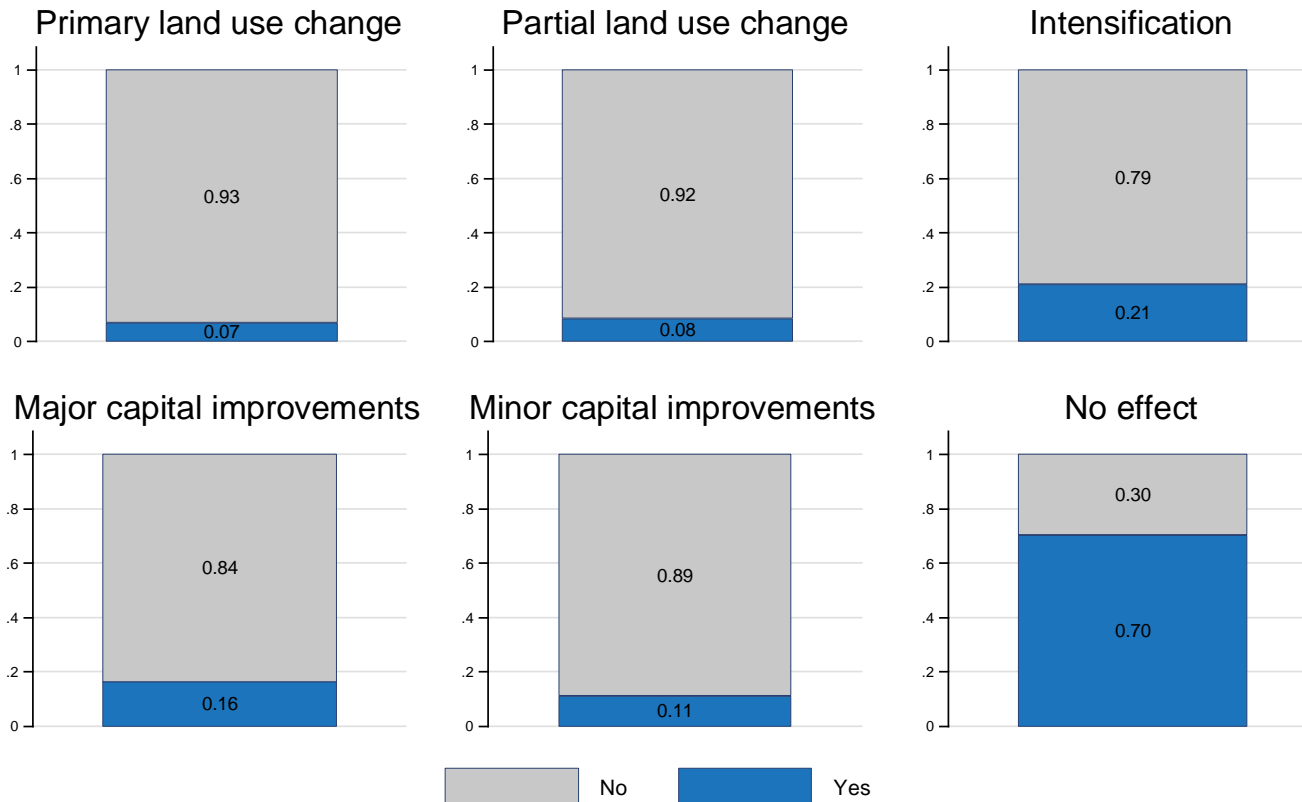
# Water Use and Irrigation

Reliability of the water supply for the farm business



# Water Use and Irrigation

Has uncertainty about water consents prevented changes to the farm business?

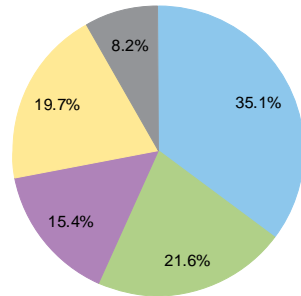


Conditional on having a consent and/or participating in an irrigation scheme.

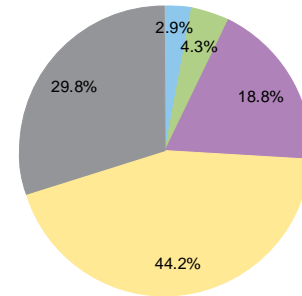
# Water Use and Irrigation

Expectation that consent for taking water will be renewed

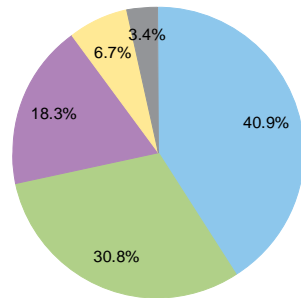
Renewed at higher level



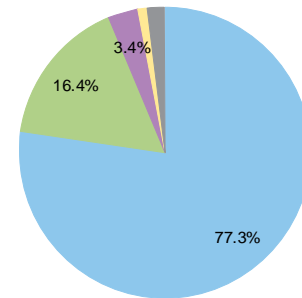
Renewed at same level



Renewed at lower level



Not renewed



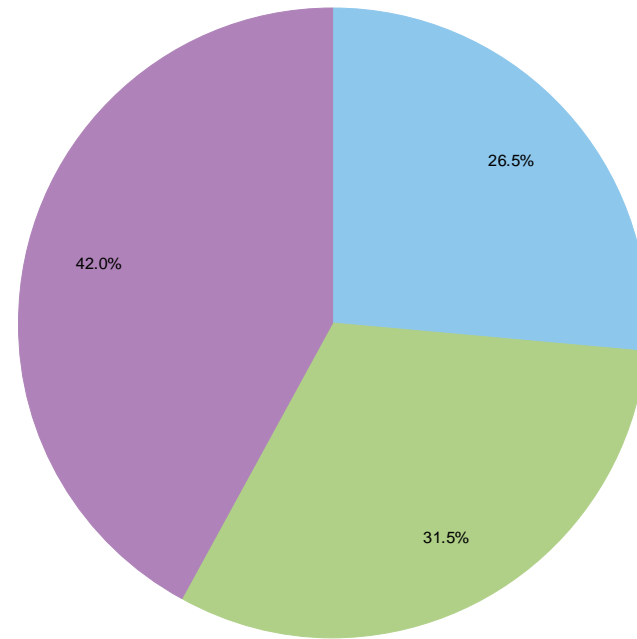
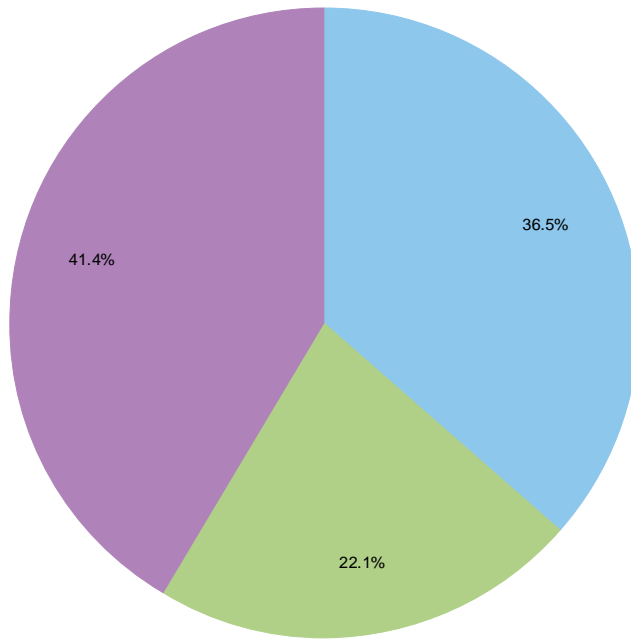
Conditional on having a consent and/or participating in an irrigation scheme.

# Water Use and Irrigation

Should transfers of water permits be allowed?

Temporary

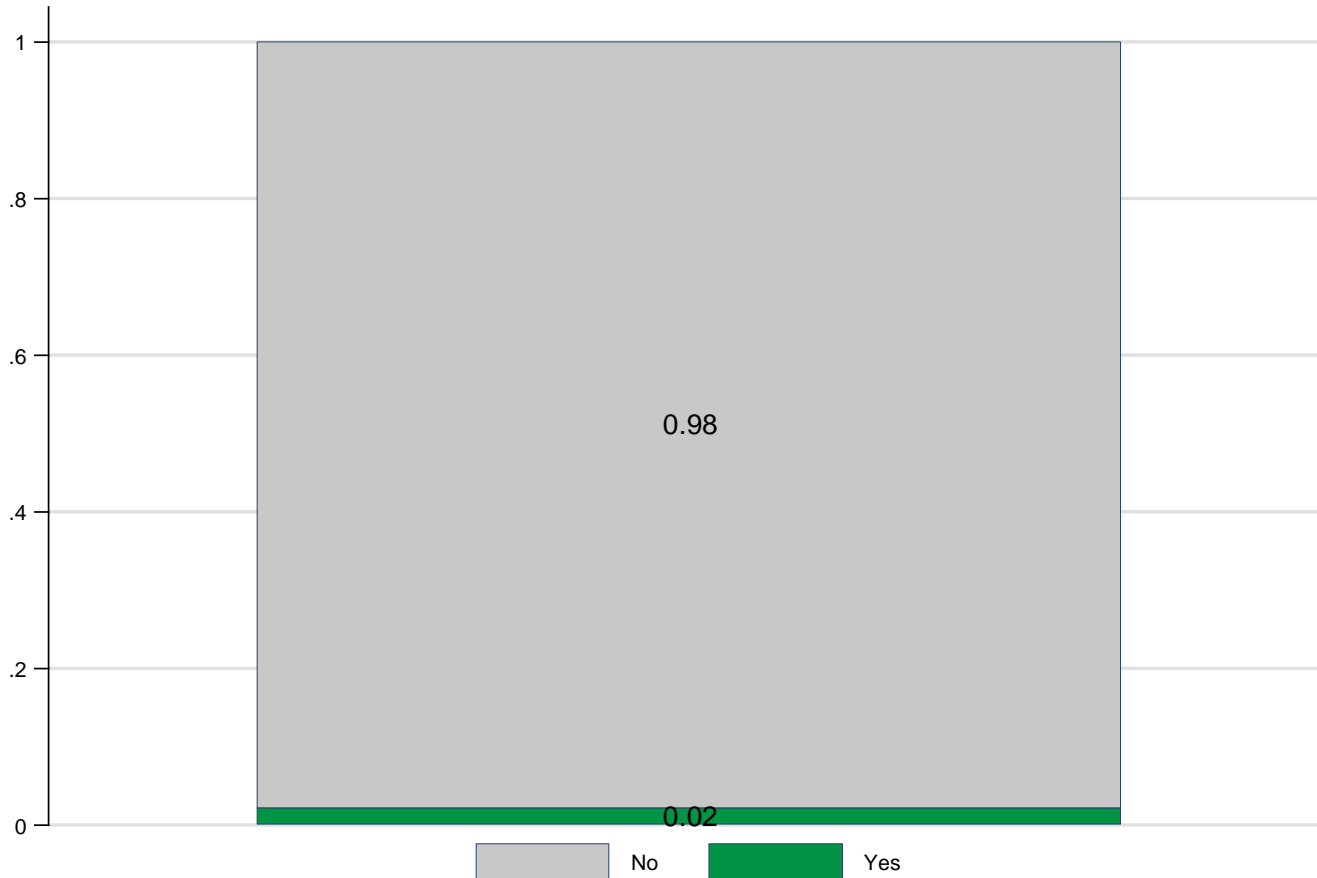
Permanent



Yes No Uncertain

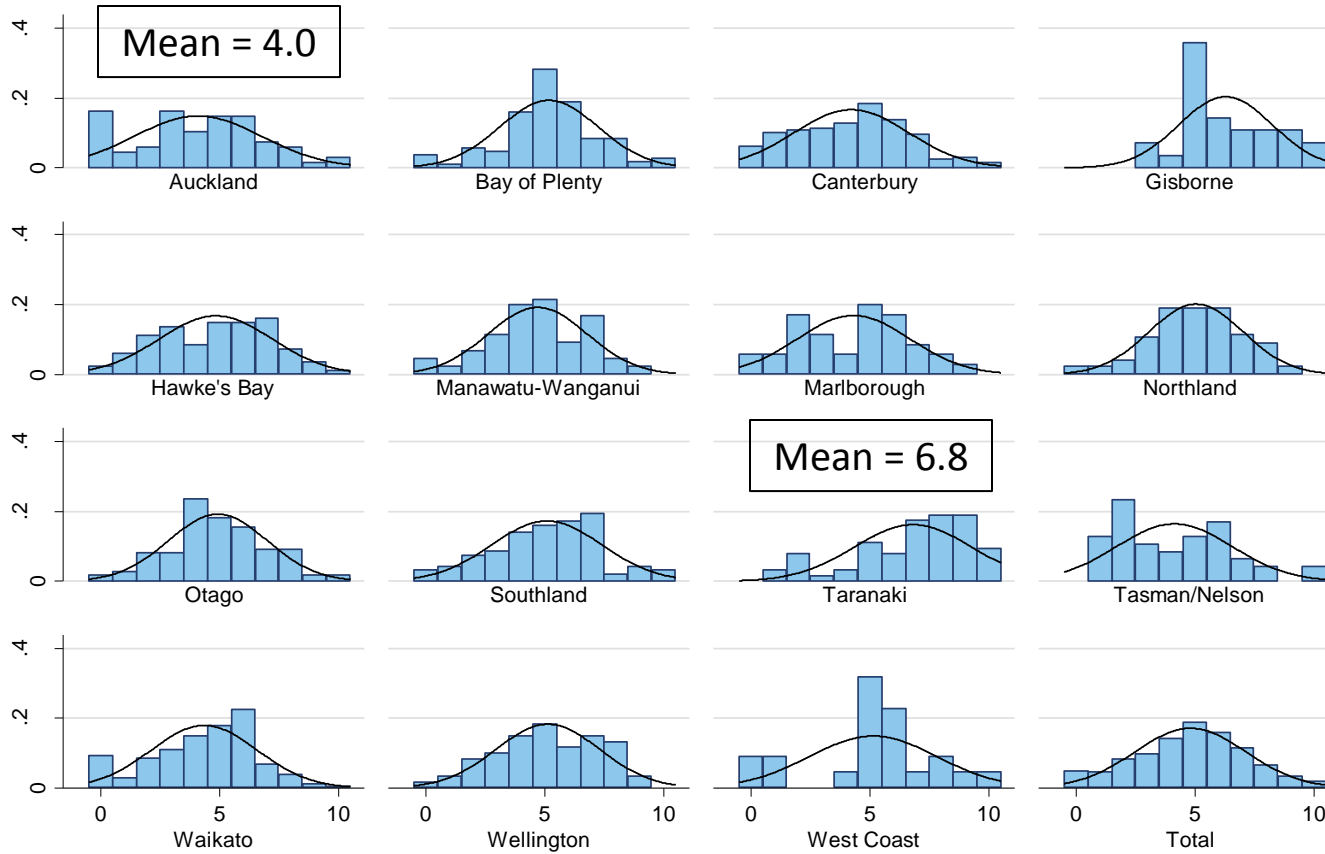
# Water Use and Irrigation

Has your farm transferred a water permit in the past?



# Water Use and Irrigation

## Council's effectiveness at managing water resources



0 = not at all effective ... 10 = extremely effective. Total shows the unweighted distribution.

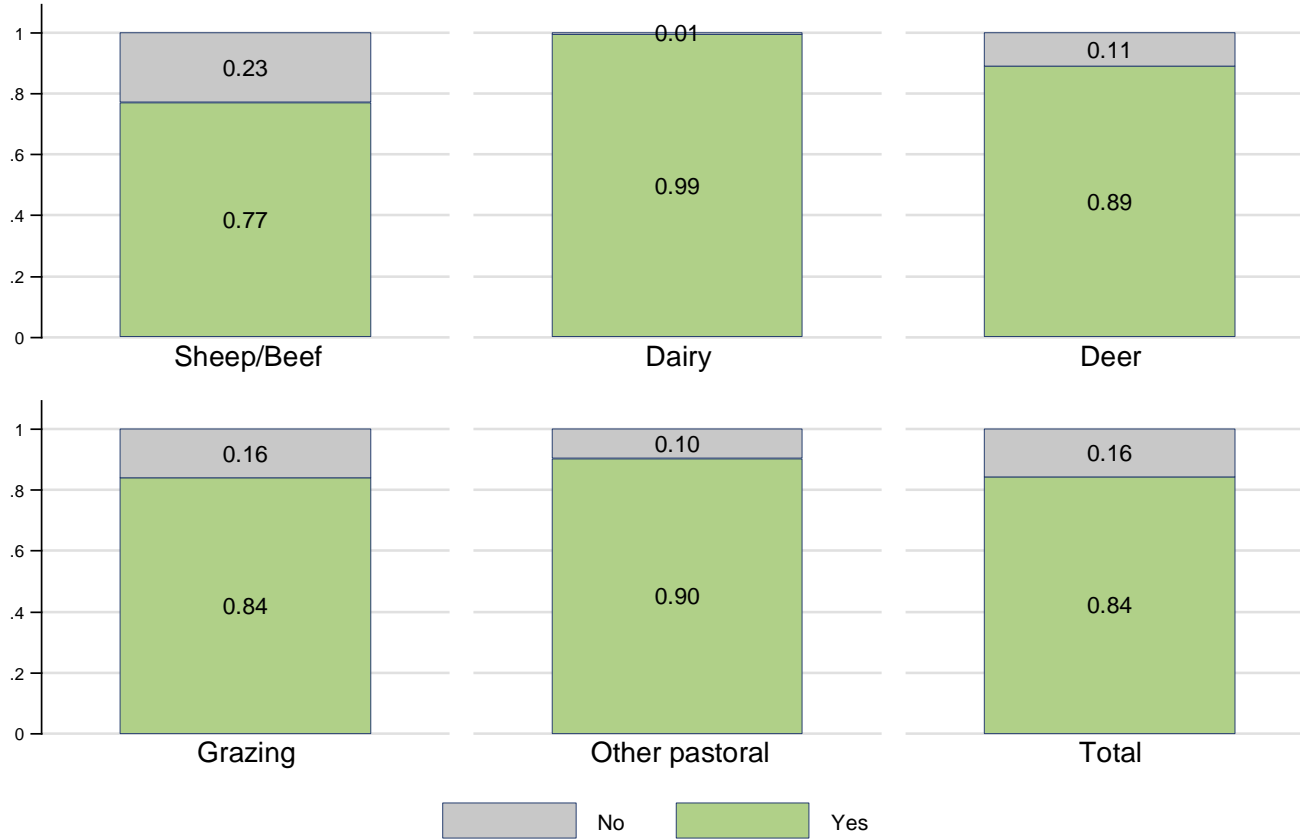
# Data Exploration

- Water use and irrigation
- **Stock exclusion**
- Age and decision making



# Stock Exclusion

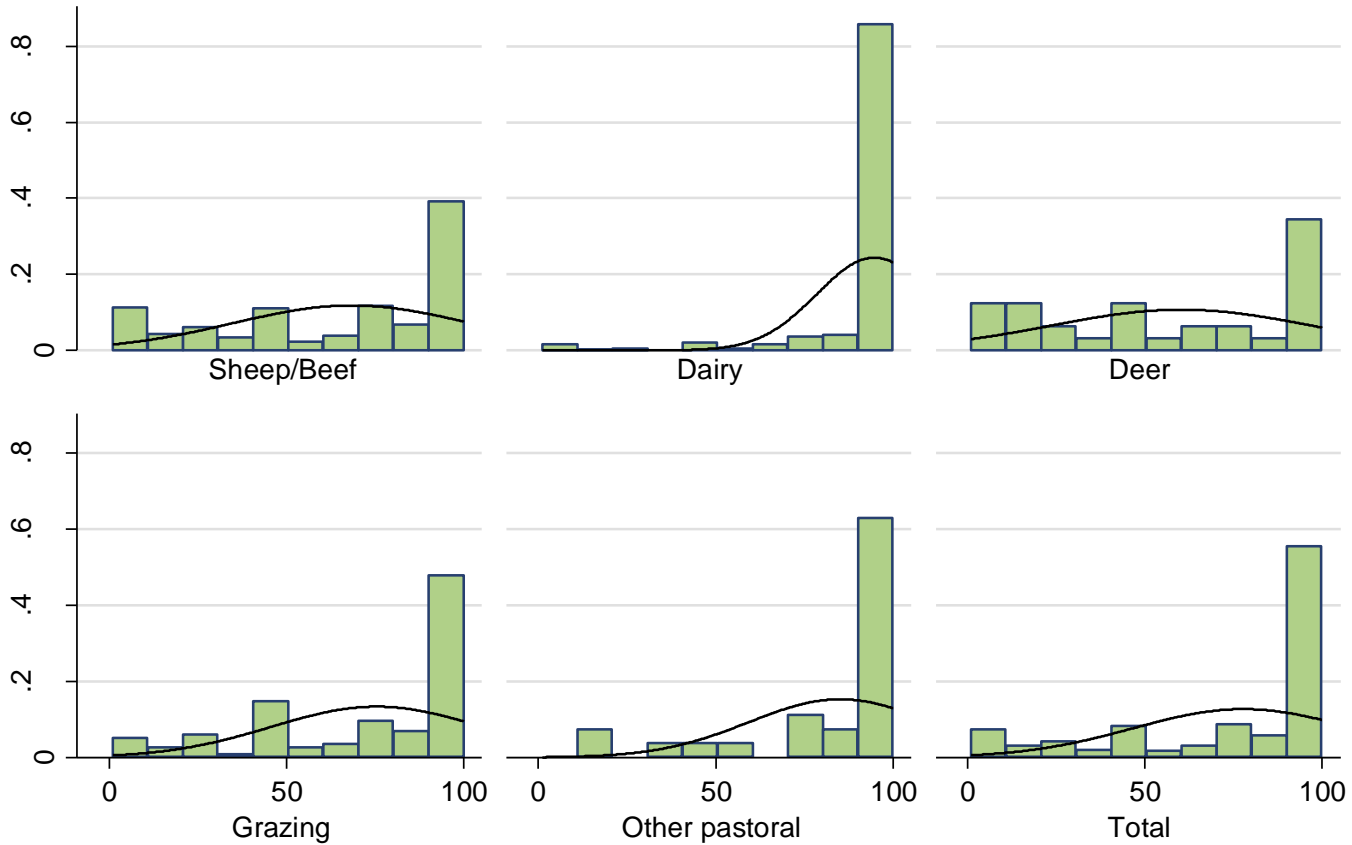
## Large streams are fenced



Among respondents with livestock.

# Stock Exclusion

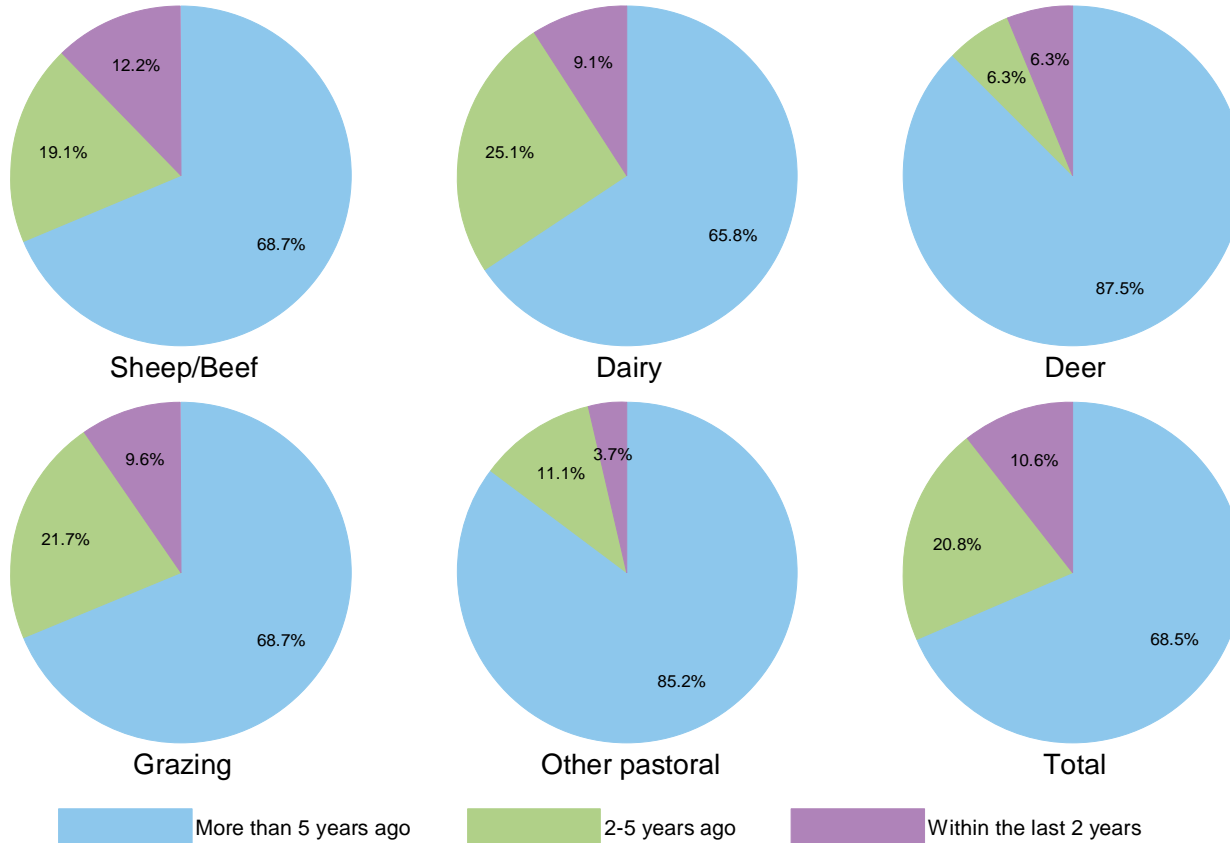
## Percent of large streams fenced



Among respondents with fenced streams. Total shows the unweighted distribution.

# Stock Exclusion

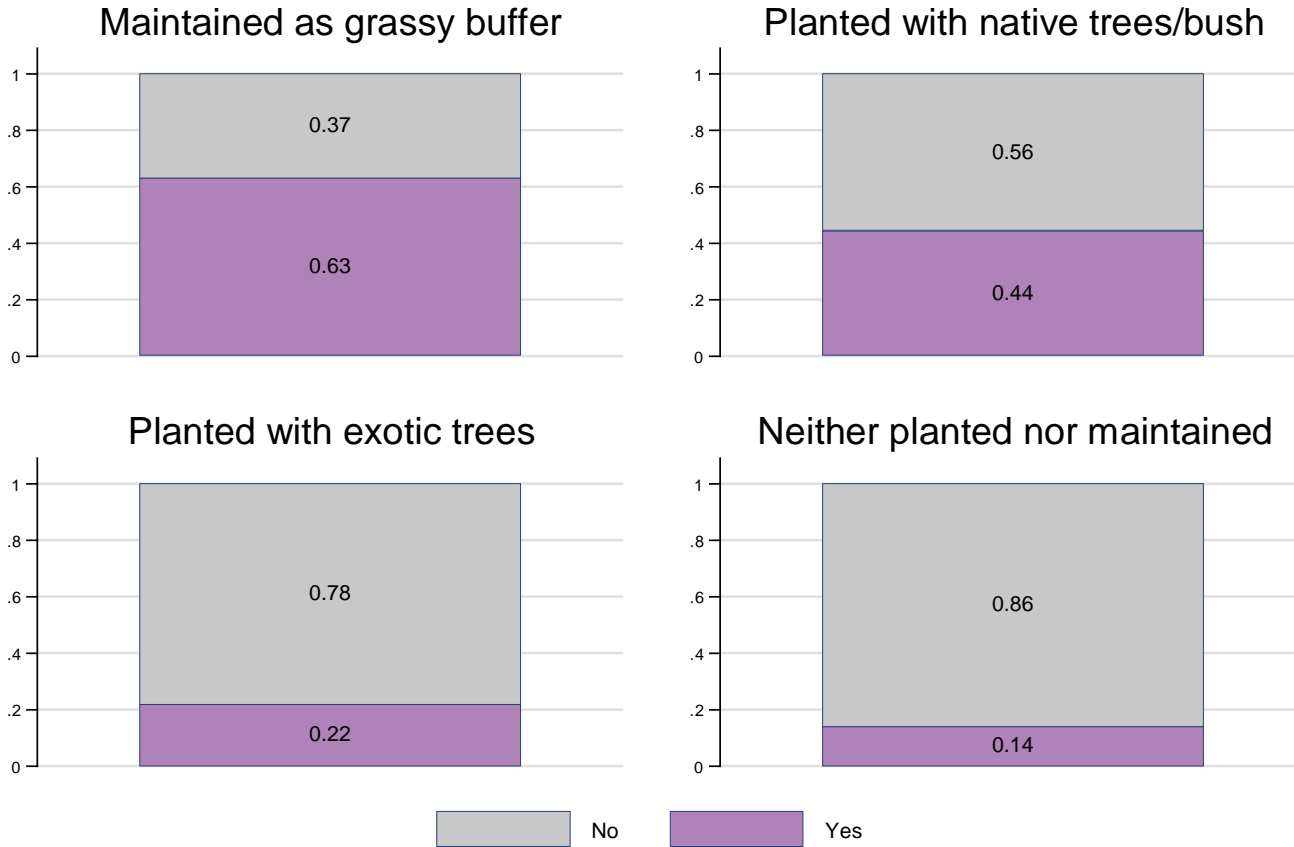
When were waterways on your farm first fenced?



Conditional on having fenced streams. Total is unweighted average.

# Stock Exclusion

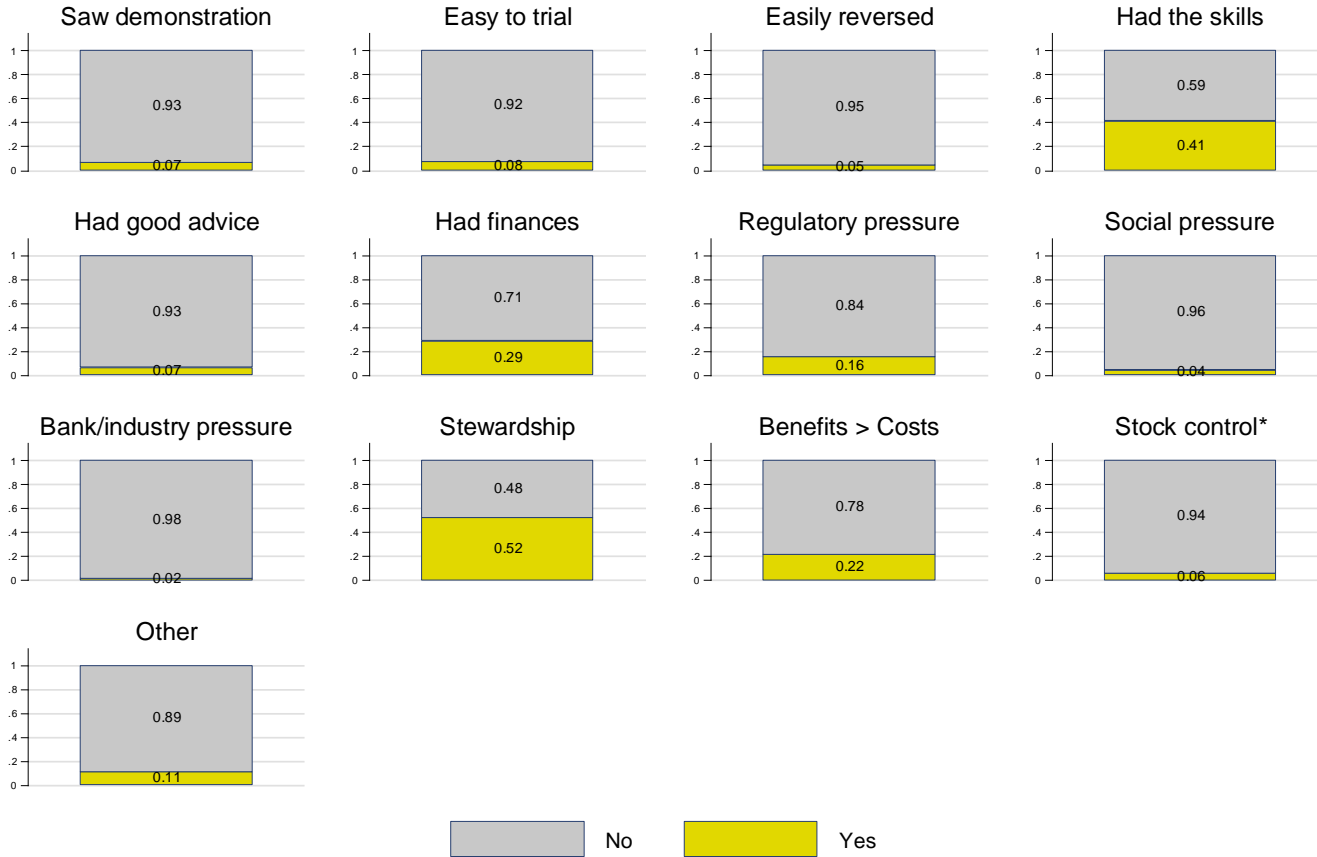
## Description of fenced waterways



Among respondents with fenced streams.

# Stock Exclusion

## Reasons for fencing large streams

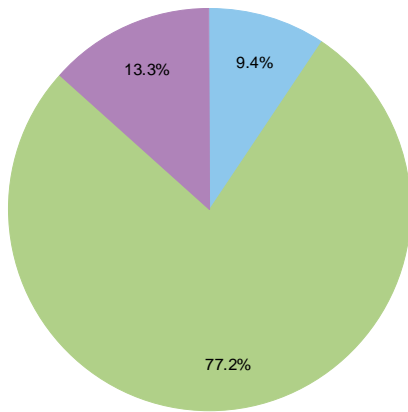


Among respondents who fence large streams. \* indicates common response recorded in 'other' category.

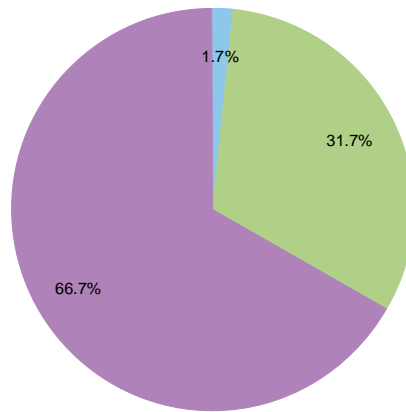
# Stock Exclusion

## Effect of fencing large streams

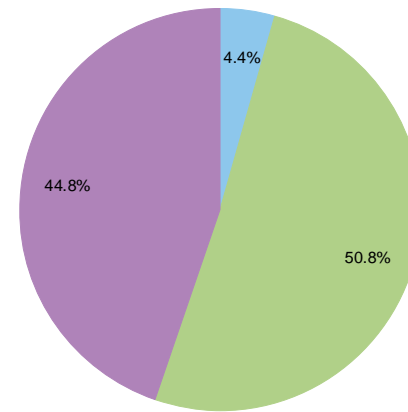
Finances



Environment



Lifestyle



Lower / worse      No change      Higher / better

Among respondents who fence large streams.

# Stock Exclusion

## Reasons for not fencing large streams

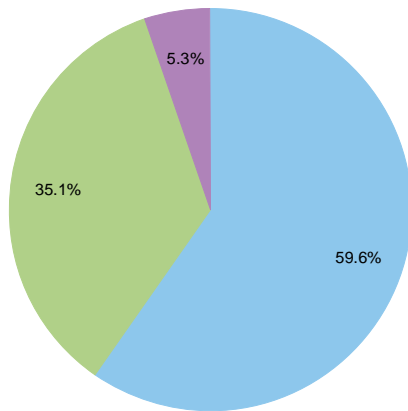


Among respondents who do not fence large streams. \* indicates common response recorded in 'other' category.

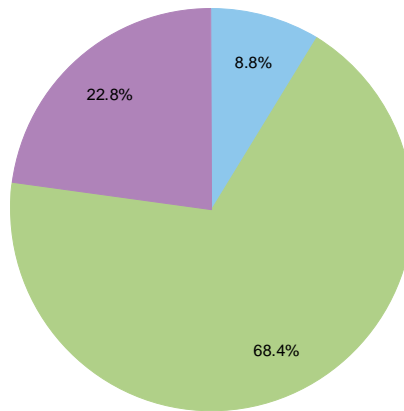
# Stock Exclusion

Effect of fencing large streams  
among those who have not done so

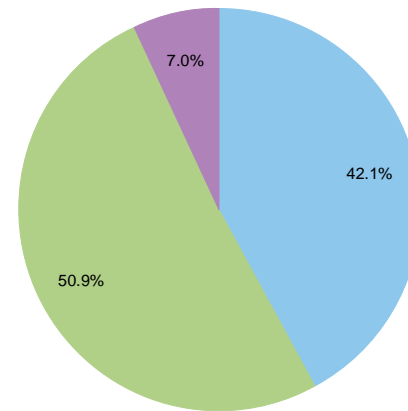
Finances



Environment



Lifestyle



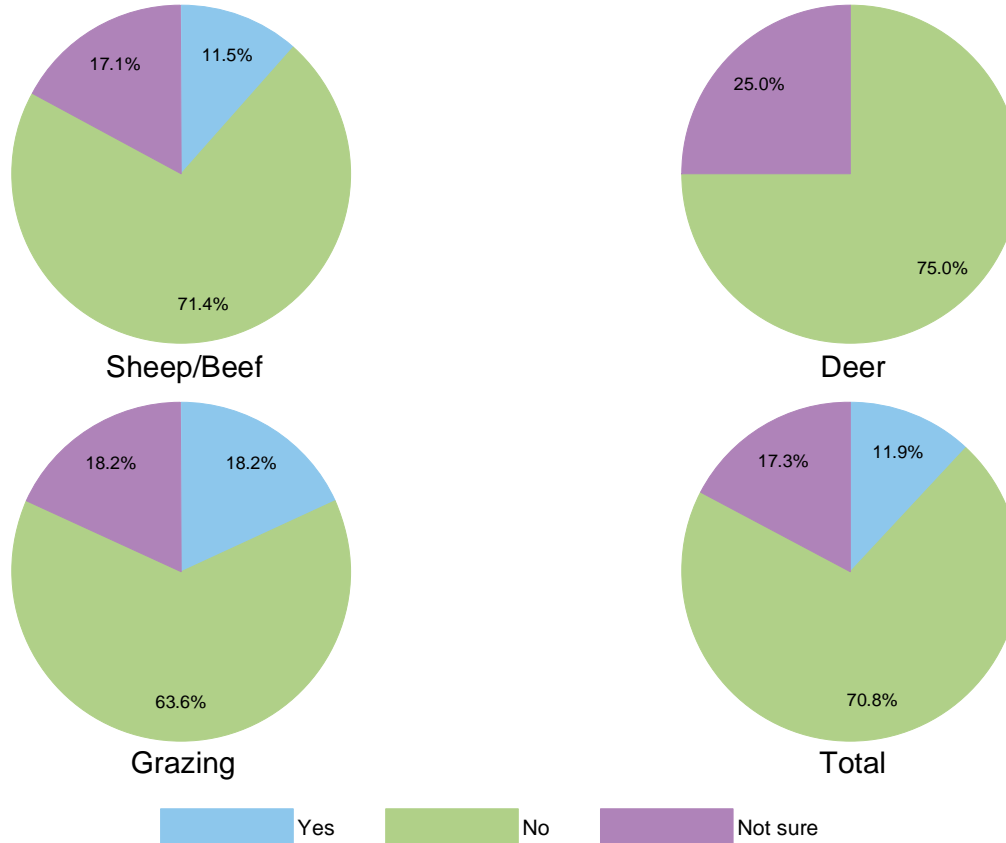
Lower / worse    No change    Higher / better

Among respondents who do not fence large streams.



# Stock Exclusion

Intend to fence large waterways in next 2 years



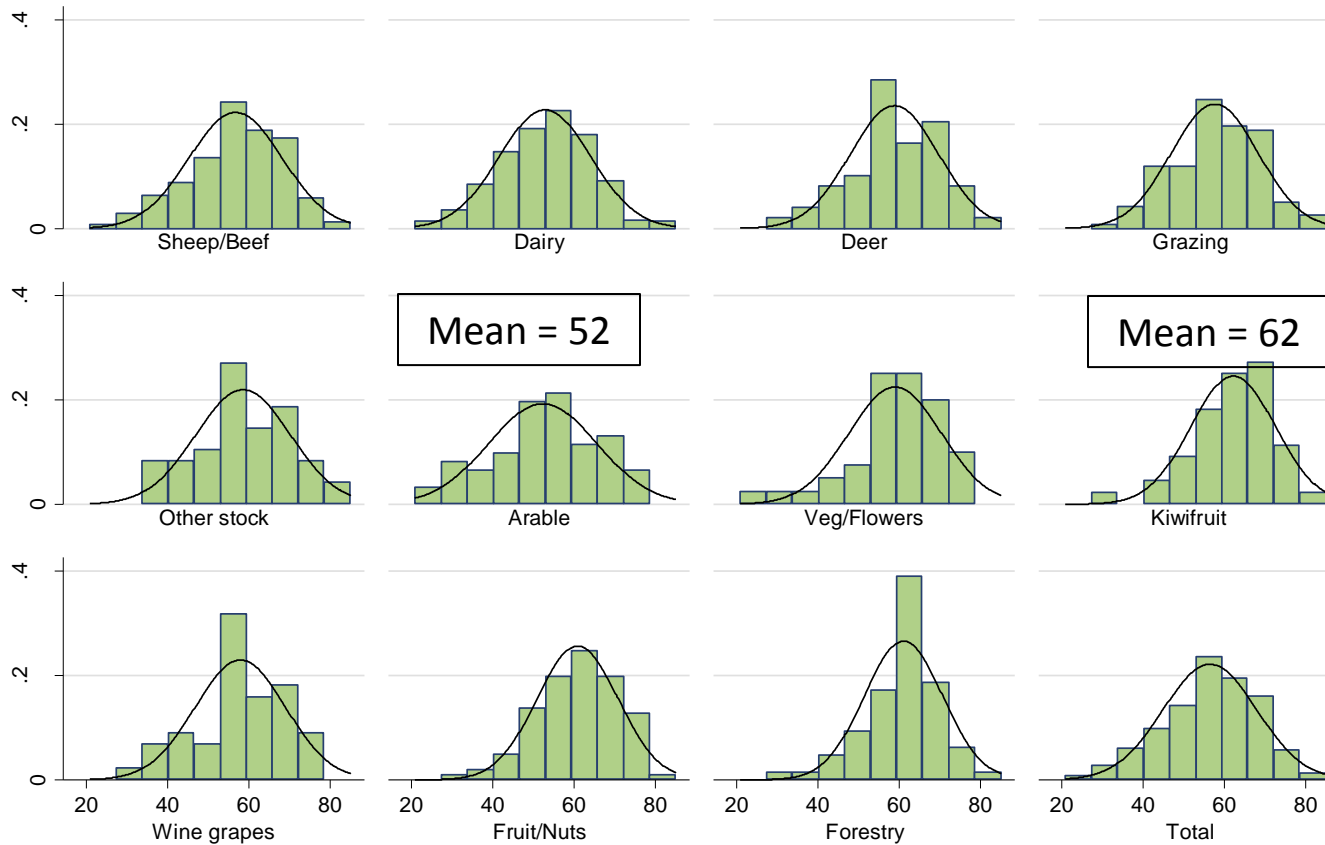
Conditional on having livestock and unfenced streams. Activities with few observations omitted. Total is unweighted average.

# Data Exploration

- Water use and irrigation
- Stock exclusion
- Age and decision making

# Age and decision making

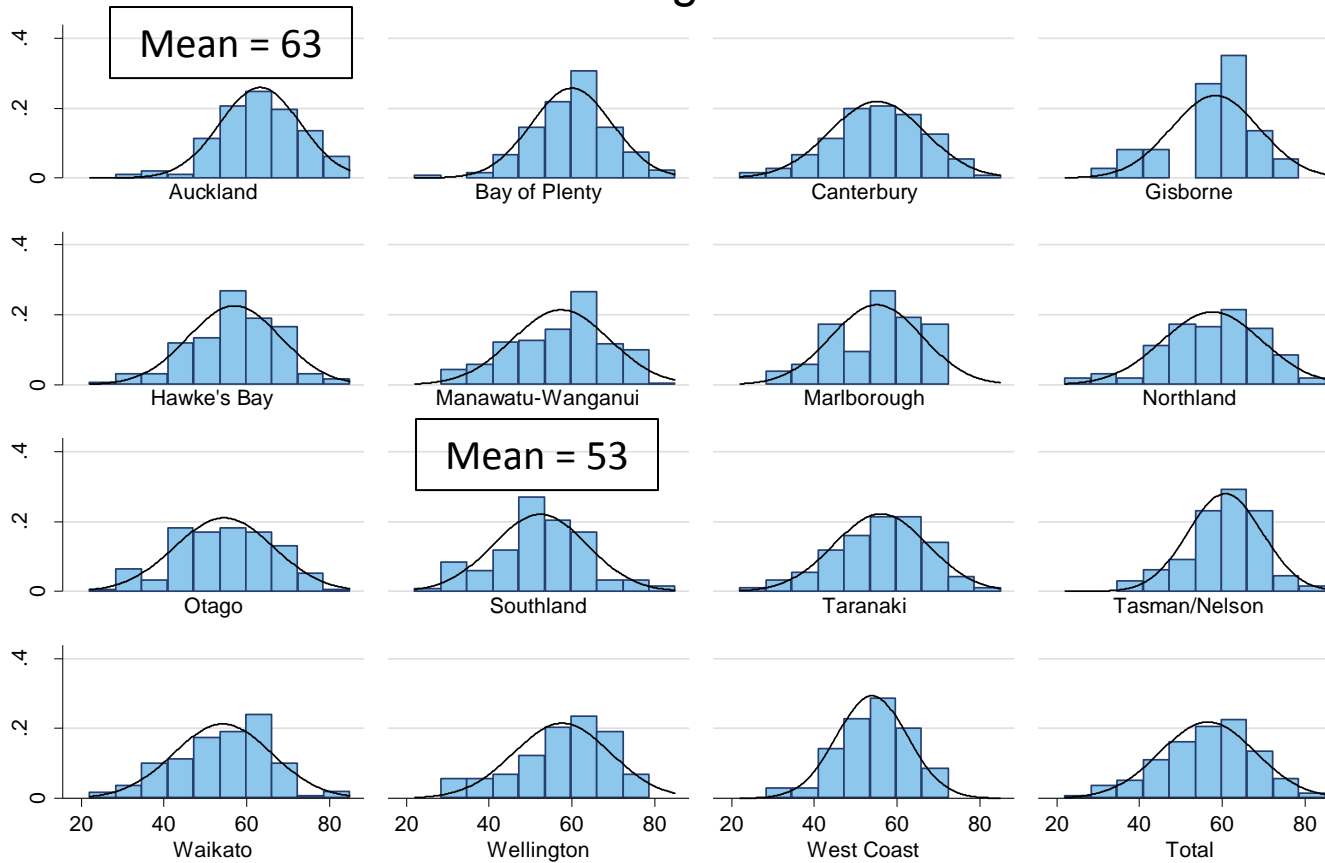
## Age



Total shows the unweighted distribution.

# Age and decision making

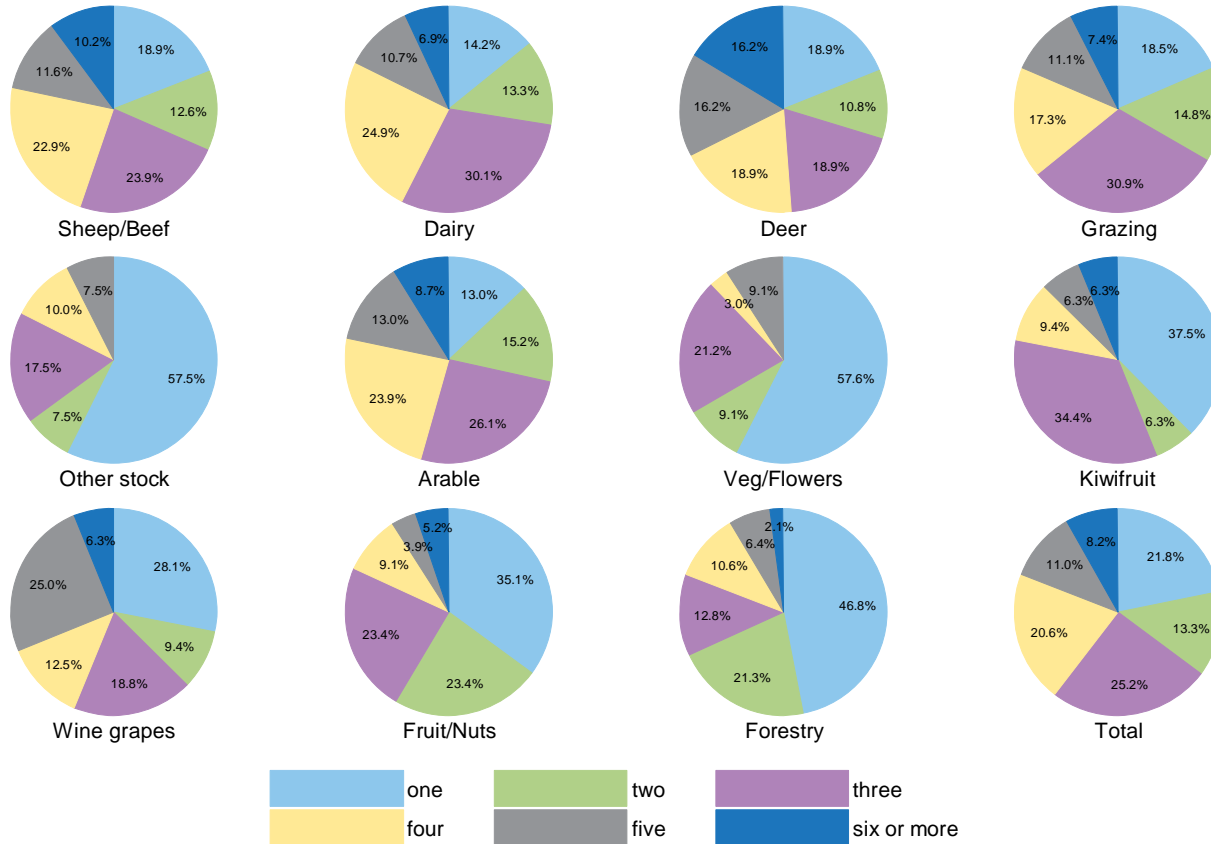
## Age



Total shows the unweighted distribution.

# Age and decision making

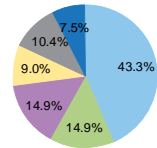
## Generations family has farmed in Aotearoa New Zealand



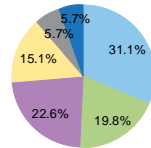
Total shows the unweighted distribution.

# Age and decision making

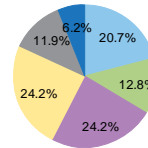
## Generations family has farmed in Aotearoa New Zealand



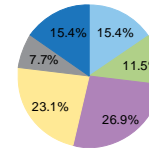
Auckland



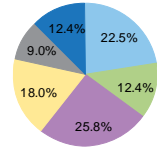
Bay of Plenty



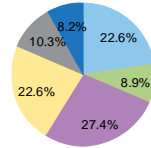
Canterbury



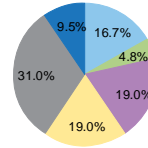
Gisborne



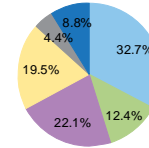
Hawke's Bay



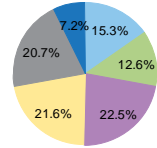
Manawatu-Wanganui



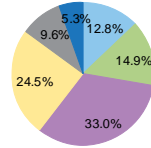
Marlborough



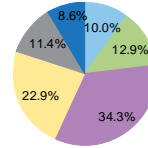
Northland



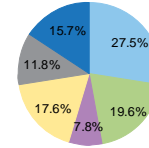
Otago



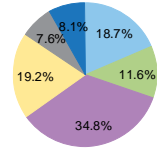
Southland



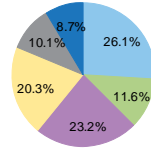
Taranaki



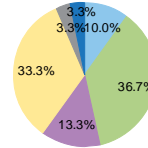
Tasman/Nelson



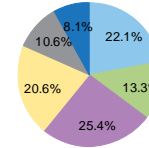
Waikato



Wellington



West Coast



Total



Total shows the unweighted distribution.

# Age and decision making

- Values
  - Willing to take risks
  - Prefers leaving experimenting to others
- Practice
  - Has adopted novel technologies
- Objectives
  - Prioritize financial performance
  - Prioritize environmental performance
- Future plans
  - Sell, subdivide, or lease
  - Intensify
  - Convert

Econometric analysis to control for gender, education, industry, region

# Age and decision making

- In general, how willing are you to take risks?

0 = do not like to take risks ... 10 = fully prepared to take risks



- I prefer leaving experimenting with new ideas to others.

0 = strongly disagree ... 10 = strongly agree



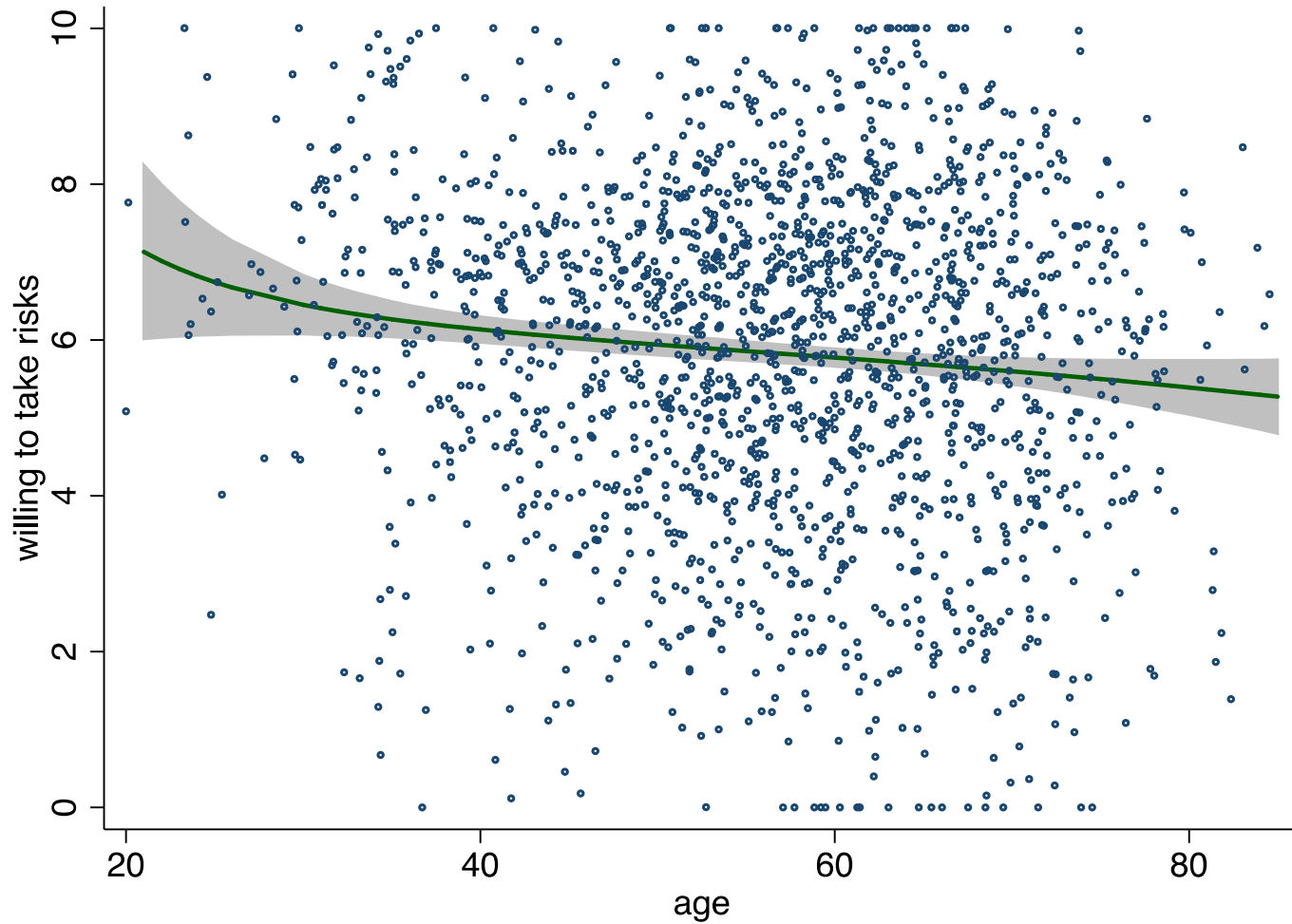


# Age and decision making

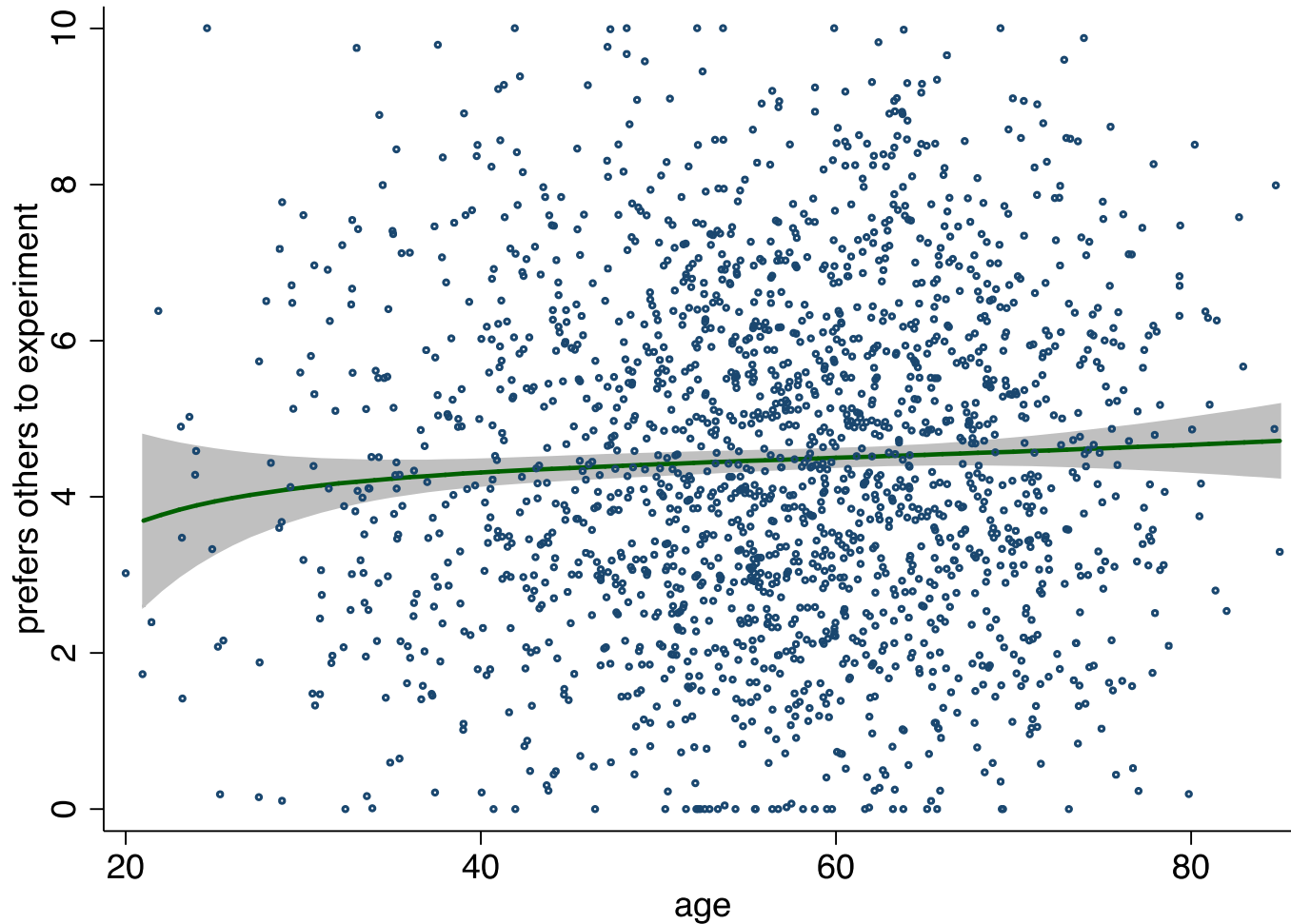
	<b>Willing to take risks</b>	<b>Prefer others to experiment</b>
ages 40-49	-0.560*** (-2.88)	0.180 (0.83)
ages 50-59	-0.517*** (-2.85)	0.0903 (0.46)
ages 60-69	-0.566*** (-2.98)	0.388* (1.92)
ages 70+	-1.152*** (-5.15)	0.573** (2.46)

*Tobit model with heteroskedasticity-robust SE  
t-statistics reported in parentheses*

# Age and decision making



# Age and decision making



# Age and decision making

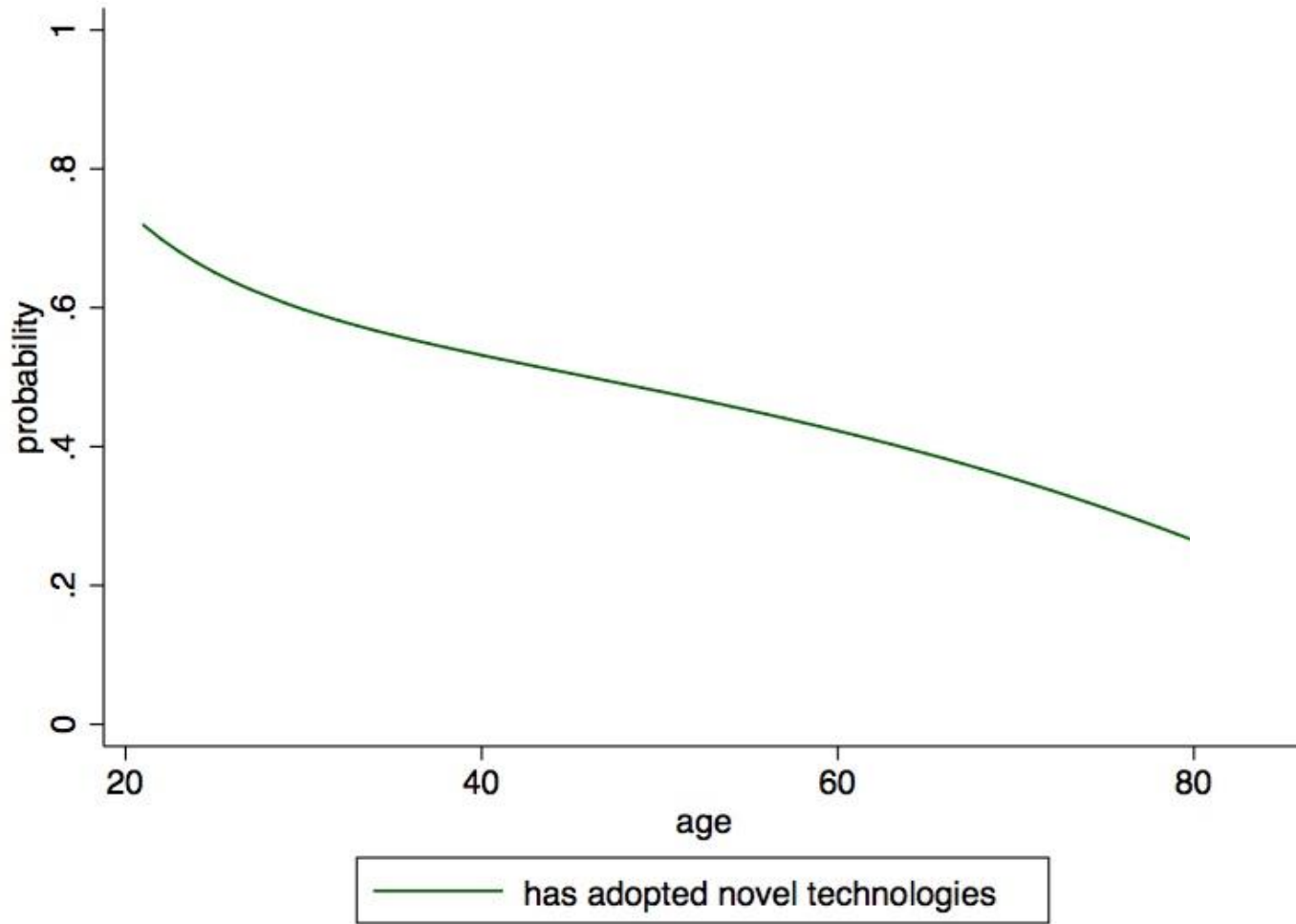
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	<b>Uses novel technologies</b>
ages 40-49	-0.0696 (-1.59)
ages 50-59	-0.0812** (-2.06)
ages 60-69	-0.144*** (-3.59)
ages 70+	-0.191*** (-3.98)

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*Logit model with heteroskedasticity-robust SE  
Marginal effects with z-statistics reported in parentheses*

# Age and decision making



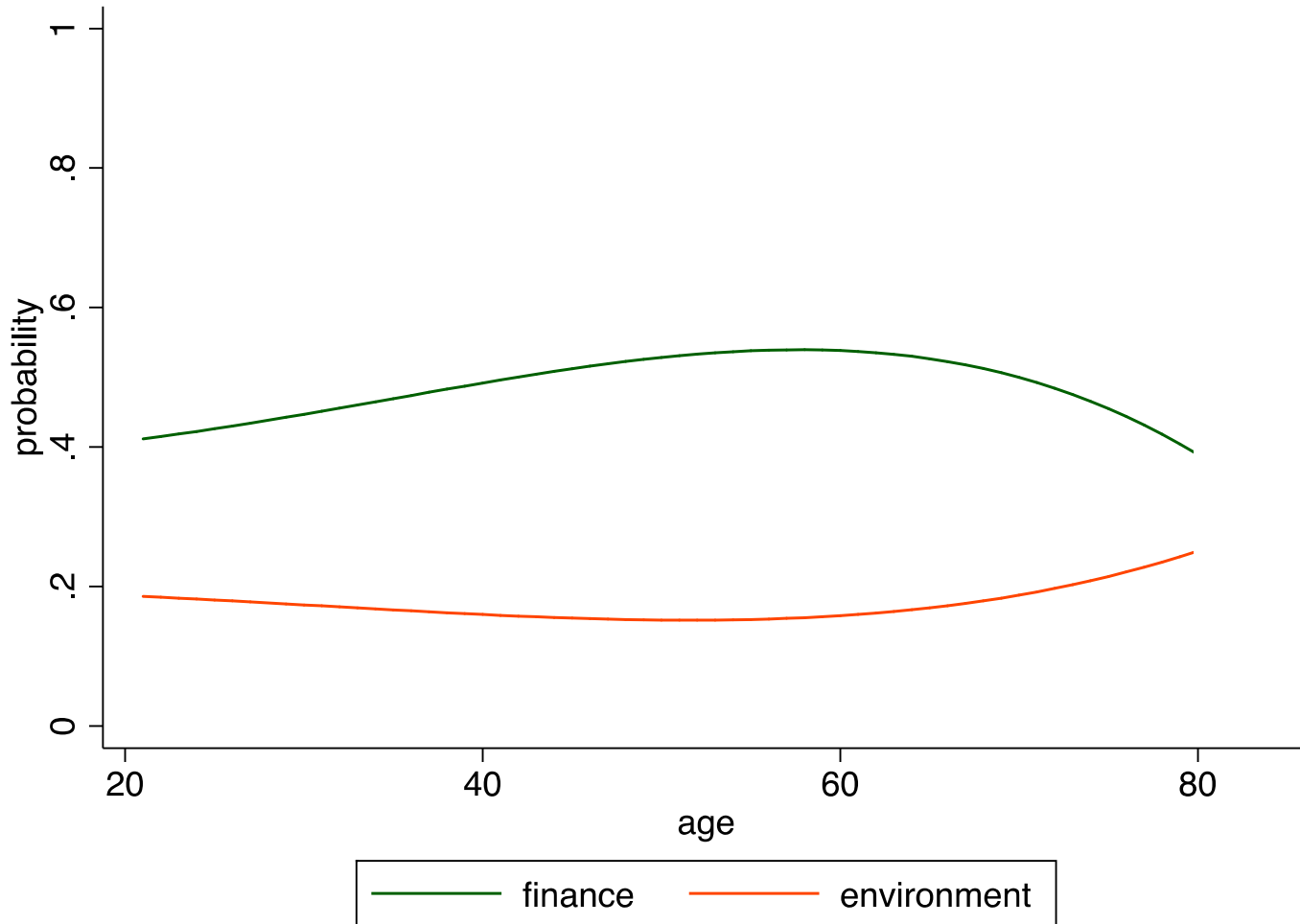
# Age and decision making

	<b>Prioritize financial performance</b>	<b>Prioritize environmental performance</b>
ages 40-49	0.0544 (1.14)	-0.0130 (-0.36)
ages 50-59	0.0739* (1.71)	0.0179 (0.55)
ages 60-69	0.0919** (2.09)	0.00468 (0.14)
ages 70+	0.0479 (0.93)	0.0362 (0.95)

*Logit model with heteroskedasticity-robust SE  
Marginal effects with z-statistics reported in parentheses*

Econometric analysis to control for  
gender, education, industry, region

# Age and decision making



# Age and decision making

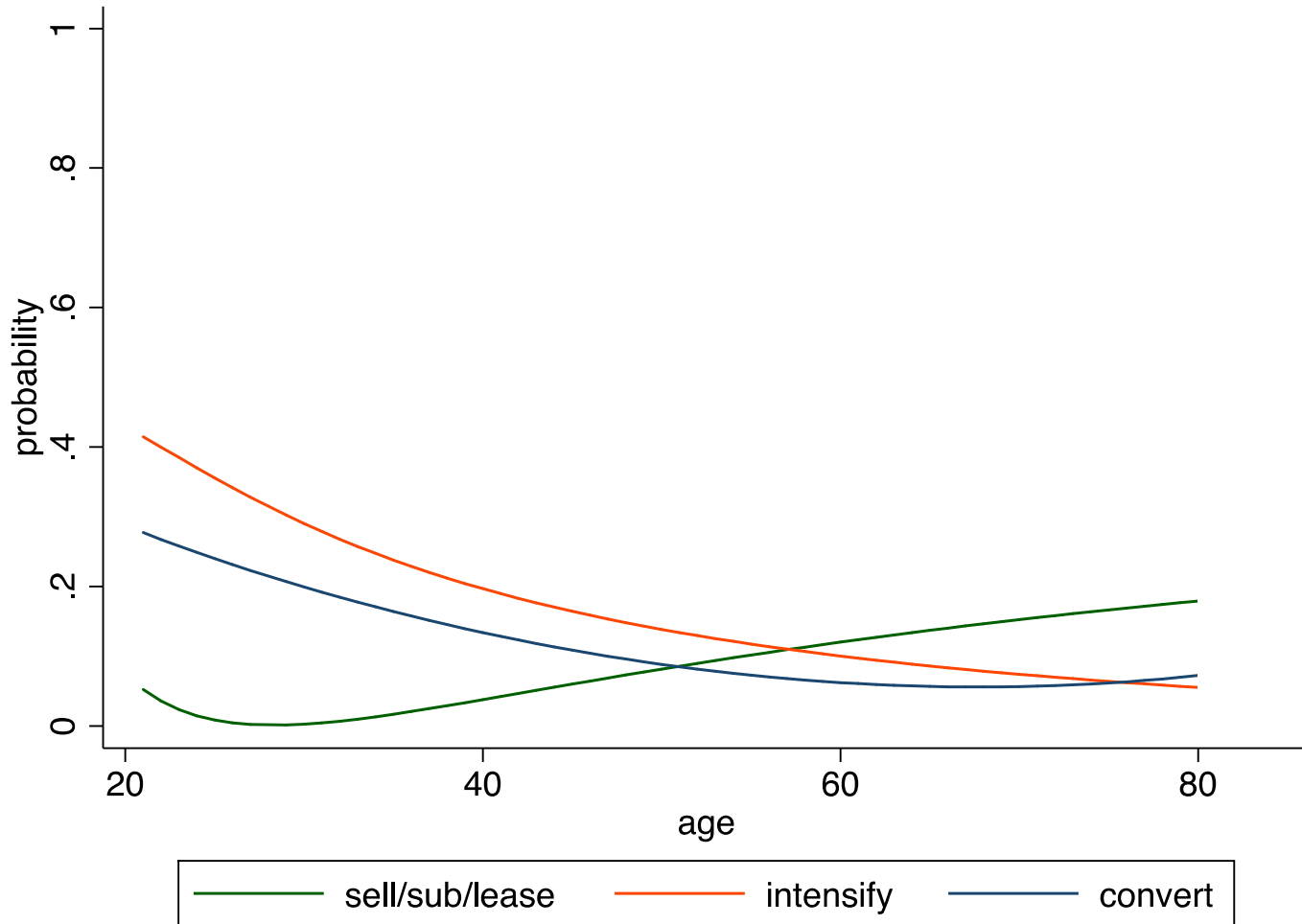
	<b>Plan to sell/sub/lease</b>	<b>Plan to intensify</b>	<b>Plan to convert</b>
ages 40-49	0.0783 (1.38)	-0.0512** (-2.12)	-0.0323 (-1.60)
ages 50-59	0.164*** (3.07)	-0.102*** (-4.55)	-0.0675*** (-3.43)
ages 60-69	0.169*** (3.20)	-0.119*** (-5.18)	-0.0925*** (-4.42)
ages 70+	0.192*** (3.53)	-0.212*** (-5.65)	-0.0956*** (-3.56)

*Logit model with heteroskedasticity-robust SE  
Marginal effects with z-statistics reported in parentheses*

Econometric analysis to control for  
gender, education, industry, region



# Age and decision making



# Rural Decision Makers SUR✓EY2015

- 288 questions
  - Wide variety of topics of interest
  - What, why, and how?
- ~3000 respondents
  - Commercial and lifestyle farming
  - All regions, all industries
- Available online and by contract



# What next?



- Results for 2015 SRDM Lifestyle
- Research papers and scientific articles
- Analysis for government and industry
- Linked surveys
- 2017 Survey of Rural Decision Makers





