LAND MANAGEMENT IN TASMANIA

RURAL LANDHOLDER SOCIAL BENCHMARKING REPORT 2023

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WITH

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DISCLAIMER

The views expressed in this report are the authors', and do not necessarily reflect the views of Southern Cross University, the Soil Cooperative Research Centre or the people consulted during the research project.

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LIST OF ACRONYMS

SCU – Southern Cross University

CSU – Charles Sturt University

Soil CRC – Soil Cooperative Research Centre

SFS – Southern Farming Systems

DIPWE/NRE – Department of Natural Resources and Environment

GIS – Geographic Information System

LGA – Local Government Area

NRM – Natural Resource Management

FTF - Full-time Farmer

PTF - Part-time Farmer

HF - Hobby Farmer

NF - Non-farmer

LEGEND

= Significant difference by Farmer Type

*** = Significant difference by Rainfall Zone

EXECUTIVE SUMMARY

The project, *Surveying On-Farm Practices*, was initiated in 2019 to implement surveys in partnership with local farming and NRM organisations across multiple Australian states, to provide accurate information for those supporting improved soil and land management. It will collate a dataset of national significance, showing both breadth and depth of information on factors involved in on-farm decision-making for Australian farmers. The project is led by Dr Hanabeth Luke of Southern Cross University (SCU) and funded by the Co-operative Research Centre for High Performance Soils (Soil CRC).

The overall survey design builds on the work of Professor Allan Curtis[1]. The general approach is that questionnaires are physically mailed to landholdings over ten hectares (10 ha) in the selected region, to either a systematic, random selection or everyone, depending on the region's population. Questions are asked regarding farmers' actual and intended practices, challenges, and aspirations. Important background information is also collected on farm management styles and farmer values and items that focus on self-assessed knowledge of, and confidence in, current recommended (best) practices and perceptions of risk.

Core questions relating to broad soil management principles and demographics remain consistent across regions to enable comparisons and the development of a nationally consistent dataset; however, our approach allows regional priorities to be explored in a number of customised questions. Each survey is customised through collaboration with regional partners to ensure local relevance.

The 2022 Tasmanian social benchmarking survey contributes to the national Soil CRC project. Southern Cross University researchers partnered with Charles Sturt University, NRM North, NRM South, Cradle Coast NRM, Southern Farming Systems and Rural Business Tasmania to develop and undertake the survey. Soil CRC Program 1 leader Professor Catherine Allan met with representatives of these groups in Campbell Town in February 2022. This workshop identified key topics and questions, with a focus on the complexities involved in decision-making about farms and land management, including: farmer attitudes, how risk-averse they may be and what drives them to change and improve their soil health. Also included was the perceived state of soil health and drivers of increased productivity, including carbon and biology, how soil testing takes place, what value-adding was taking place, and what regional interest there may be in regenerative agriculture. A questionnaire was drafted and piloted with Catherine Allan as facilitator, with local partners and a small group of rural landholders. Some minor revsions were made following this.

The final questionnaire is presented in Appendix 2. In mid-2022, a survey booklet was mailed to a sample of 2000 rural property owners holding land in Tasmania over 10ha in size. Following removal

[1] Curtis, A., & Luke, H. (2019). Social benchmarking for natural resource management: 2019 North Central Victoria. Southern Cross University, NSW, 2480.

of return to senders and opt-outs, the final sample size was 1217, of which 424 questionnaires were returned, resulting in a solid response rate of 35%.

Demographic and descriptive characteristics were collected to contextualise responses including general personal and property information e.g. property size, absentee ownership, as well as asking respondents to identify as full-time, part-time, hobby farmers, or non-farmers. This background information was used to check for sampling bias and to enable correlations to be sought between contextual variables and practice change.

The results show that while there was a range of enterprises and land use mixes, the most common land use was sheep and beef (44% & 31%, respectively). Forty-five percent used the land for pastures, 34% for horticulture and less than 10% of landholders were cropping.

Management of soil health was most often through soil testing, lime applications, maintaining groundcover at 70% minimum and planting perennial pastures. Overall, the data indicates a strong personal responsibility to maintain the productivity of soil where soil testing to understand soil condition is an essential step, particularly among full-time farmers. Just over half of Tasmanian full-time and part-time farmers believe that the benefits of stubble retention outweigh problems arising from the practice (61% and 53%).

While 94% of full-time farmers agreed that soil testing is an essential step in understanding soil condition, the frequency of testing varied greatly. For example, when (FT, PT) landholders were asked how often soil testing was performed on their property, 61% indicated that they tested every 3 – 5 years; 27% at least annually; 8% once ever; with 5% having never completed any soil testing. Of the full-time farmer group, 32% tested annually, 57% tested every 3-5 years, with most (83%) concentrating on soil testing systematically in multiple paddocks.

The top four issues for commercial farmers in the region were: 'water security (82%); declining soil health/ soil productivity' (72%); 'public support/opposition for agricultural practices (e.g. GMs, animal welfare, pesticide use)' (70%) and 'changes in weather patterns' (68%). Issues such as costs of inputs, land, and machinery were also seen as a big challenge to farmers. A very important issue in Tasmania is the impact of pest plants or animals (across all four landholder types 63 - 68%).

Importantly, 87% of property holders and 91% of full-time farmers reported being open to new ideas about farming and land management. However, 70% of landholders in the region stated they will not take risks if their intuition says 'no'. Furthermore, they trust their intuition over other information when risk is involved (63%). Half of full-time farmers surveyed were interested in learning more about regenerative farming approaches. Just 35% considered themselves to be an early adopter of new agricultural practices and technologies.

When asked to nominate what they saw as their biggest challenge or opportunity in the next ten years, the strongest emergent theme was that of climate change. Many farmers were cognisant of the seasonal variability linked to climate change focusing on a broad range of issues such as drought and water storage, with some highlighting the need to adapt to climate change and to take such actions as "drought-proofing the farm". The second most common challenge highlighted was that of aging, pending retirement, farm succession and health.

1. INTRODUCTION

A national project, *Surveying On-Farm Practices*, was initiated in 2019 to implement surveys in partnership with local farming organisations across multiple Australian states, to provide accurate information to support improved soil and land management. The project is collating a dataset of national significance, showing both breadth and depth of information on the factors involved in on-farm decision-making for Australian farmers. The project is led by Dr Hanabeth Luke of Southern Cross University (SCU) and funded by the Cooperative Research Centre for High Performance Soils (Soil CRC). The research team includes social scientists from Southern Cross University and Charles Sturt University.

Data gathered will support the activities of local Soil CRC partners while contributing to the broader Soil CRC research portfolio. Leveraging the insights from in-depth landholder surveys, Soil CRC researchers will be able to explore farmer knowledge of soil health and management, the impact of farmer participation in soil health groups, and the implementation of best practice soil management by farmers. Similar surveys funded by the Soil CRC have been developed in Victoria, South Australia, Western Australia and New South Wales.

The survey methodology draws on a widely accepted approach to social benchmarking for regional land and natural resource management developed by Professor Allan Curtis[2]. This survey-based methodology has previously been applied across Australia, including as part of the Australian Government's National Action Plan for Salinity and Water Quality, with case studies in Victoria, New South Wales and Queensland.

The general survey approach is that questionnaires are physically mailed to landholders in a region over ten hectares (10 ha) in size, to either a random selection or all landholders in low population areas that are linked to cadastral lists that enable spatial analysis and display of data. The surveys include questions on farmers' actual and intended practices, challenges, and aspirations. Important background information is also collected on-farm management styles and farmer values and items that focus on self-assessed knowledge of, and confidence in, best practices and perceptions of risk (Curtis and Luke 2019[3]).

Having spatially referenced data means that we can show social, economic and environmental trends spatially across the region. Our data can also be cross-referenced with other spatial data such as soil type and rainfall.

[2] Curtis, A., Byron, I., & MacKay, J. (2005). Integrating socio-economic and biophysical data to underpin collaborative watershed management. *Journal of the American Water Resources Association, 41*(3), 549-563.
[3] Curtis, A., & Luke, H. (2019). Social benchmarking for natural resource management: 2019 North Central Victoria. Southern Cross University, NSW, 2480

1.1 CONCEPTUAL FRAMEWORK

The conceptual underpinning of this study recognises that the drivers of human behaviour and decision-making are complex, multi-layered and interlinked. This requires careful consideration when seeking to support practice change in the context of rural land management. Drivers of practice change include governance frameworks, weather, property prices and demographic factors. This includes what farmers view as important, their knowledge of 'best-practice' and how they perceive their own role as landholders. In the absence of well-understood causal relationships between decision-making drivers, the potential success of practice change support is diminished.

While values, beliefs and personal norms (i.e., accepted behaviour and decision-making patterns) may mediate or moderate some of these other factors, it is difficult to change these deep-seated personal attributes in the short or medium term. Nevertheless, it is essential to understand the values and beliefs of landowners if they are to be effectively engaged. Values-Belief-Norm Theory (VBN) is a theoretical approach developed and applied to explain the relationship between values and behaviour, particularly regarding human-environment interactions and land management.

In short, landholder values and beliefs may be difficult to change but are extremely important to understand for effective engagement. The two main elements of this we explore in the survey are: 'assigned values' and 'held values', both of which are deemed important for guiding personal action[4]. 'Held', or 'intrinsic' values, are ideas or principles that people hold as important to them and may be abstract and conceptual,[5] whereas we describe 'assigned' or 'attached values' as those values landholders attach to their land and farm.

Value orientations are the position a person takes when a particular set of held values are more important to them than other held values[6]. It is important to note that individuals can simultaneously have more than one value orientation[7].

Practical strategies to encourage investment in current recommended practice (CRP) and new innovations can be improved by identifying a number of 'levers' to effect change[7]. If a landholder does not know of or understand an approach, technology or practice, it is unlikely that they will invest in it. If they are aware of the practice or innovation but have little confidence in its effectiveness, they are unlikely to adopt it. If they view it as too expensive or time-consuming to implement, they are also unlikely to take it up. Therefore, the survey must identify both knowledge of, and confidence in, relevant best-practice land and farm management[7].

It is also helpful to identify personal 'norms,' or the level of personal responsibility that landholders feel towards managing their soil, land and farm. Personal norms concerning risk-taking are essential

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[4] Lockwood, M. (1999). Humans Valuing Nature: Synthesising Insights from Philosophy, Psychology and Economics. *Environmental Values*, 8(3), 381-401.
[5] McIntyre, N., Moore, J., & Yuan, M. (2008). A place-based, values centred approach to managing recreation on Canadian crown lands. *Society & Natural Resources*, 21, 657-670.
[6] Axelrod, L. J. (1994). Balancing personal needs with environmental preservation: identifying the values that guide decisions in ecological dilemmas. *Journal of Social Issues, 50*(3), 85-104.
[7] Lockwood, M. (1999). Humans Valuing Nature: Synthesising Insights from Philosophy, Psychology and Economics. Environmental Values, 8(3), 381-401; Stern, P. C. (2000). Toward a coherent theory of environmentally significant behaviour. Journal of Social Issues, 56(3), 407-424.

predictors of adoption, where those with a higher risk tolerance are more likely to implementpractice change[8].

The next step is identifying the most effective 'extension' or information-sharing approaches, processes or platforms for engaging rural property owners in learning, dialogue and action. In identifying these approaches, it is also important to understand how landholders perceive and trust their local and regional organisations[9].

Landholder types present a useful way to see how different priorities influence landholder management practices. This questionnaire asked whether the respondents identified themselves as a full-time farmer, part-time farmer, hobby farmer or non-farmer. This typology was developed by Groth et al. (2014), has been published in peer-reviewed academic journals[10], and has been applied in all phases of this Soil CRC project[11].

1.1 SURVEY DEVELOPMENT

The important topics and priorities relevant to Tasmania (Figure 1) were 'co-produced' in a facilitated workshop led by Professor Catherine Allan with Tasmanian NRM staff Ali Dugand, Helen Truscott and Tom O'Malley from the Cradle Coast Authority; Andrew Baldwin from NRM North, James Stronach from NRM South; Darren Kidd from NRE Tasmania; Naomi Hender from Southern Farming Systems; and Lovisa Stagoll and John Dunbar of Rural Business Tasmania (Figure 1).

This group discussed key topics and questions to inform survey development. A list of issues farmers face that are relevant to Tasmanian conditions was prepared. Issues included having a large variety of crops and enterprise types, trending towards more cropping over pastures. An increasing reliance on technology and equipment was also raised. A major theme discussed was the complexities of decision-making in farming and land management. These include the role of farmers as business and land managers; how production goals are balanced with good soil and land stewardship; as well as how landholders manage uncertainty, farm planning and succession. There was also a priority to better understand the mechanisms by which landholders access information on climate change, finance and soil management challenges such as waterlogging, salinity, erosion, biology, and how to build soils rather than 'mine' them. The constraints on accessing and applying this information were also discussed, including time in the sector; who landholders trust; their motivations; perceptions of risk; data collection and interpretation skills, and confidence in the implementation of innovations/best-practices.

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[8] Curtis, A., & Luke, H. (2019). Social benchmarking for natural resource management: 2019 North Central Victoria. Southern Cross University, NSW, 2480.

[9] Luke, H. (2017). Social resistance to coal seam gas development in the Northern Rivers region of Eastern Australia: Proposing a diamond model of social license to operate. *Land Use Policy*, 69, 266–280.

[10] Groth, T. M., Curtis, A., Mendham, E., & Toman, E. (2014). Farmer identity in multifunctional landscapes: using a collective identity construct to explore the nature and impact of occupational identity. *Australian Geographer,* 45(1), 71-86; Groth, T., Curtis, A., Mendham, E. A., & Toman, E. (2016). The utility of a collective identity construct to explore the influence of farming identity on natural resource management. *Society and Natural* Resources 29(5) 508-602; Groth, T., and Curtis, A. (2017). Mapping farmer identity. Why? How? What it tells us? *Australian Geographer,* 48:3, 365-383.

[11] Curtis, A., & Luke, H. (2019). Social benchmarking for natural resource management: 2019 North Central Victoria. Southern Cross University, NSW.

A list of priorities was summarised into five main topics:

A) Profile of farming in Tasmania
B) The complexities of decision-making in Tasmanian land management
C) Land management challenges
D) The future of farming in Tasmania
E) How to engage land managers

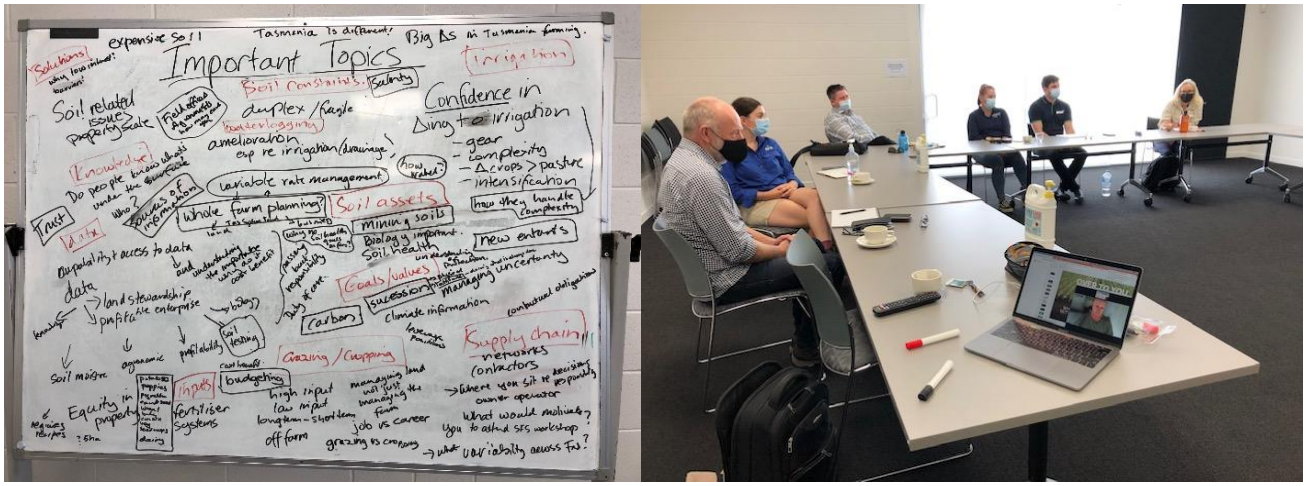

Figure 1: Developing the survey priorities at the workshop (C Allan photograph)

Following the workshop, the project team built these topics into the core survey instrument, with sections on significant issues faced by landholders, their values, practices, experience and understanding of various topics, as well as confidence in a range of best practices in soil, farm and land management.

A survey was drafted and sent to all workshop participants for comment and input. The next draft was piloted with local partners and a small group of rural landholders (Figure 2). The final questionnaire is presented in Appendix 2.

Figure *2:* Pilot participants at Forthside Vegetable Research Facility, June 2022 (C Allan photograph)

1.2 SURVEY ADMINISTRATION AND RESPONSE RATE

In advance of the survey, in June 2021, notices were mailed to 2000 randomly selected properties over ten hectares, which is about half of properties in the agricultural areas of Tasmania. The Tasmanian property addresses were identified using "The LIST" spatially referenced landholder contact lists. These notices included a link to an online survey posted on the Soil CRC website and allowed some refinement of the mailing list. In July 2022, 2000 comprehensive survey questionnaire booklets were mailed out to landholders. These were followed up with two reminder notes, a second survey and a final reminder.

Of the mailed questionnaires, following removal of return to senders and opt-outs the final sample size was 1217. Ninety-eight online surveys were completed, 62 of which were linked to the spatial property identifier. Thus, a solid 35% response rate was recorded from 424 completed surveys.

1.3 DATA ANALYSIS

We seek understanding of the data using three methods: descriptive statistics; tests for statistically significant relationships; and correlations between variables using linear regression modelling.

Descriptive statistics such as frequencies, means and medians were used to summarise responses to all survey items ("not applicable" and missing responses were removed from the means analysis).

Further analyses included examining data for statistically significant differences between different landholder groups (full-time farmer, part-time farmer, hobby farmer, non-farmer) and generational groups (Baby Boomers, Generation X, Generation Y).

Kruskal Wallis rank sum tests were used to determine significant differences on a continuous variable or a Likert scale variable (e.g. age or agreement with an issue) based on a grouping variable (e.g. farmer identity cohorts). The Likert responses 1-2 and 4-5 were combined for the reporting of percent in the analysis.

Chi-squared goodness of fit test were used to examine dependence between two grouping variables. Similarly, Pearson's chi-squared test with simulated values was used to test for differences on a Yes/No (i.e., nominal data as for Landcare participant) based on a grouping variable (e.g., the farmer identity cohorts).

Pairwise comparisons tested for relationships (positive and negative) between variables expected to influence investment in best-practice management (i.e., the dependent variables). Those practices consisted of current recommended practices that often relate to sustainable or regenerative agricultural practices and natural resource management. For all questions within the survey, respondents were given the choice "Don't know/Not applicable" to allow for context-specific responses. Consequently, the proportion of selecting this option varied across the best-practice items.

In all analyses, the p statistic represents the significance level where a p-value below 0.05 is considered to be statistically significant. A p-value below 0.05 means that it is unlikely (probability of less than five percent) that the observed relationship or difference has occurred purely by chance. All statistical analyses were performed using R statistical software package and Microsoft Excel.

Interpretation of the pairwise comparisons (e.g., to eliminate significant relationships that were irrelevant/nonsense) allowed the research team to identify a small number (approximately 25) of independent variables to include in the modelling for each best practice. The selected variables were then modelled with combinations of all variables, ranked by Akaike Information Criterion (AIC), with any models flagged where there could be multicollinearity.

Logistic regression modelling was used to explore the extent a small number of independent variables contribute to the presence or absence of best-practice implementation. For logistic regression modelling we have only considered models with an accuracy of above 70%.

Rejecting regression models where multicollinearity (i.e., where two variables essentially have the same impact) may be detected, could lead to conceptually significant variables being excluded from models. However, experiences with social benchmarking data suggest that those efforts may lead to conceptually significant variables being excluded from models. For example, pairwise comparisons may reveal a meaningful relationship between the implementation of a best practice and both participation in a soil health group and property size. If participation in a soil health group and property size are also correlated, regression modelling may exclude one of these variables. There are sophisticated statistical techniques that can help to further tease out causality, but these are beyond the scope of this research project.

The sections that follow detail the results of the survey.

2 PROFILE OF TASMANIAN LANDHOLDERS

2.1 A MULTIFUNCTIONAL LANDSCAPE

While much of Tasmania remains forested, and often wilderness, there are substantial cleared areas. This cleared land is predominantly used for agriculture (mixed enterprises), with 57% of all respondents earning an income from their property in 2020/21. Of those who reported a net profit, 38% reported earning more than $50,000 from these activities; this sits below the national average of 69% of agricultural enterprises with a profit of $50,000 or above[12].

The reported median landholding was 42 hectares across one property (mean of 359 hectares). The most common land uses were pastures (45%), beef (44%), and sheep (31%), with 7% of landholders cropping.

Overall, 96% of respondents reside on their Tasmanian property. The median length of land ownership by the respondent's family was reported as 22 years, with a mean/average of 39 years. Across all respondents, the median age was 61 years and 75% of respondents were male. This is older than the national median farmer age of 54 years, which sat well above the national general workforce median age of 40 years and suggested slightly lower female participation in farm management than the national average of 32% females across the agricultural sector[13].

Survey participants were asked to self-identify into one of four landholder types, with results as follows:

- Full-time farmers: 33%
- Part-time farmers: 16%
- Hobby farmers: 29%
- Non-farming landholders: 22%

Full-time farmers represented just over one-third of the respondents (33%), 88% of these respondents were male, with an average age of 60 years. Full-time farmers had the largest holdings, with an average holding size of 959 hectares. The most likely land use was for pasture (64%), beef cattle (63%) and sheep for wool or meat (51%). Full-time farmers had very high on-property residency rates (95%) and had the longest association with their land, with an average family ownership of 62 years. This group was most likely to have a family member working on the farm (71%), with 45% of this group working alongside their spouse/partner; 34% their children; 13% their parent; and 13% a sibling. This cohort was least likely to have off-farm employment, sourcing 85% of income from agriculture in the region and spending more than 50 hours working on the farm. Full-time farmers were most likely to have additional land under their management (an average of 152 hectares). In

[12] National Farmers Federation, (2017), *Food, Fibre & Forestry Facts — A Summary of Australia's Agriculture Sector*. NFF https://nff.org.au/wp-content/uploads/2020/01/171116-FINAL-Food-Fibre-Food-Facts.pdf
[13] Binks, B., Stenekes, N., Kruger, H., & Kancans, R. (2018), *Snapshot of Australia's Agricultural Workforce*, Australian Bureau of Agricultural and Resource Economics and Sciences.

terms of education, 52% had completed high school or vocational training and 38% held tertiary qualifications.

Part-time farmers were the least common group, representing 16% of all respondents and of these respondents, 75% were male. The average age of part-time farmers was 57 years, and they held an average of 152 hectares, with 95% residing on the property. On average, their family had owned the land for 47 years. This group was the second most likely to have a family member working on the farm (61%), with 42% of this number their spouse/ partner, 22% a child of the respondent, 8% a parent and 2% a sibling. Part-time farmers were most likely to use their land for farming beef (75%), pasture (61%), and sheep for wool or meat (28%), areas of remnant vegetation (30%), and areas set aside for tree plantings (22%). This was the most highly educated group in terms of education, with 35% having completed high school or vocational training and almost two thirds (63%) holding tertiary qualifications.

Hobby farmers made up 29% of all respondents, and of these, 67% were male. The average age of hobby farmers was 57 years, with 96% of hobby farmers living on their property, which had an average size of 35 hectares and had been owned by their family for 19 years. This group was the third most likely to have a family member working on the farm (49%). Of this, 40% were their spouse/ partner, 12% were children of the respondent, 3% were a parent and 2% were siblings. This group used their land for pasture (43%), beef cattle (35%), sheep for wool or meat (32%), and areas of remnant vegetation (37%). Fifty-seven percent of hobby farmers had completed secondary school or higher, with 38% holding tertiary qualifications.

Non-farmer landholder type comprised 22% of respondents holding an average property size of 49 hectares. This group had an average age of 62 years and 69% were male respondents. Non-farmers have generally owned their property for 23 years, with 5% of respondents reporting income from regional agriculture and working around 10 hours per week on the property. 99% of them were residents on the property. Their family ownership of the land spanned an average of 26 years and they were the group most likely to set aside an area of remnant vegetation (53%). Forty-four percent of non-farmers had completed high school or higher and 55% held tertiary qualifications.

Figure 3 shows map of landholder type by local government area.

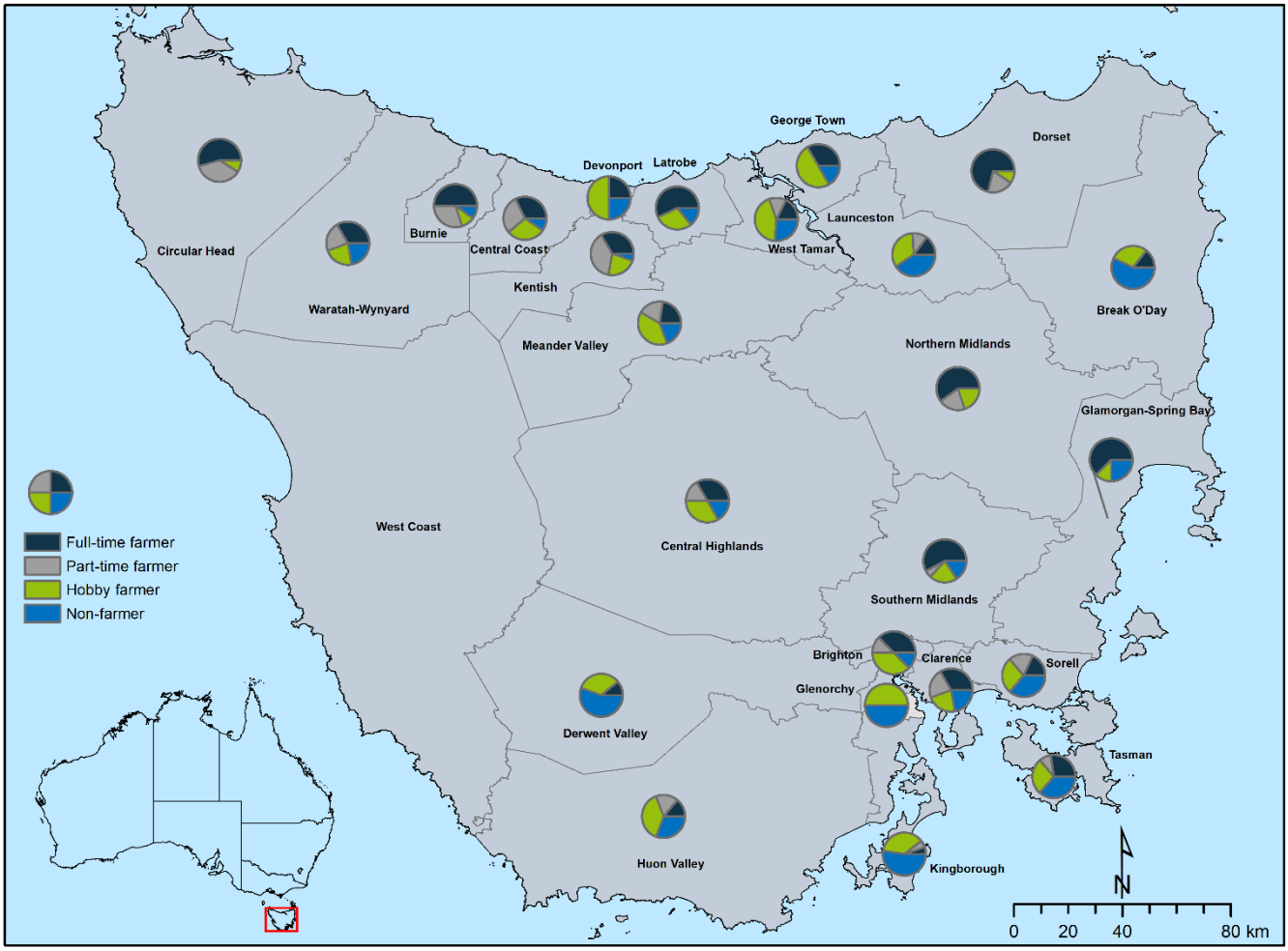

Figure 3: Distribution of landholder type in Tasmania by local government area, 2022.

A breakdown of the survey responses relating to each reported land use is in Figure 4, with a further breakdown of land use and enterprise type in Table X2, Appendix 1.

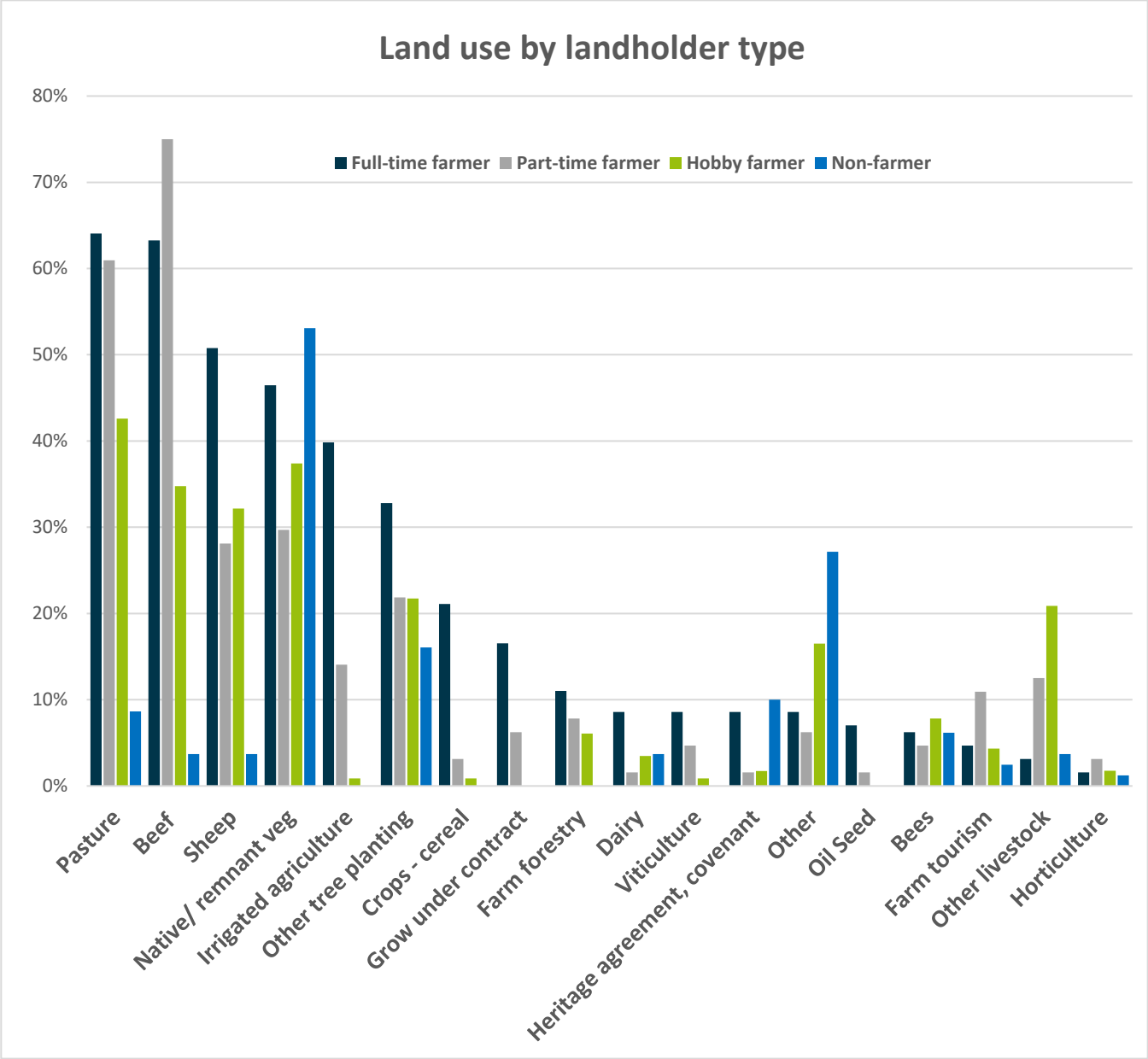

Figure 4: Breakdown of land use by landholder type. Percentage indicates the proportion undertaking that activity on their land. 2022

2.2 FARM MANAGEMENT

Twenty-six percent of landholders reported to have bought additional land in the region in the last twenty years, with 14% having subdivided or sold part of their property in that time. Across all landholder types, the average number of hours of on-property work was 31 hours per week, and 55% of respondents had another family member working on the farm, most of which (40%) were their spouse or partner. Off-property income was important for 56% of landholders. Of this off-farm income, 56% was above $50,000 in the 2020/2021 financial year.

Key characteristics of the respondents overall and by landholder type are summarised in Table A.

Table A Key attributes summary table Tasmanian Landholder Survey, 2022 (income for 2020-2021) (n= 277-393)

Key attributes (mean unless indicated)	**All**	**Full time**	**Part-time**	**Hobby Farmers**	**Non-Farmer**
Proportion of survey responses	100%	33% (own 87% land surveyed)	16% (own 7% land surveyed)	29% (own 3% land)	22% (own 3% land)
Age of respondent	60 years (median=61)	60 years (median=62)	57 years (median=57)	57 years (median=59)	62 years (median=64)
Percentage of Female respondents	25%	12%	25%	32%	31%
Mean total area owned (median in brackets)	359 ha (42 ha)	959 ha (240 ha)	152 ha (50 ha)	35 ha (20 ha)	49 ha (26 ha)
Bought additional land in region in past 20 yrs	26%	51%	27%	6%	8%
Subdivided or sold part of property past 20 yrs	14%	23%	18%	3%	6%
Property leased, share farmed or agisted by others	Area mean 40 ha 14%	Area mean 69 ha 16%	Area mean 94 ha 24%	Area mean 4 ha 12%	Area mean 6 ha 5%
Property leased, share farmed or agisted from others	57 ha	152 ha	18 ha	3 ha	1 ha
Resident on property	96%	95%	95%	96%	99%
Mean length of family ownership (median)	39 years (22)	62 years (47)	45 years (30)	19 years (13)	23 years (15)
Other family members working on the property	55%	71%	61%	49%	35%
Paid off-property work last 12 months (n=277)	103 days	24 days	143 days	157 days	112 days
Hours work on-property per week	31 hours	54 hours	24 hours	19 hours	11 hours
Income from agriculture in relevant region 2020/21	57%	97%	75%	34%	5%
Net profit from agriculture in relevant region in 2020/21	46%	62%	23%	13%	2%
Received off-property income 2020-2021	19% primary respondent	13% primary respondent	29% primary respondent	21% primary respondent	14% primary respondent
	11% spouse	23% spouse	9% spouse	4% spouse	2% spouse
	26% both	18% both	46% both	32% both	19% both
% survey respondents net income from off-property >$50k n=237	56%	52%	66%	65%	33%

Key attributes (mean unless indicated)	All	Full time	Part-time	Hobby Farmers	Non-Farmer
Completed short course related to property management, past 5 yrs	24%	36%	38%	11%	12%
Attended a field day in the last 12 months	34%	54%	43%	22%	9%
Property management or whole-farm plan completed	36%	58%	55%	21%	4%
Area of land lost to production due to soil problems (mean n=34)	11%	11%	8%	17%	3% or NA
	Area: 7 ha	Area: 10 ha	Area: 2 ha	Area: 6 ha	Area: 10 ha (n=1)

On-farm management was largely collaborative, with 75% of farmers including at least one other person in their management decisions. Most often, this was their spouse/partner, other family member or a paid advisor such as an agronomist.

Of commercial farmers (full-time and part-time together), 76% reported having generated a profit over the last ten years. Those who had prepared comprehensive property plans generally had consistently high knowledge levels of most best-practices, particularly those relating to sustainable or regenerative agriculture. They also had a high level of confidence in applying those practices. They regularly test their soils, were competent with data management and view data as an essential basis for decision-making. They were also more likely to own more than one property in the region.

2.3 LANDHOLDER VALUES

A key element of the conceptual basis for this social research is that farmer behaviour is derived from "core elements of personality and belief structures"[14], which can be seen through underlying values, beliefs and norms. Prior research has shown the usefulness of this Values-Belief-Norm (VBN) theory of understanding environmental behaviours, suggesting that individuals were more likely to act when something they value may be threatened[15].

This section of the report explores the values that landholders connect to their property ('attached values', also called 'assigned values') as well as underlying values and principles held by the landholder ('held values'). Values described in this way help inform understanding of the complex priorities of landholders that may drive land management behaviours. Landholder beliefs and norms will be examined in following sections.

[14] Curtis, A., & Luke, H. (2019). Social benchmarking for natural resource management: 2019 North Central Victoria. Southern Cross University, NSW, p28.
[15] Ibid, p28.

Table B Attached values, overall and by landholder type, 2022 (n = 389)

ATTACHED VALUES Why your property is important to you	% INDICATING IMPORTANT/ VERY IMPORTANT				
	OVERALL (mean/5)	% FTF	% PTF	% HF	% NF
Ability to pass on a healthier environment for future generations ###	87% (4.4)	94	92	82	76
An asset that is an important part of family wealth ###	65% (3.8)	80	70	56	45
A great place to raise a family ###	81% (4.1)	90	82	80	64
Sense of accomplishment from building/ maintaining a viable business ###	59% (3.5)	89	79	40	14
The productive value of the soil on my property ###	65% (3.8)	89	83	53	28
An attractive place/ area to live	90% (4.4)	90	86	93	92
An important source of household income ###	46% (3.1)	88	52	26	12
Sense of accomplishment from producing food and fibre for others ###	59% (3.5)	86	76	46	12
My property is an important part of who I am ###	75% (4.1)	81	79	73	60
Native vegetation provides habitat for birds and animals ###	71% (4.1)	66	57	75	86
Provide opportunities to learn new things ###	66% (3.8)	75	70	65	43
An asset that will fund my retirement ###	56% (3.5)	61	60	52	40
Provides a sense of belonging to a place	75% (4.1)	83	78	66	70
Native plants and animals make the property an attractive place to live ###	62% (4.4)	55	48	65	81
Provides a sense of belonging to a community ###	55% (3.6)	65	60	49	54
A place or base for recreation ###	58% (3.6)	47	63	67	65

Our results show that different types of landholders attach different values to the land they own and manage, which is consistent with our findings in other areas[16] [17]. Table B shows the attached values in relation to the four landholder types.

The values landholders attached to their property were measured across environmental or biospheric (green shading), social or altruistic (blue shading) and economic or egoistic (orange shading) values. These different groupings reflect the links between agriculture and the natural and social landscapes within which it occurs, particularly given the high levels of on-farm residency expressed earlier. We observed a range of attached values across themes of environmental and social values (Table B). These results highlight that a range of values are assicated with farms for those who live, work and recreate on the land. The top three values by landholder type are indicated with grey shading, but looking across the whole sample, there is a fairly even spread among the top four ways that landholders value the property. These are the property: represents the ability to pass on a healthier environment to future generations (87%), is an attractive place/area to live (87%), and a great place to raise a family (83%).

In addition to the values attached to the property, the survey also considered the principles that guide a respondent's life, as represented by the underlying values held by respondents ('held values'). These are summarised in Table C (shows related items built on a typology measuring egoistic (orange), biospheric (light green) and altruistic (blue)).

Table C Principles that guide your life, both overall & by landholder type, 2022 (n= 389)

PRINCIPLES THAT GUIDE YOUR LIFE	% INDICATING IMPORTANT/ VERY IMPORTANT				
	OVERALL (mean/5)	% FTF	% PTF	% HF	% NF
Looking after my family/ loved-ones and their needs	97 (4.7)	97	100	95	96
Creating wealth and striving for a financially profitable business ###	55 (3.5)	83	64	40	18
Preventing pollution and protecting natural resources ###	89 (4.4)	87	89	88	95
Respecting the earth and living in harmony with nature ###	82 (4.2)	79	83	83	87
Caring for the weak/vulnerable and correcting social injustice ***	59 (3.7)	54	57	60	67
Fostering equal opportunities for all community members	49 (3.5)	45	46	52	58
Being influential and having an impact on people and events	33 (3.0)	35	38	36	26

[16] Luke, H., Baker, C., Allan, C. & McDonald, S. (2020). Agriculture on the Eyre Peninsula: Rural Landholder Social Benchmarking Report 2020. Southern Cross University, NSW, 2480.
[17] Luke, H., Baker, C., Allan, C., McDonald, S., & Alexanderson, M. (2021). Agriculture in The Northern Wheatbelt: Rural Landholder Social Benchmarking Report 2021. Southern Cross University, NSW, 2480.

The data in Table C shows a strong dominance of the principle of 'looking after my family/loved ones and their needs across all landholder types' (97%), representing a significant focus on the family unit. Consistent with the attached values shown above, there is a strong correlation among the landholder types across the top four principles guiding their lives, with a focus on more egoistic items (looking after family, wealth creation and creating a financially profitable business) and environmental values (preventing pollution, protecting natural resources; respecting the earth and living in harmony with nature).

3 COMPLEXITY IN FARMING & LAND MANAGEMENT

This section focuses on the implementation of farm management practices. Some tables and information presented use combined data from self-identified full and part-time farmers, unless clearly identified otherwise.

3.1 LAND MANAGEMENT PRACTICES

The farming practices that farmers incorporate in their management – historically, currently and those they intend to undertake – are important outcomes of decision-making. Figure 5 shows changing farming practices implemented over time. A full breakdown of management practices is in Table X4.

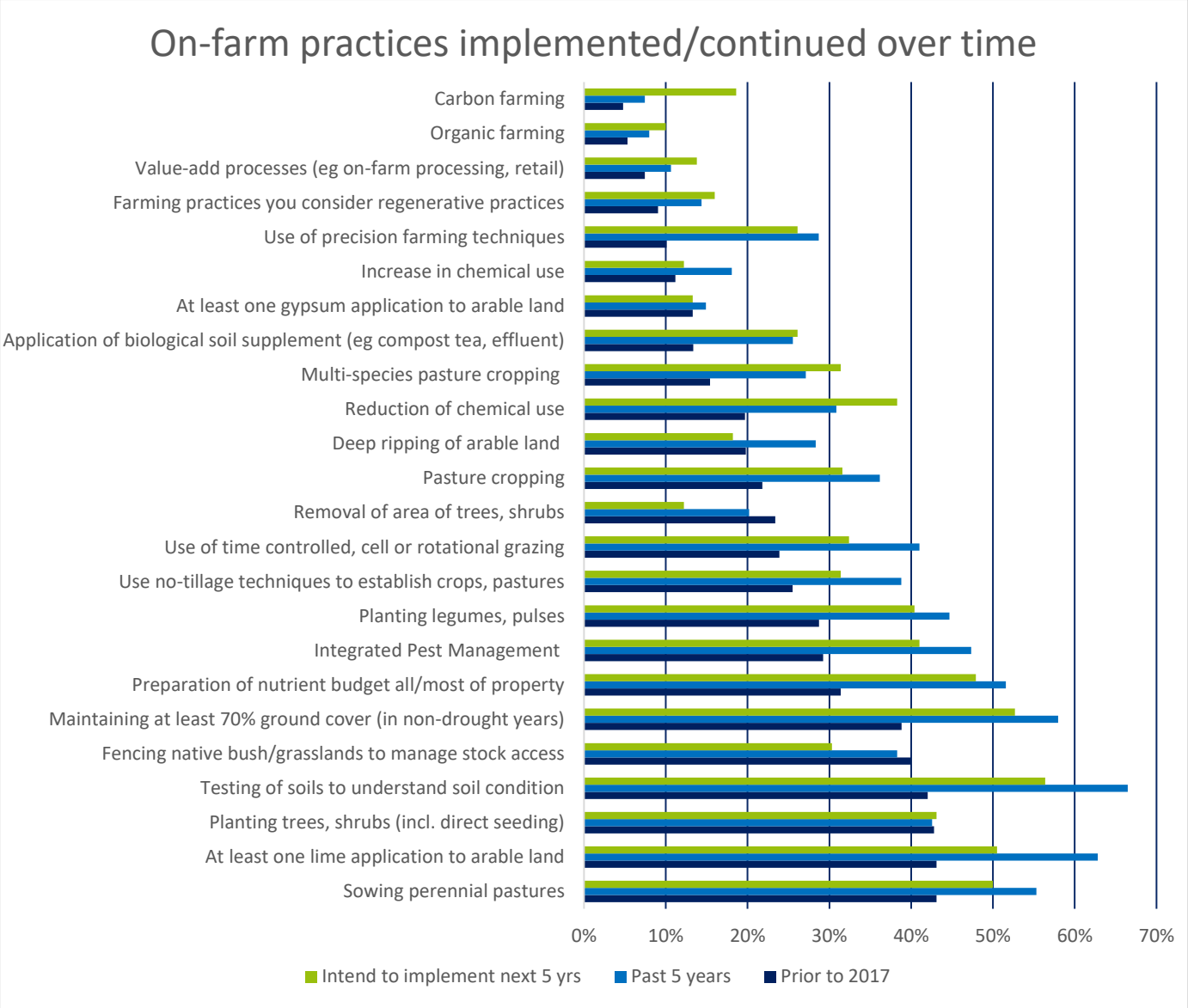

Figure 5: Full- and part-time farmer practices, historical, recent & future intentions, 2022 (n = 188-192).

For Tasmanian landholders there are four top practices implemented prior to 2017: soil testing, lime applications, perennial pastures, and tree planting. The most common practices in the current period (2017 – present) for almost half of farmers, are soil testing regimes and at least one application of lime, followed by sowing perennial pastures. Practices such as fencing stock access to native bush/ grasslands, deep ripping and removal of trees or shrubs show a decline. Apart from these three practices, most others indicate an increase in implementation over time.

When future intended practices were considered, most practices were being maintained or showed an intended increase in a number of practices. The reduction of chemical use, use of multi-species pasture cropping together with applications of a biological soil supplement were signalled as increasing. There was a slightly higher rate of intention to implement across the board for full-time farmers (Table X4).

In relation to regenerative agricultural practices, just 14% considered themselves to be undertaking practices that they consider to be regenerative. Despite this a much higher proportion of farmers are implementing practices that are broadly considered to be within the toolkit of regenerative agriculture. For example, 58% of farmers are now cover cropping (in non-drought years), a practice that only 41% of farmers claimed to have been doing prior to five years ago. Even multi-species cover-cropping is a practice that a quarter of farmers have implemented in the last five years.

More farmers appear to be reducing chemical use than they did in the past, however, a similar number have been increasing chemical use in the last five years. Farmers who reported to be reducing their dependence on chemicals were also likely to be doing organic farming or carbon farming. They were more likely to be concerned about climate change and to consider a 100-year timeframe when making strategic decisions on the farm.

Conversely, those who reported to be increasing their chemical use were also more likely to own larger tracts of land and multiple properties in the region and spend a higher number of hours working on the farm each week. They were more likely to be cropping than other land uses, and plant legumes on a regular basis. These farmers were less likely to intend to sell their properties or put aside any part of their land for conservation purposes.

3.2 DRIVERS OF BEST-PRACTICE

3.2.1 Risk and openness to change

Overall, there was a very high level of openness to change, with 88% of farmer respondents agreeing that they were open to new ideas about farming and land management, including 89% of full-time farmers in Table D. Just over half of farmers were interested in learning more about alternative/ holistic farming approaches (53%), with a third being confident that adopting regenerative/ holistic farming practices is justified by the returns (36%) as detailed in Table X3.

However, these responses were complicated by relatively low levels of agreement on other measures, such as 'financially, I can afford to take a few risks and experiment with new ideas' (44%), 'I am usually an early adopter of new agricultural practices and technologies' (31%), and 'I have sufficient time available to consider changing my practices' (47%). This suggests that while farmers may have an open mindset, there are financial and time constraints on investing in best-practices. For a further breakdown of measures of trust and risk, refer to Table X6 in the Appendix.

Table D Highest response questions on risk & openness to change, 2022 (n=192 to 183). Mean out of 5 (5 = very important).

RISK AND OPENNESS TO CHANGE	Mean/ 5	% Imp/ Very imp	Highest concern by landholder type
I am open to new ideas about farming & land management	4.1	88	Part-time farmers (98%)
Human activities are influencing climate change	4.1	75	Part -time farmers (79%)
If we do nothing climate change will have dire consequences for all living things inc. humans	4.0	69	Non- farmers (85%)
I won't take a risk if my gut/ intuition says no	3.7	66	Full-time farmers (69%)

3.2.2 Confidence in the implementation of best practice

An important element of decision-making in farm management practice are the beliefs that farmers hold toward those practices, otherwise understood as the level of confidence in the practice in Table E. Also very important are the personal norms that farmers relate/ascribe to their farm, such as the personal responsibility they feel towards good soil stewardship. (The later section of modelling analyses a collection of norms and beliefs related to soil management for different types of landholders).

Table E View statement agreement overall & by landholder type, 2022 (n= 383-387). Mean is out of 5. Top three for each group are shaded grey.

VIEWS & EXPERIENCE	% AGREE/ STRONGLY AGREE				
	OVERALL (mean/ 5)	FTF	PTF	HF	NF
Fencing to manage stock access is essential element of protecting health of waterways & native vegetation	87 (4.4)	90	92	90	73
Biological activity is important indicator of the productive capacity of soils	85 (4.3)	94	87	84	71
Soil testing is essential first step in understanding soil condition	83 (4.3)	94	90	82	64
I feel a personal responsibility to maintain the productive capacity of my soil	83 (4.3)	96	100	77	57
I am confident that my land is in a better condition than when I took on the management of this farm	77 (4.3)	91	82	76	46
Primary producers should do all they can to reduce carbon emissions from their activities	73 (4.0)	65	75	75	78
I feel confident working with numbers and managing my farm accounts	69 (4.1)	93	80	65	23
I'm confident managing my farm in the face of increasing change & uncertainty	68 (3.9)	88	79	62	31
Most years I am satisfied with the income from my farm's production	64 (3.9)	89	80	52	17

Overall, our results indicate a strong sense of personal responsibility to maintain the productivity of soil, with soil testing regarded as an essential step, particularly among full-time farmers. Full-time farmers show the strongest support across most of the soil management items.

3.3 MODELLING DECISION-MAKING

3.3.1 Who is making decisions?

Those making decisions as part of a team were linked positively to all of the best-practice items. In the model, they were likely to be testing their soils at least annually, be confident working with numbers, and open to new ideas about land and farm management. Their land size was slightly larger and they were slightly more likely to be earning over the national average (with a non-significant p score for these two items) (R2=0.35).

The modelling shows that people who include others in their decision-making are more likely to live and work on their property beside and with other family members, most frequently their spouse and their child/ren. Indeed, they may be filling in the survey together with their spouse. Those living with members of their family on the property are likely to have a view that decision making needs to be strongly influenced by data; test their soils at least annually; have a whole-farm plan in place; and have a view that farming system groups are the best way to drive and direct local research, development and extension (R^2=0.29). The results indicate that commercial or independent consultants also play an important role in supporting on-farm decisions, as do extension agents.

There was a weaker association showing that those working together with their family are more likely to be open to new ideas, and consider themselves an early adopter. They were less likely to see 'no reason to change' their farming operations.

3.3.2 Early adopters

The model for those who considered themselves early adopters found that they were more likely to be open to risks and embrace new ideas, with the financial capacity to try new things. They and their spouse are also likely to have recently completed a short course on soil/land management and have implemented changes on their property to sequester carbon. They are also likely to work a high number of hours on their property each week (R^2=0.26). They were also likely to have taken steps to reduce their on-farm emissions during the past 12 months and don't need to see local evidence of success before trying something new.

The pairwise comparisons showed that the group who self-identify as early adopters are more likely to be preparing a whole-farm plan, testing soils, implementing carbon farming, IPM, minimum or no tillage, cover crops, time-controlled grazing, lime applications, multi-species pasture-cropping, precision-farming, and have been reducing chemical use over time. They are also more likely to be taking a regenerative approach to farming.

While undertaking the modelling, broad observations were that:

- Having turned a profit, or having an income over $50,000 was important for eleven of the best-practice items.
- Those planting trees generally made plans over a much longer timeframe.

- Those who were planting trees, undertaking precision-farming, testing their soils and implementing multi-species pasture cropping were around 5-8 years younger than those not implementing these practices.
- Landholders who have put up fences are also likely to be doing other best-practice farming, including biological soil supplements, maintaining at least 70% groundcover, minimum tillage, have sewn perennial pastures, be implementing time-controlled grazing, multi-species pasture-cropping, integrated pest management and value-adding.

3.4 MODELLING BEST-PRACTICE LAND MANAGEMENT

The modelling for many best practices often had two or more items with p-values that were too high, thus not all models are included in the following section. However, consistently occurring factors about those implementing the nominated practices were that they had larger land size, higher education levels, were younger, have family living on the farm (most often child or spouse), and were likely to have recently attended short courses with their spouse.

3.4.1 Whole-farm planning

The modelling showed that those who had implemented whole-farm planning usually involve others in their strategic decision-making and own larger areas of land. Whole-farm planning was also closely linked to high levels of knowledge about native grasses and time-controlled or holistic grazing (NagelkerkesR^2=0.41, 80% correct).

Decision-making based on data emerged as key, including having good systems in place to manage data, as well as a high level of confidence in data management. Landholders with whole farm plans were likely to be soil-testing systematically across paddocks, and irrigating their land.

The pairwise comparisons showed that landholders undertaking whole-farm planning have a sound knowledge of various practices (usually with a strong likelihood of their implementation), including soil health and allocating land use according to land/soil characteristics, on-farm biodiversity, emerging agricultural technologies, regenerative agriculture and time-controlled grazing, as well as how to manage waterlogging and minimise erosion. They work more hours per week but are also coping better with the associated stressors of managing their property.

Those with whole-farm plans in place value their soils, feel a personal responsibility towards its management and know how to identify and manage soil constraints. They are also generally more confident that their land has been improved by its management.

3.4.2 Precision farming

The model for those implementing precision-farming showed that they were more likely to be younger, own additional land, and have plans to purchase more land in the near future. They were likely to be earning a lower off-property income but an above national average ($50,000) on-farm income (Nagelkerkes R^2=0.542).

3.4.3 Tree removal

Landholders removing trees were more likely to be planning to subdivide the property, make decisions opportunistically, and be earning a profit over the national average. There was a weak link to being family farms (not corporate-owned) (NagelkerkesR^2=0.29).

3.4.4 Multispecies pasture cropping

The model showed that those implementing multispecies pasture-cropping are more likely to be younger farmers living on their farm with a partner, generating an income from it, with plans to intensify their farming (Nagelkerkes R^2=0.17).

3.4.5 Value adding

Farmers who are implementing value-adding on their land are also likely to be conducting horticulture, setting aside some of their land for conservation, and are planning to move off the property when reaching retirement age (NagelkerkesR^2=0.48).

Alternatively, landholders were asked whether their property 'may not be the best farm around' but 'see no reason to change': 25% of farmers agreed while 61% of farmers disagreed to this question (Table X6). The modelling showed that farmers who agreed with this (that their farm may not be the best farm around, but that there was no need to change), needed to see local evidence of success before considering any changes. For this group, there was a strong *negative* correlation with preparing a whole-farm plan, with a belief among this group that climate change is *not* caused by humans. There was a weak association with their earning being below the national average. They also had no intention of leasing their land in the future (R^2=0.25).

The pairwise statistics showed that this group are not likely to be open to new ideas or taking risks, unlikely to consider things over a longer timeframe, nor have time or money to consider changing their practices. They are less likely to have any formal qualifications and more likely to be working solo on the farm. While they may be family farmers (not corporate-owned), ownership of the property is not likely to stay within the family.

3.5 TIMING OF STRATEGIC DECISION MAKING

Year-to-year timeframes were the timeframe most relied on for influencing strategic decisions, with half of full-time farmers making strategic decisions based on a year-to-year timeframe. This was followed by seasonal timeframes (42%), and "up to five years" timeframes (37%). Only 6% farmers indicated that they consider a timeframe of more than 100 years, with 13% considering timeframes of up to 20 years (Figure 6).

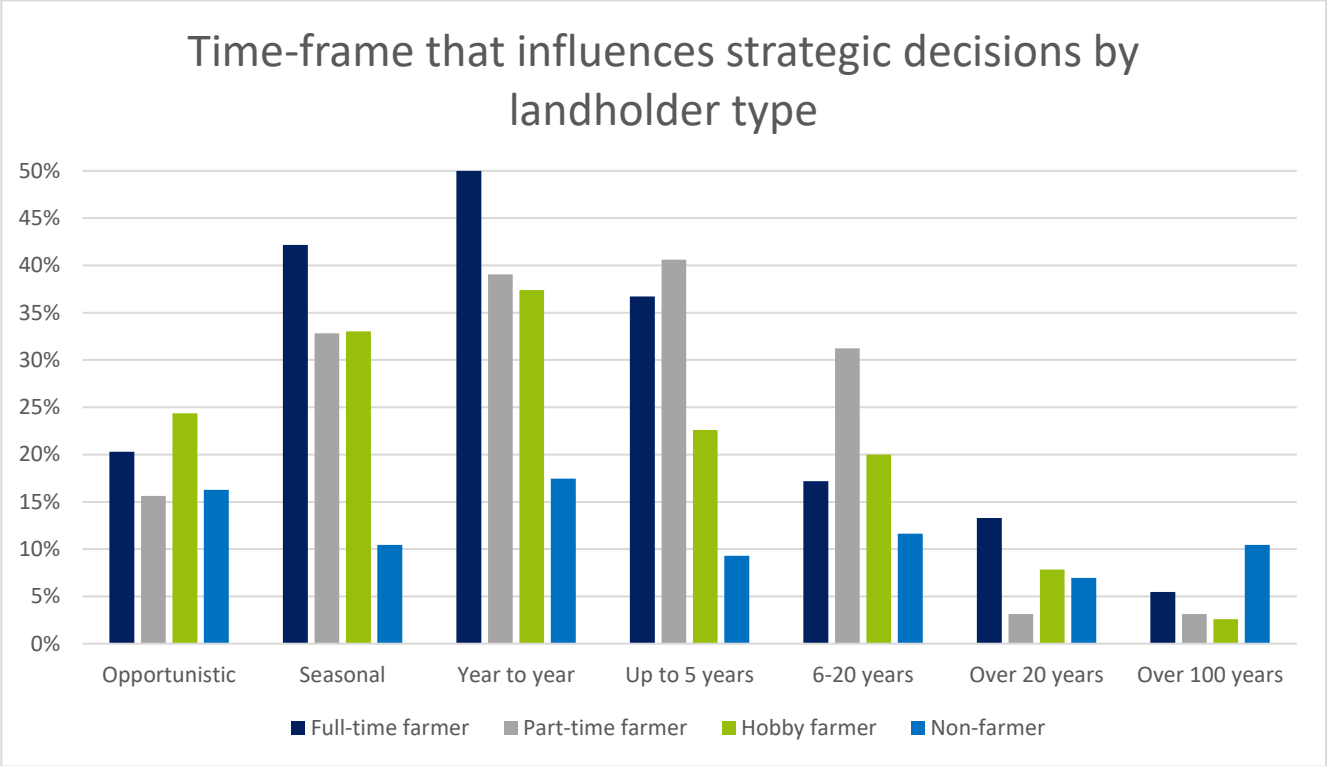

Figure 6: Time-frames of strategic, on-farm management decisions, 2022 (n= 279)

Across the landholder groups, full-time farmers consider strategic decisions primarily on a season-to-season basis, while the largest proportion of those considering more than 100 years ahead were non-farmers.

Well developed engagement approaches aiming to improve productivity, land management and soil stewardship can be supported by a better understanding of landholder beliefs, experiences and attitudes, that have been explored in this section. The following section outlines self-reported knowledge-levels of a range of practices, and how farmers are currently accessing information, to inform future engagement.

3.6 DATA MANAGEMENT

Business management at the farm level will directly impact land management decisions and has important consequences for profitability. Of full- and part-time farmers, 59% agreed that data should strongly inform decision-making around farm management, and 56% agreed that they already have good systems in place to manage farm data, yet about a half (53%) report internet connectivity as a barrier to using on-farm data effectively.

When asked what testing or indicators farmers use to assess soil and land health, soil tests were the predominant answer, but some also indicated the importance of other methods such as visual inspections of soils, plant health observations (including weeds), and yields (Figure 7).

While 94% of farmers agreed that soil testing is an essential step in understanding soil conditions, thus soil testing was perceived as an integral part of data gathering, only 43% of farmers reported having tested their soils at least once in the last five years.

In response to survey questions about soil testing frequency on their property, 61% of full-time and part-time farmers indicated that they tested every 3 – 5 years; 27% at least annually; 8% once, and 5% never. For a breakdown of the results for different landholder types, see Tables F and G.

Table F Frequency of soil testing performed, by landholder type 2022 (n=376)

Landholder type	3-5 years	At least annually	Once	Never
Full-time farmer	57%	33%	8%	3%
Part-time farmer	67%	16%	8%	8%
Hobby farmer	31%	8%	21%	41%
Non-farmer	14%	2%	17%	68%

Regarding where farmers concentrated their soil testing, 83% of landholders indicated that they test systematically across paddocks, while only 10% tested systemically in one paddock. Overall, only 7% of property holders preferred one location for soil testing. For a breakdown of the results for different landholder types see Table G.

Table G Preferred geographic approach to soil testing by landholder type, 2022 (n=161)

Landholder type	Systematically across paddocks	Systematically in one paddock	One preferred location
Full-time farmer	81%	8%	5%
Part-time farmer	85%	6%	0%
Hobby farmer	64%	16%	14%
Non-farmer	22%	17%	50%

Full-time farmers reported a higher level of knowledge on how to use data to inform land-management decisions than other landholder types. Figure 7 demonstrates the varying levels of understanding of how to use data to inform decision-making. This consistently lower knowledge across practices for part-time farmers could present an important opportunity for agricultural support organisations to target this group of land managers, who also play an important role in the productivity of approximately 7% of the land.

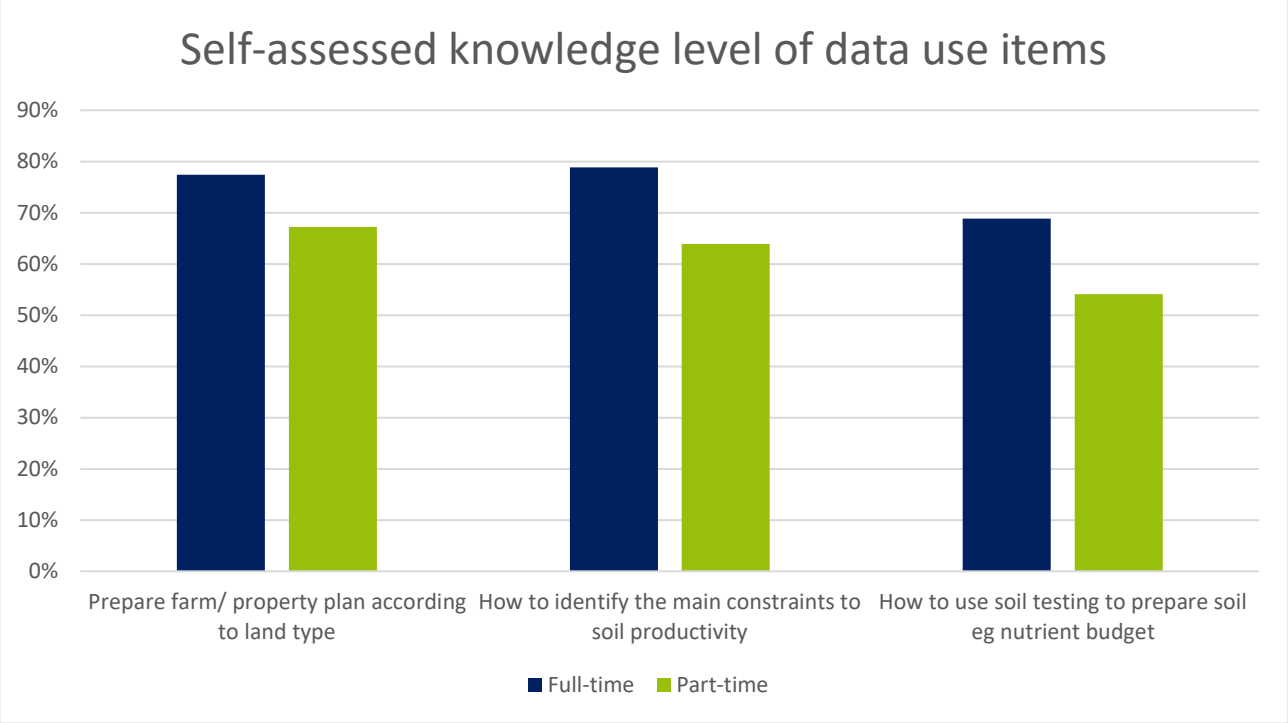

Figure 7: Self-assessed knowledge of data use by full- & part-time farmers, 2022 (n=188)

Table H brings together some key elements of how farmers are using data. It shows there is a strong belief in the importance of soil testing, and a general confidence in working with numbers, and soil testing was implemented by 56% of full- and part-time farmers in the previous five years. What this indicates is that farmer capacity to use and apply this data could improve, with 48% of farmers reporting having prepared a nutrient budget, and half of farmers having prepared a whole-farm plan. Farmer (FT, PT) belief in the importance of data for informing decision-making is 64%.

Table H Management practice implementation compared to related knowledge, confidence in the practice for full-time & part-time farmers, 2022 (n= 182) For detailed breakdown, see Table X3.

Management Practice	Imple-mented in past 5 years	Confidence	Agree-ment	Knowledge	Sound or very sound
Testing of soils to understand soil condition	56%	Soil testing is an essential first step in understanding soil condition	93%	How to use soil testing to prepare a nutrient budget that will increase soil productivity	64%
Preparation of a nutrient budget for all/ most of the property	48%	I feel confident working with numbers and managing my farm accounts	69%	How to identify the main constraints to soil productivity on your property	74%
Prepared/ preparing a property management or whole-farm plan	57%	Decision making needs to be strongly influenced by data	64%	How to prepare a farm/ property plan allocating land use according to land/soil characteristics	74%

4 LANDHOLDER CHALLENGES

Respondents were asked to rate the importance of a set of issues at the region and property scale, identified by local groups at the survey development workshop. The results show the proportion of respondents indicating an issue was important or very important. This section is divided into the four landholder categories to show the differences across issues by landholder type. Matters at this scale can mean a threat to the values expressed by the different groups in Section A, and therefore play a role in land management behaviours as a possible driver of action. Issues at the regional scale are presented in Figure 8.

4.1 REGIONAL ISSUES

The top four issues for commercial farmers in the region were: water security (82%); declining soil health/ soil productivity (72%); public support/opposition for agricultural practices (e.g. GMOs, animal welfare, pesticide use) (70%) and changes in weather patterns (68%) (Figure 8). For a complete list, see Table X5 in the Appendix.

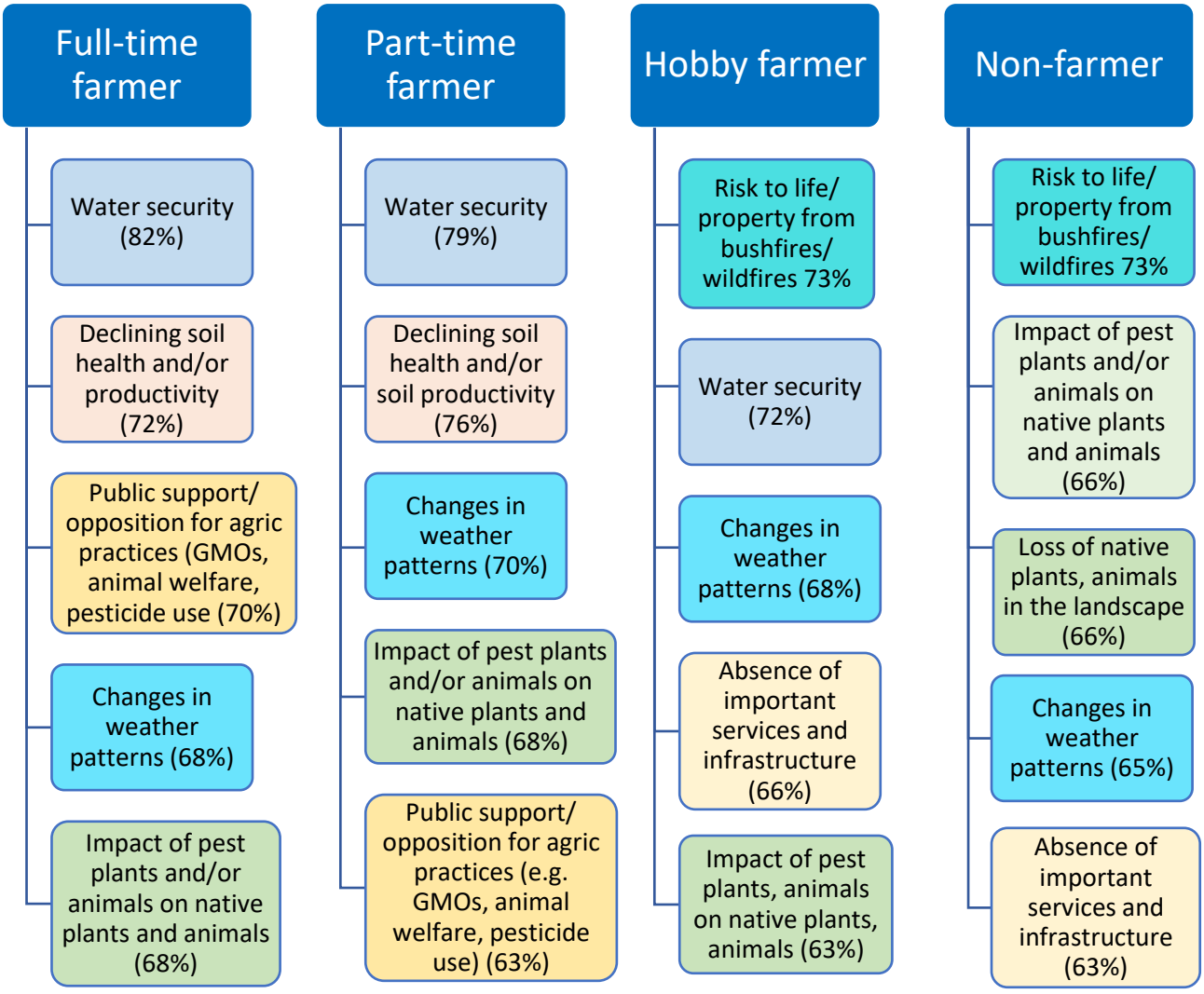

Figure 8: Top five most important regional issues by landholder type 2022 (n= 324-385), issues related to climate change highlighted in blue, soil issues in orange, social issues in yellow, environmental impacts in green.

4.2 PROPERTY SCALE ISSUES

At the property scale, the top issue across the groups was the impact of feral animals/overabundant native animal species on productivity. The 'impact of weeds/over-abundant native plant species on productivity' is also a top-two issue across all groups. Water quality was the third-most important for all four landholder types (an issue identified by 70% of full-time farmers).

In relation to soil issues, having a 'low level of biological activity in soils' was considered the most important issue for farmers (with 57% of full-time farmers identifying this as an issue (Figure 9)).

For a complete list of property scale soil issues by landholder type, see Table X5 in the Appendix.

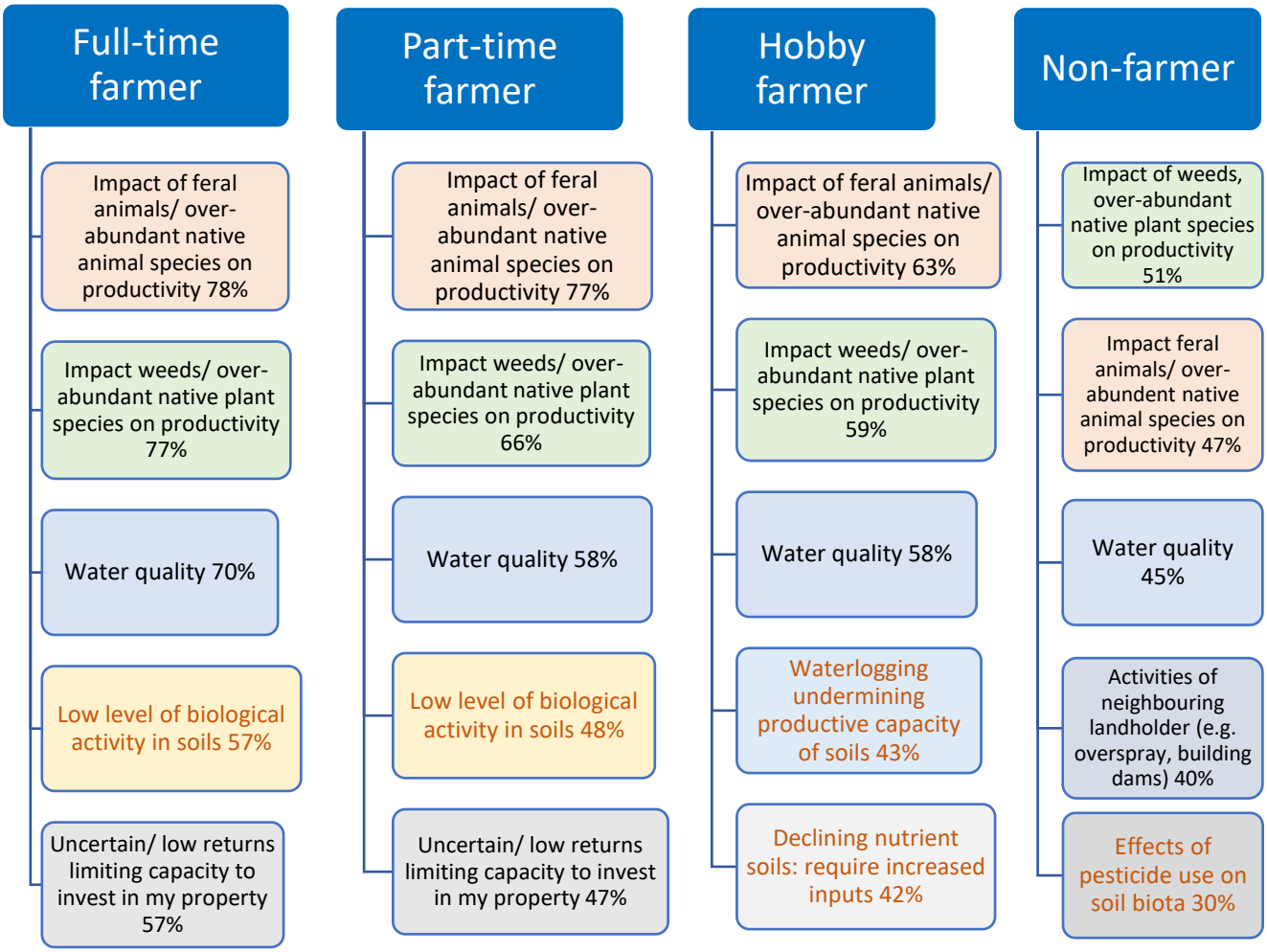

Figure 9: Top five property-level issues by landholder type, 2022 (n=389). Orange colour shows soil-related items

In an open-ended question, landholders were asked to nominate what they saw as their biggest challenge or opportunity in the next ten years. In terms of challenges, the strongest emergent theme was that of climate change. Many farmers were cognisant of the seasonal variability linked to climate change, focusing on a broad range of issues such as reliability of water supply, with some highlighting the need to adapt to climate change and to take actions such as planting more trees.

The second most common challenge listed was maintaining profitability due to labour availability, costs of inputs, acquiring more land, and suitable machinery. Quality of internet service was also seen as a challenge to farmers ready to adopt high-tech such as precision farming. Reflecting

Tasmania's diversity other written responses ranged across commercial concerns (selling wine, or being profitable with increased stocking rates, or cost of fertiliser) to personal (staying healthy/ being physically able) to environmental (habitat preservation, regeneration) and extreme events due to climate changes, and disease (e.g. FMD), or weed control.

Figure *10:* NVivo word-cloud representation of responses to the open question 'In the next 10 years, what would you see as likely being your biggest challenge and/or opportunity?', each word is emphasised in relation to times used in responses.

As mentioned at the property-scale (Figure 9), the two major issues across all groups were the impacts on productivity of both feral animals, overabundant native animal species, and of weeds, overabundant native plant species.

4.3 RESPONDING TO THE CHALLENGES

Farmers were asked about their level of satisfaction with their farm's productivity, finding that 86% (Full-time 89%; Gen X 85%) were satisfied in light of the seasonal conditions experienced. Over 79% of farmers indicated that they are coping well with the associated stresses and challenges of managing their farm. This was similar to 81% of farmers aged between 41-57 years (Gen X).

Landholders were asked, in an open-text question, to nominate what was the most important management decision that affected profitability in the last twelve months. The most common management decision were stock management processes, such as selling or buying, while maintaining a balance between destocking and restocking was evident from the responses. Other common activities mentioned were reducing or increasing fertiliser, maintenance of fencing and weed control. Over a longer period of the previous 10 years, decisions made included

implementation of ground cover, perennial pastures, rotational grazing and fencing small paddocks, and setting up farm infrastructure (e.g. solar pump for troughs, irrigation).

When asked what the most important influence on soil health is, the most common responses were around management such as soil testing, maintaining soil pH, groundcover, additions of lime and fertiliser consistent with the commonly reported implemented practices. Other common responses included grazing management, composting and managing seasonal rainfall patterns. A word cloud created from the words raised in the open question can be found in Figure 11. Each word becomes larger the more frequently it was reported.

Figure 11: NVivo word cloud of what farmers consider the most important influence on soil health, which shows words made bigger in proportion to the number of times mentioned by respondents, 2022.

In terms of opportunities for the next decade, several were mentioned relating to increasing productivity, building soil capacity while diversifying land usage and farm production.

When asked if there was a particular technology, tool, innovation and/or knowledge that would support their farm management goals, the responses were wide-ranging and not always relating to technology. One of the most common themes was improved information for soil and weed management on specific topics, including "easier access to non-biased data-based knowledge", "soil moisture monitoring, hyperspectral imaging (canopy moisture)" and "making biological soil amendments". Many farmers indicated they needed improved fire management approaches. For example, "fire management, burnoffs etc", "Indigenous fire management; wattle regrowth and horehound controls", to: "new technology to inform fire management; drone-based assessment of most effective firebreaks, clearing". A number of responses related to organic, regenerative and holistic farming practices such as "replanting and regenerating bushlands and waterways", "access to contractors set up for regen ag practices, and source materials, field days on soil biology, integrated pest management" and "increased diversity of regenerative farming in our region - supporting soil recovery and getting off of chemical dependency - recognition of native forest values".

4.4 RELATIONSHIPS BETWEEN ISSUES AND PRACTICE

We assessed the relationship between soil health issues experienced on farmer properties and management interventions commonly employed using a Kruskal-Wallis rank sum test. Significant positive associations were identified between declining soil health and productivity with the several management interventions including maintaining at least 70% ground cover, soil testing, sowing perennial pastures, planting legume and pulses and carbon farming. Regarding interventions that assist soils' water holding capacity, we observed a positive relationship with management interventions such as rotational grazing, no-tillage crop or pasture establishment techniques, gypsum application and sowing perennial pastures. Indeed, gypsum application was a common management intervention being used across a range of significant issues including declining soil health (nutrients (carbon, pH, and productivity), soil compaction, soil erosion, and changes in weather patterns).

With regards to soil management practices, the strongest pairwise comparison was the association between low levels of organic carbon and low levels of biological activity in soils on their property, showing that farmers view these as synonymous. Understanding the role of soil carbon in maintaining soil health strongly correlated with knowledge on how to build soil organic matter/ soil carbon.

4.4.1 Landholder wellbeing

The extent to which farmers are coping with the associated stressors of managing their farm has a strong correlation with having a whole-farm plan in place. These farmers are likely to feel supported in their farming and land management, have the financial capacity to take a few risks and experiment with new ideas, and often trust their intuition over other information where there is risk involved. They are also likely to enjoy listening to the radio! (R^2=0.2).

4.4.2 Sense of belonging

A strong model showed that those with a strong sense of belonging to a place feel that their property is an important part of who they are, and are open to new ideas about farming and land management. They value the native flora and fauna and consider themselves to have a sound knowledge of carbon markets (R^2=0.49).

The modelling also showed that those with a strong sense of belonging to their place reported to be making plans over a much longer timeframe (20-100 years); They had been on their land for longer and planned to keep the property in the family. In addition, these farmers report to have been implementing regen practices and carbon farming for more than 5 years. Their most important information sources are NRM organisations and field days.

4.5 CLIMATE CHANGE

We draw out a section on accelerated climate change because of the notable presence of climate change as a key issue raised by landholders. In terms of the level of concern expressed by respondents, the survey included regional issues related to climate change: 'water security', 'changes in weather patterns', and 'risk to life and property from bushfires/ wildfires'.

As shown in Figure 12, survey respondents were largely aware of the risks associated with climate change, with 65% agreeing and 13% of respondents disagreeing that climate change poses a risk to

the region, with 23% unsure. Of all respondents, 75% agreed that human activities are influencing changes in climate, with 73% agreeing that landholders should do all they can to reduce carbon emissions. Well over half (69%) of all respondents agreed that if nothing is done, climate change will have dire consequences, with 52% of the view that fundamental changes were required to improve the resilience of the region.

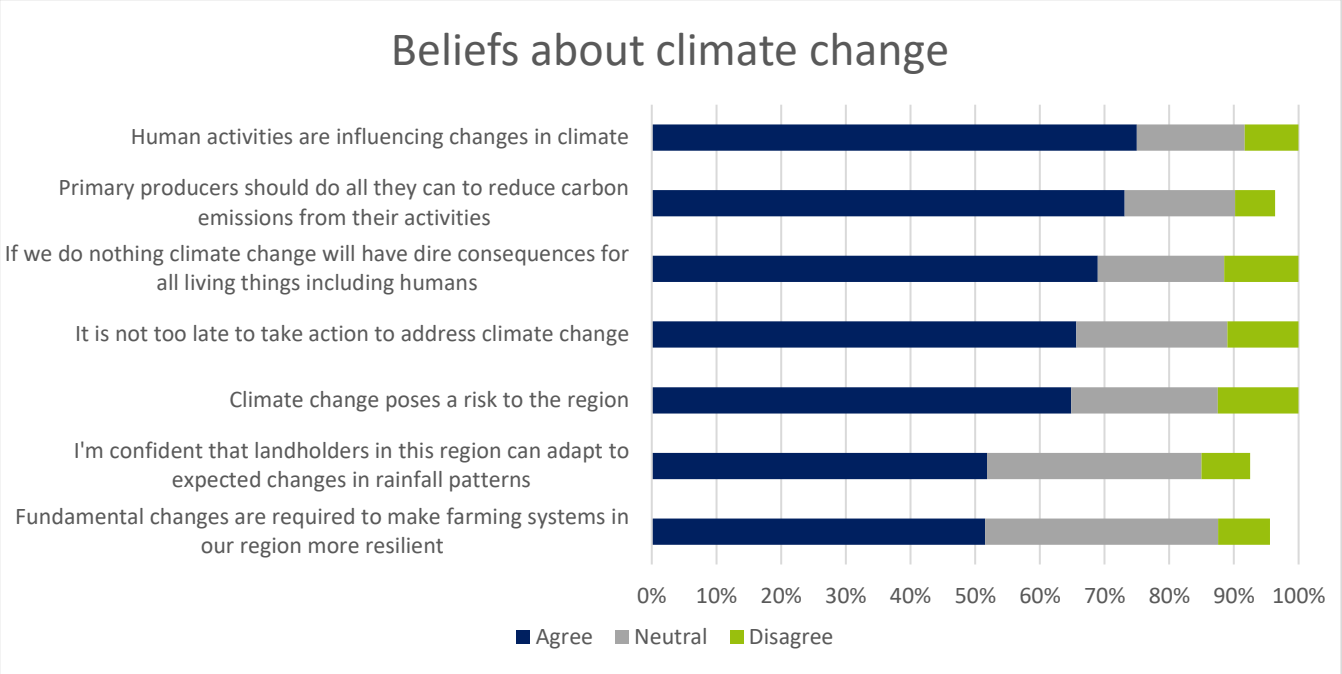

Figure 12: Landholder beliefs about climate change across all four landholder types, 2022 (n=372 to 379)

A moderately high level of confidence that landholders in the region can adapt to changes in weather patterns was apparent (52%). The data shown by landholder type in Figure 13, shows that of the four landholder types, full-time farmers were the most optimistic about the effects of climate change and our ability to adapt (76%), while the least likely to believe that climate disruption is due to human activities (69% of full-time farmers vs 86% of hobby farmers). Non-farmers (78%) were most likely to be of the view that primary producers should be doing all they can to reduce emissions, compared to 65% of full-time farmers.

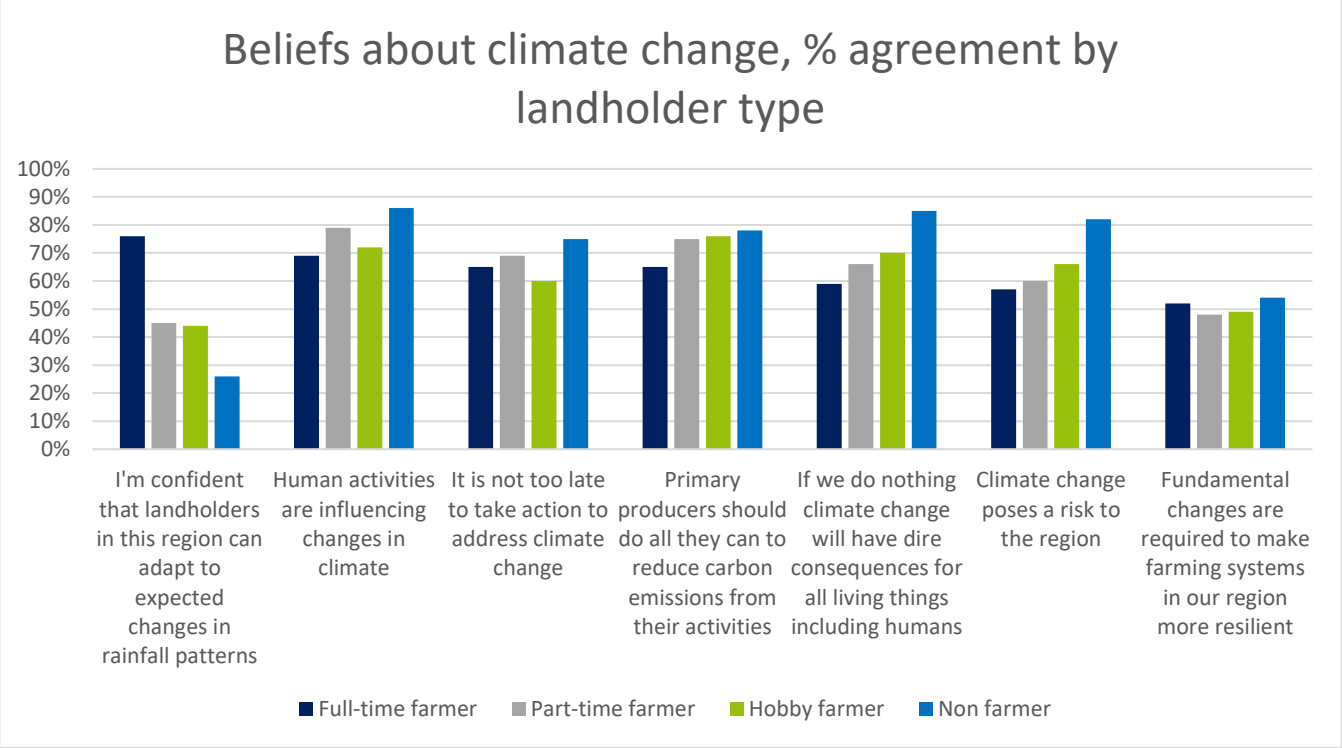

Figure 13: Beliefs about climate change by four landholder types, 2022 (n=369 to 384).

With water security and changes in weather patterns being top issues across landholder types, it is perhaps unsurprising given the decadal trend in both rainfall and temperature (Figure 14) and associated impacts in the region.

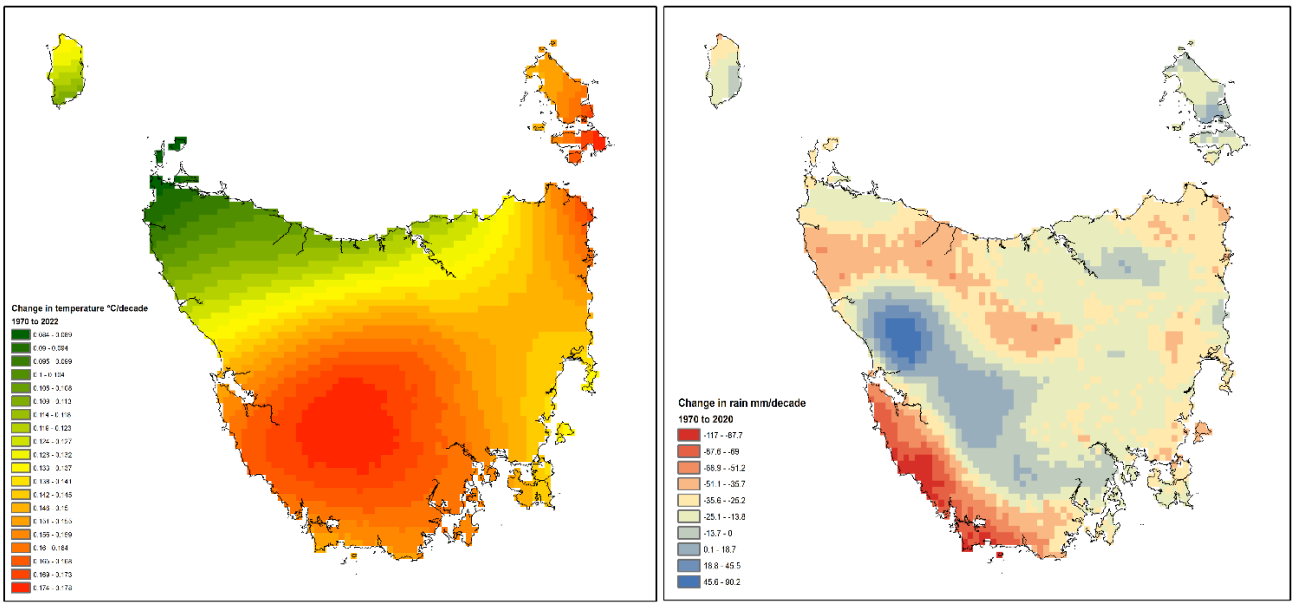

Figure 14: Trends in mean temperature and rainfall, 1970–2020 (source BOM). Climate change trends & extremes. Australian Bureau of Meteorology, Australia, accessed May 2023.

Figure 14 is based on historical Bureau of Meteorology data that demonstrates trends in decreasing annual rainfall and increasing mean annual temperatures since 1970. The prominence of fire risk as

an issue for more than 50% for all landholder types echoes similar results to those in other survey work[18].

4.5.1 Responding to climate change

The model on those who view climate change to be anthropogenic shows that these landholders usually make decisions considering a longer timeframe (>100 years). While they believe that climate change will have dire consequences, they remain optimistic that it's not too late to take action. They are also more likely to live on the farm with their spouse (R^2 = 0.57).

Table I Practices related to climate change issues overall & by landholder type 2022 (n= 327-374) ### significant difference by landholder type

CURRENT PRACTICE	% Yes TOTAL	% Yes FTF	% Yes PTF	% Yes HF	% Yes NF
In the past 12 months have you changed your operations to increase the soil carbon on your property (e.g. by revegetation, soil management) ###	20	27	26	18	8
In the past 12 months have you changed your financial or on-property operations as a result of seasonal changes in weather patterns? ###	12	23	19	5	3
In past 12 months have you changed your on-property operations as a result of considering opportunities to reduce carbon emissions (e.g. generating solar/ wind power, increased power use efficiency, improved grazing practices, improved nitrogen use efficiency) ###	20	28	27	14	8

Table J Long-term plans related to climate change for all landholder types, (2022 n=359-367). ### = significant difference by landholder type

LONG-TERM PLANS	UNLIKELY	LIKELY	UNSURE
Buying property outside of my current area to mitigate increased seasonal variability ###	83%	6%	11%
Some part of my property will be set aside for conservation purposes	41%	37%	22%

[18] Norman, B., Newman, P. & Steffen, W. 2021. Apocalypse now: Australian bushfires and the future of urban settlements. *npj Urban Sustainability* 1, 2.

4.5.2 Climate-smart agriculture

The modelling showed that those who are confident that implementing regenerative practices is justified by the returns, have a view that fundamental changes are required to make the region's farming systems more resilient, are open to new ideas about farming & land management and have sufficient time available to consider changing their practices. There was a negative correlation with including a parent in their decision-making (R^2=0.30).

In the pairwise comparisons, landholders confident in implementing regenerative practices were far less likely to use commercial consultants, independent consultants or other farmers as an information source, preferring books, Landcare, NRM and environmental organisations, podcasts, websites and YouTube. They do not need to see something working next door to try something new.

In relation to implementing practices the landholder considers regenerative, both spouses attending a short course, having part of their property set aside for conservation purposes and strategic planning over a medium to longer timeframe (6 to 20 years) emerged as important in the model (Nagelkerkes R^2 = 0.19).

5 THE FUTURE OF FARMING

5.1 DIFFERENCES BY GENERATION

Age can be an important influence on farmer decision-making, both through the impact of changing life stages and associated priorities, as well as the level of experience of landholders. The respondent farmer data (for full-time and part-time farmers) was broken down into three age categories, as determined by established definitions of generations[19]: Generation Y+ (born 1981-1996 and younger), Generation X (born 1965-1980) and Baby Boomer and older (born prior to 1965, referred to as Baby Boomer+).

Given the age demographics of the cohort, the Baby Boomer+ group (aged 57 years and older group) was the largest group, so tests for significance were undertaken, where significance was set at $p<0.05$. From this analysis, some interesting differences emerged. As a group, Generation Y managed 982 hectares on average, while Generation X managed significantly less land, with an average of 511 hectares compared to the oldest cohort average of 718 hectares. In the youngest group, 27% had bought additional land in the region in the last 20 years (compared to 45% of the Baby Boomers+ group). For the oldest group an average of 100 hectares of their land managed by others (compared with 144 hectares of the younger group). Generation Y work an average of 38 hours per week on the farm, compared to 45 hours for Generation X and 44 hours for Baby Boomers+.

[19] Dimock, M. (2019). Defining generations: *Where Millennials end and Generation Z begins.* Pew Research Centre. Washington. https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/

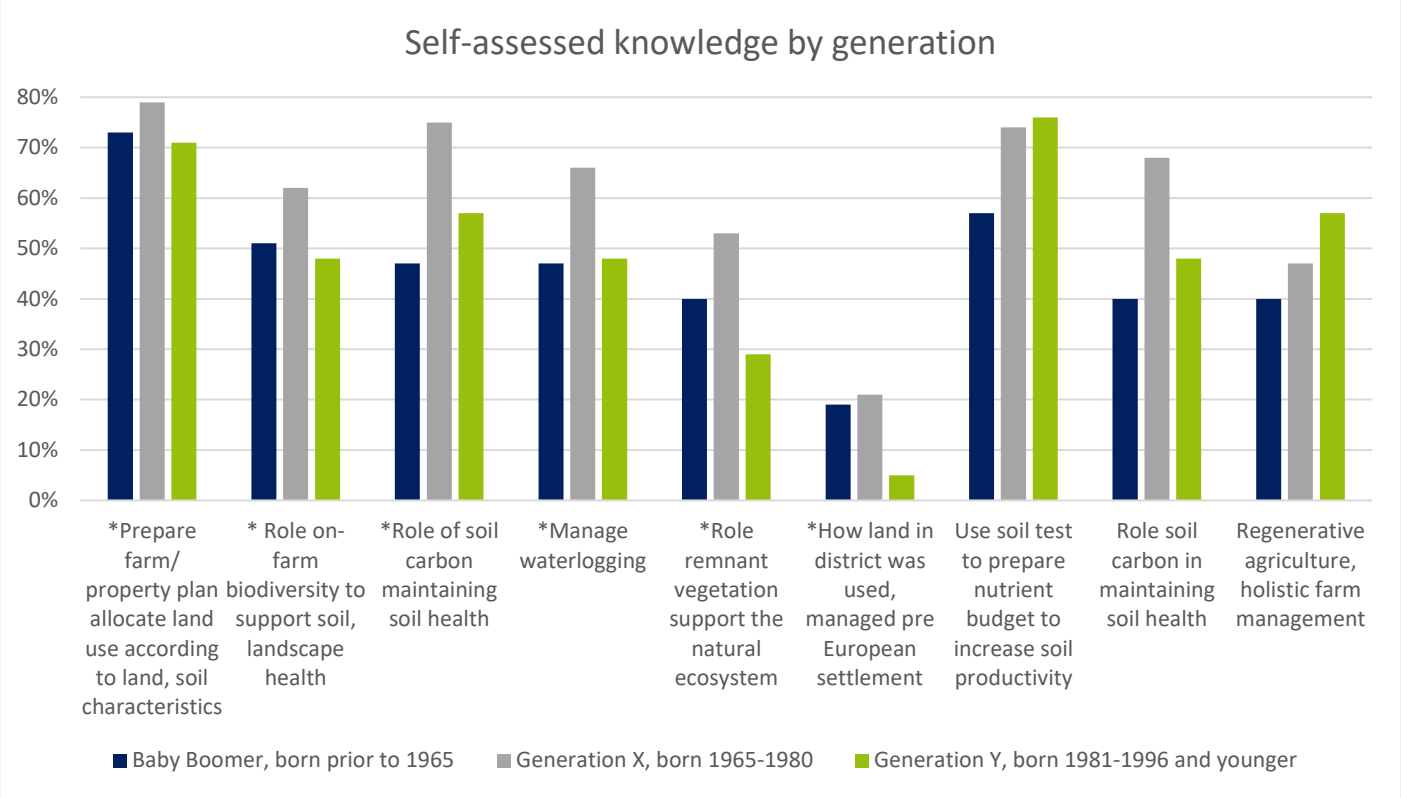

*Figure 15: Self assessed knowledge of land management practice by generation, with Gen X bookmarked by Baby boomers and older, Gen Y and younger. * = significant differences by generation.*

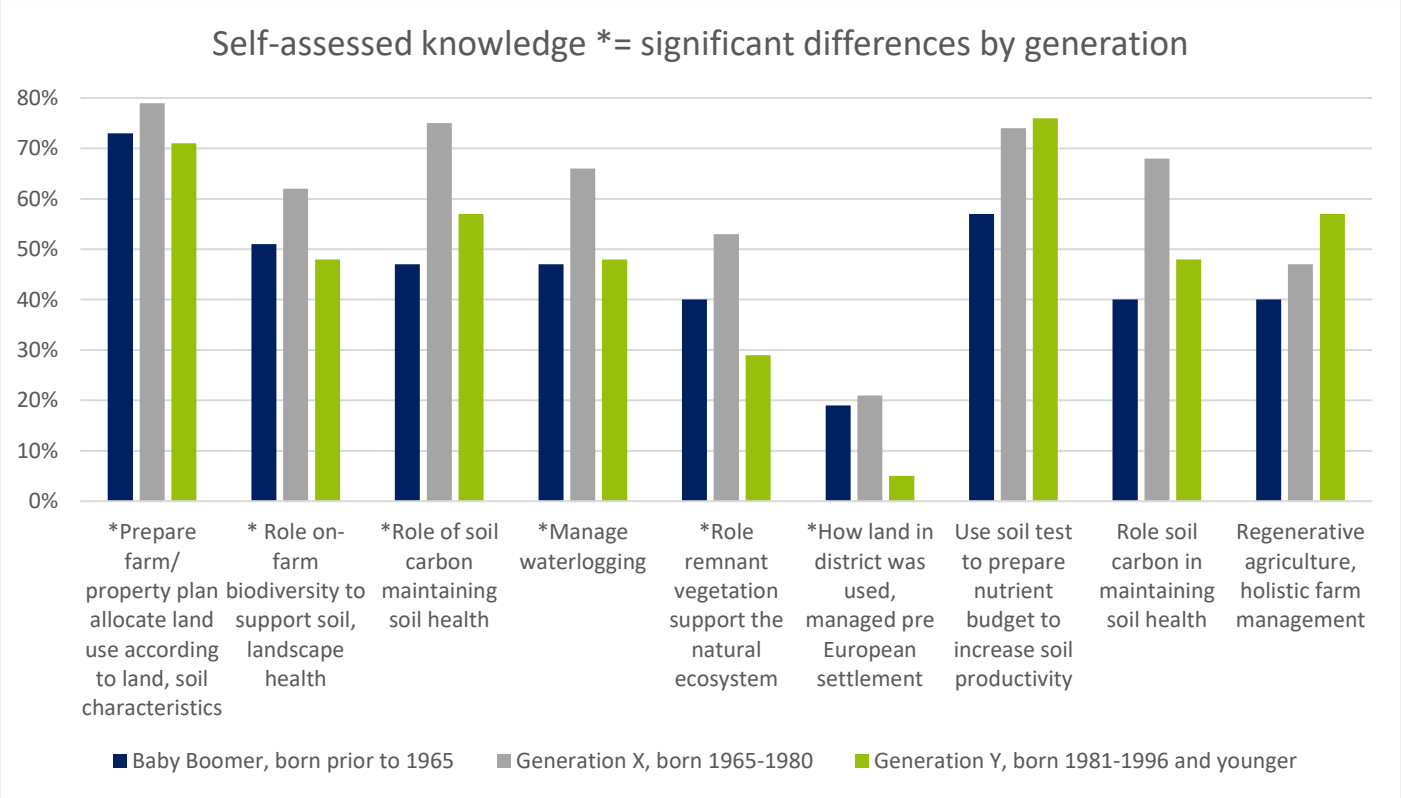

Figure 16 Management practices that show significant difference between age groups – past 5 years, 2023. (Full- & part-time farmers)

The area in which one difference emerged was in the levels of self-assessed knowledge among the groups (Figure 16), with the two younger generation groups indicating a higher level of self-assessed knowledge on the topic 'the role of soil carbon in maintaining soil health' (Gen Y 57%, Gen X 75% compared to Baby Boomers+ 47%).

This higher level of reported knowledge translated into a higher rate of actual management practices over four items, both for those that have been put in place and intended practice. As displayed in Figure 17, there were five practices in which there was a significant difference among generations in implementation since 2017.

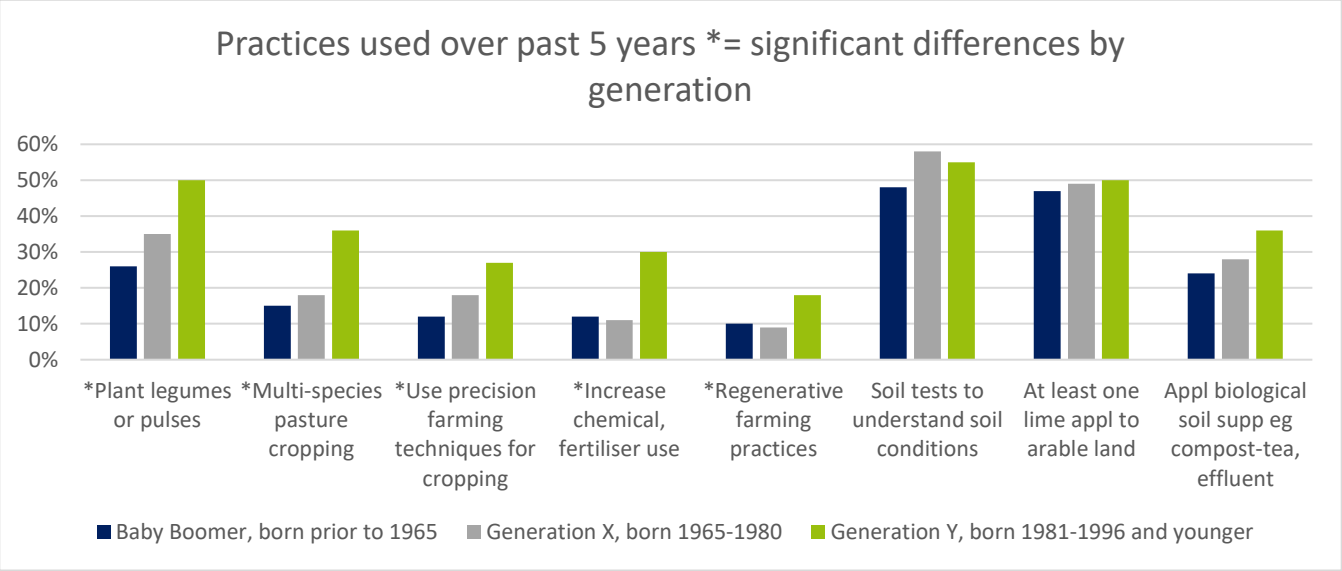

Figure 17 Management practices from 2017 to present that show a significant difference between age groups, 2022. (Full-time, part-time farmers only)

As shown in Figure 18, this extended to 17 practices when considering intended and continuing implementation. All of these items correspond to self-assessed knowledge items that were rated with higher levels of confidence by the younger group. As can be seen, there were no items more commonly applied or intended to adopt by the oldest generation.

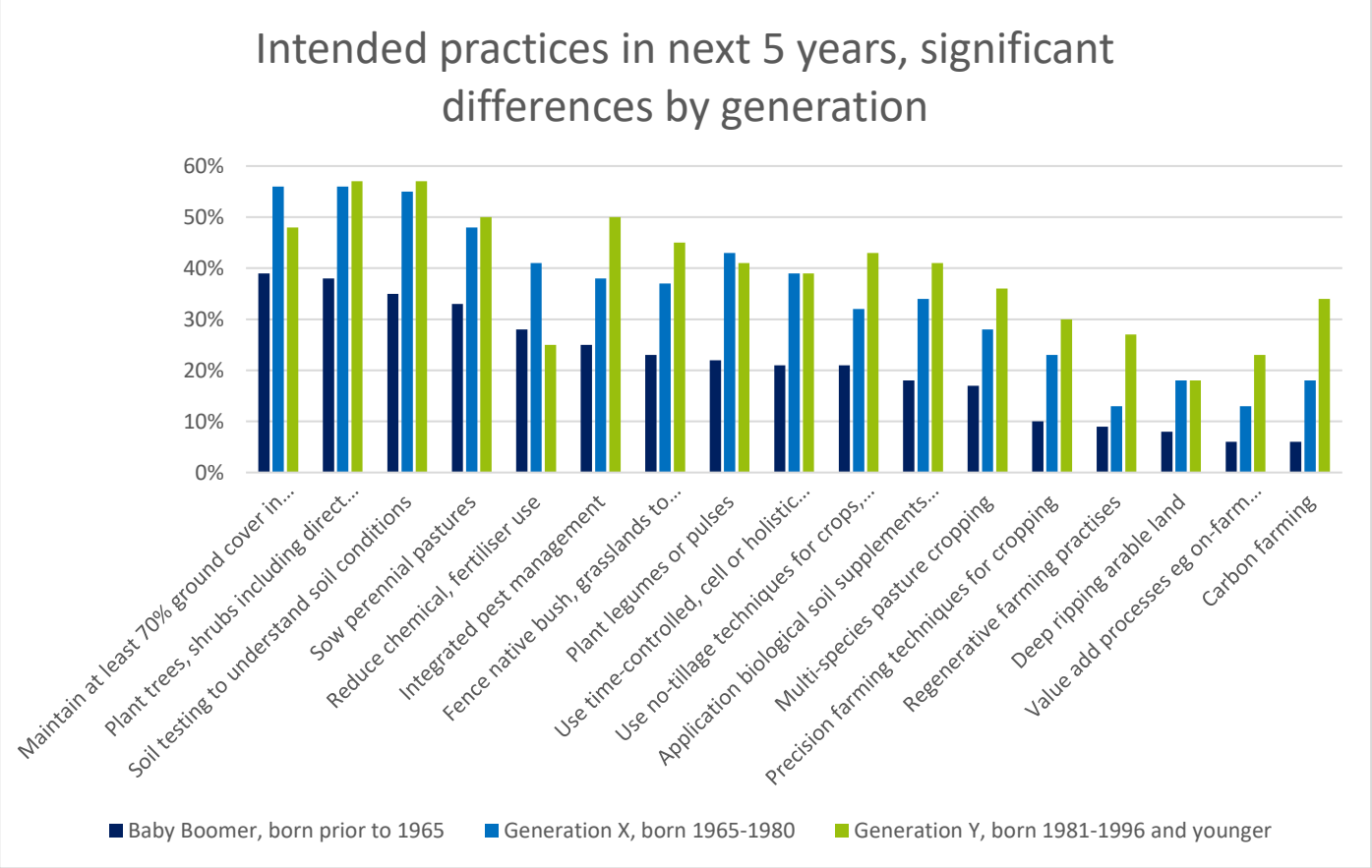

Figure 18 Intended management practices that show a significant difference by age group, 2022 (n=404)

In terms of views and experiences, the issues on which there were significant differences between the groups relate directly to these practices. The Baby Boomers+ group had strong levels of agreement with the statements 'most years I am satisfied with the income from my farm's production' (79% compared to 72% of Generation X), and that 'biological activity is an important indicator of the productive capacity of soils' (90% compared to 79% for Generation X). Generation Y had stronger levels of agreement with the statement: 'soil testing is an essential first step in understanding soil condition' (88% compared to 81% of Baby Boomers+), and that 'I am coping well with the associated stresses & challenges of managing my farm' (79% compared to 66% of generation X). Additionally, Generation Y also had stronger levels of agreement with the statements that 'there is adequate compensation or support for conservation activities on my farm (18% compared to 6% for Generation X) and that 'I have good systems in place to manage my farm data' (64% compared to 42% of Generation X). Finally, Generation Y also had stronger levels of agreement that 'biological activity is an important indicator of the productive capacity of soils' (90% compared to 79% for Generation X).

5.2 LONG-TERM PLANS

With only 16% of farmers indicating that they intend to sell the property, ownership turnover of farmlands is expected to be low. A third of (31%) of full-time farmers indicated that they intend to

purchase additional land, which is in line with broader industry trends to larger holding sizes[20]. Only 13% of farmers indicated they would lease additional land and a fifth of full-time farmers intended to change the enterprise mix to diversify income (23%) or move toward intensive enterprises (20%).

Three quarters (77%) of farmers indicated that ownership of the property would stay within the family. However, only 50% of farmers had a family member interested in taking on the property in the future. For a breakdown of long terms plans by landholder type see Table X8 in Appendix 1.

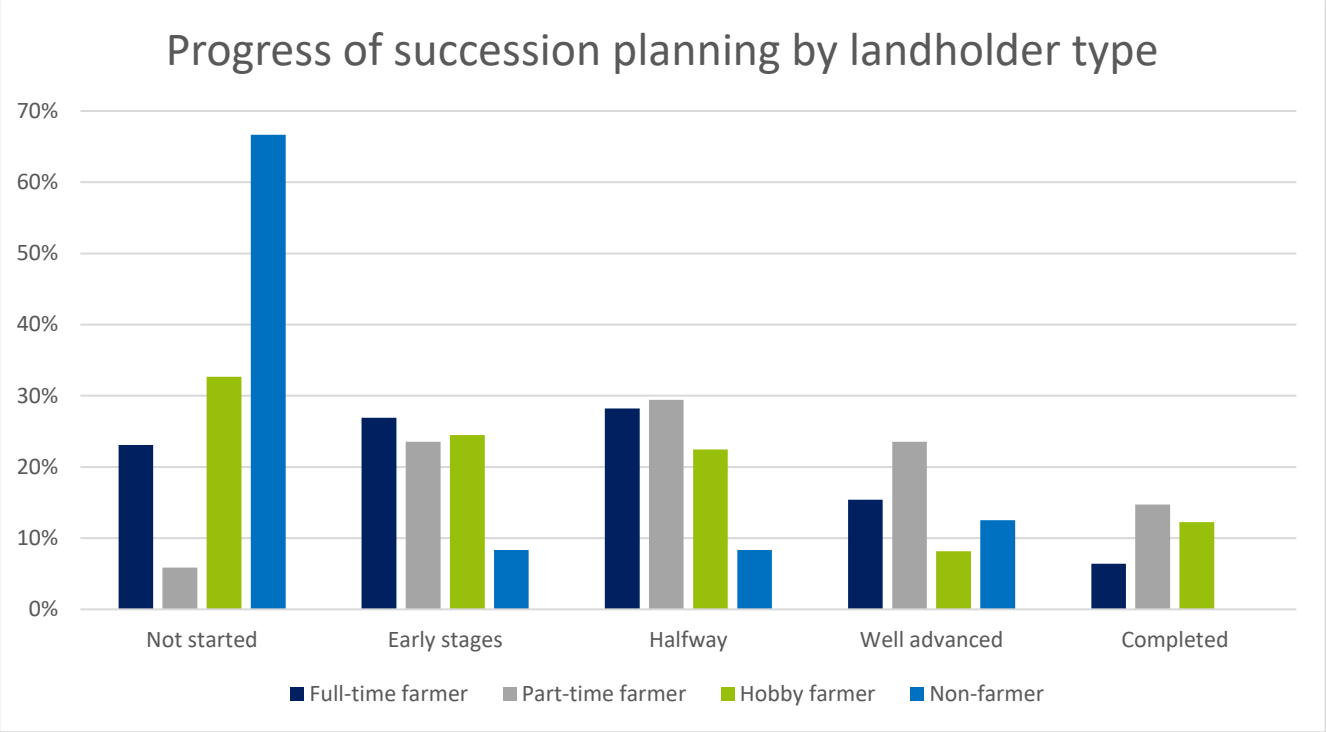

Figure 19 Progress of succession planning by landholder type, 2022 (n = 202)

When asked what the biggest challenge and/or opportunity might be over the next ten years, transition to retirement and related issues such as succession planning were a major issue raised. This was reinforced by the figures, with very low levels of succession planning, as shown in Figure 19. Part-time farmers are the most likely to have commenced and completed succession planning.

[20] Jackson, T., Zammit, K., & Hatfield-Dodds, S. (2020), *Snapshot of Australian Agriculture 2020*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.

6 ENGAGING LAND MANAGERS

6.1 KNOWLEDGE OF CURRENT RECOMMENDED PRACTICE

The knowledge surrounding a practice remains an extremely important element of its implementation. Respondents were asked to assess their level of knowledge of a number of farm management practices. Table K shows the percentages of self-reported knowledge for the listed topics. Analysis showed a sound level of expertise for farmers in a number of topics, including 'strategies to maintain ground cover to minimize erosion in this area' and identifying 'main constraints to soil productivity'. A number of issues have low reported knowledge levels, with the lowest being 'market mechanisms that support carbon farming', 'how land in district was used, managed before European settlement', and 'Aboriginal groups connected to your area/ property'. Notably, hobby farmers and non-farmers have the lowest self-reported knowledge for most items.

Table K Self-assessed knowledge by landholder type, 2022 (n= 390). Mean out of 5. Grey shading indicates knowledge level below 50% ### significant difference by landholder type.

KNOWLEDGE TOPIC	Overall % (mean/ 5)	FTF %	PTF %	HF %	NF %
Strategies to maintain ground cover to minimise erosion in this area ###	64 (3.8)	87	71	47	40
How to identify the main constraints to soil productivity on your property ###	50 (3.4)	78	64	36	14
Preparing a farm, property plan allocating land use according to land/ soil characteristics ###	49 (3.4)	77	67	31	11
Options and strategies to (re) establish perennial pastures (e.g. lucerne, native grasses) in this area ###	46 (3.5)	72	61	31	10
The processes leading to soil structure decline ###	49 (3.5)	69	62	33	29
How to use soil testing to prepare a nutrient budget that will increase soil productivity ###	42 (3.3)	69	54	26	11
How to build soil organic matter/soil carbon ###	45 (3.4)	61	51	32	33
The benefits of applying biological soil supplements (e.g. compost, manure, microbial inoculants) ###	51 (3.5)	58	53	48	43
Managing waterlogging ###	35 (3.1)	58	43	18	11
Time controlled, holistic or cell grazing strategies ###	37 (3.1)	56	57	26	7
The role of on-farm biodiversity for supporting soil and landscape health ###	35 (3.2)	56	49	20	14
The role of soil carbon in maintaining soil health ###	38 (3.2)	49	51	23	27

KNOWLEDGE TOPIC	Overall % (mean/ 5)	FTF %	PTF %	HF %	NF %
Regenerative agriculture and holistic farm management ###	32 (3.0)	48	41	24	14
The role of remnant vegetation in supporting the natural ecosystem	38 (3.3)	46	36	32	37
Managing soil salinity ###	27 (2.8)	46	33	12	7
The extent and type of biological activity in soils on your property	28 (3.2)	44	38	13	8
Emerging and/or cutting-edge agricultural technologies ###	21 (2.7)	42	26	8	3
How to support the persistence of native grasses in this area ###	23 (2.8)	30	21	17	16
Market mechanisms that support carbon farming ###	11 (2.4)	19	12	6	3
How land in your district was used and managed before European settlement ###	13 (2.3)	18	18	8	7
The Aboriginal group/s connected to the area where your property is located ###	6 (2.0)	5	10	7	1

6.2 ACCESSING INFORMATION

The provision of information, support and education are important ways to increase knowledge and confidence in farm management practices. Understanding how landholders engage with processes of knowledge sharing and education, and with industry and land management groups, provides useful insights into how information can best be shared and landholders can be meaningfully engaged.

Respondents were asked to list their top modes and sources of information in regards to topics related to the management of their property (Table L). For full- and part-time farmers combined, websites (49%), field days (47%) and newspapers (46%) were the most frequently nominated information modes. The top source of knowledge was other farmers (73%), followed by a farmer's own knowledge from their own experiences (67%), and the BOM (52%).

Table X1 shows modes of information and knowledge sources for all landholder types. In terms of up-skilling, 34% of landholders reported attending a field day/ farm walk or demonstrations focused on soil health in the past 12 months; 24% of farming property owners and/ or their spouses reported completing a short course or workshop relevant to property management in the past five years.

Table L Top information modes, sources of information for full-time, part-time farmers, 2022 (n =191)

MODE OF INFORMATION	% YES
Websites	49
Field days	47
Newspapers	46
Magazines	34
Emails	33
Books	29
Radio	29
Television	29
Brochures/ leaflets/ newsletters	26
YouTube	19
Academic journals/ research papers	16
Facebook	11
Podcasts	11
WhatsApp, Messenger groups	3
Instagram	2
Twitter	1

SOURCE OF KNOWLEDGE	% YES
Other farmers	73
My knowledge from my own experience	67
Bureau of Meteorology	52
Independent agricultural consultants, agronomists, stock agents	48
Friends/ neighbours/ relatives	45
Commercial agricultural consultants, agronomists, stock agents	43
My intuition, gut feeling	34
Other farming system, grower groups	22
DIPWE, NRE	21
NRM	20
Landcare	16
Universities, TIA, CSIRO	16
Extension officers	12
Environmental organisations e.g. Greening Australia	9
Rural R&D e.g. GRDC	9
Commodity groups	7
Southern Farming Systems	7
Local council	4
Soil CRC	4
RDA	1

Farmers were divided into age groups by standardised generations[21]: Generation Y+ (born 1981-1996 and younger), Generation X (born 1965-1980) and Baby Boomer and older (born prior to 1965, referred to as Baby Boomer+). The age breakdown reveals that older farmers (58%) are more likely to refer to traditional information sources such as newspapers, radio, brochures and the BOM, whereas younger farmers were more likely to use social media such as YouTube, podcasts, Facebook and Instagram. Gen X and Gen Y groups were likely to draw on field days (Gen X 57% and Gen Y 59%) with Baby Boomers+ at 43%. The middle age group (Gen X) was the most likely to use websites (65%). The youngest group of farmers were far more likely to draw on commercial consultants (Gen Y 68%) for agricultural advice than the two older groups (Baby Boomers+ 38%, Gen X 48%).

[21] Dimock, M. (2019). Defining generations: *Where Millennials end and Generation Z begins.* Pew Research Centre. Washington. https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/

6.3 SOURCES OF SUPPORT

Respondents were asked a series of open questions relating to their sources of support and desired support for their agricultural and land management practices. Just over two thirds, at 70%, felt adequately supported to conduct farming and land management activities on their properties.

This qualitative data complemented the quantitative, showing that support from friends, family, neighbours and other farmers was of great importance. However, agronomists, farming system groups, Local Land Services and Landcare were also raised as important support organisations.

Under half of farmers (45%) agreed that farming system groups are the best way to drive and direct local research, development and extension. The same proportion of farmers (45%) reported to have attended field days/farm walks/demonstrations focused on soil health and productivity in the past 12 months (Table M). A very low 13% of farmers considered there to be adequate compensation or support for on-farm conservation activities.

Table M Views and experiences overall by Landholder Type, 2022 (n= 387). Mean out of 5,

VIEWS & EXPERIENCE	% AGREE/ STRONGLY AGREE				
	OVERALL (mean/ 5)	FTF	PTF	HF	NF
Farming System Groups are the best way to drive and direct local research, development and extension	33 (3.4)	51	33	28	8
I feel adequately supported to conduct farming and land management activities on my property	51 (3.6)	74	55	42	21
I feel a personal responsibility to be part of a local grower group	36 (3.3)	51	41	30	13
There is adequate compensation or support for conservation activities on my farm	10 (2.7)	20	12	5	0

7 CONCLUSION

This report provides a broad range of insights into the values, beliefs, norms and practices related to farming in Tasmania.

A high proportion of farmers are open to new ideas about farming and land management. It is, however, evident that while landholders are open to new approaches, their ability to take on the risk involved could be tempered by unconscious considerations. Their approach to taking on new ideas and risks is also influenced by financial considerations, with just under half of farmers reporting that they can afford to take a few risks and experiment with new ideas.

This may explain why, despite most being open to new ideas, there is a relatively low number of self-identified early adopters in the sample. Further, a quarter of landholders indicate that their farm is doing fine the way things are and see no reason to change, which correlates negatively with best practice implementation. A broad range of information is used by farmers, with older farmers more likely to access traditional information sources, with younger farmers more likely to access online and social media sources. More than half of farmers surveyed in Tasmania trust their intuition and other farmers over other sourced information.

In relation to soil-related practices, soil testing to understand soil condition was the most implemented practice across the region, perceived as the most important influence on soil health and productivity. This was closely followed by planting trees and shrubs and use of at least one lime application. Overall, the data indicate a strong personal responsibility to maintain the productivity of soils, with young farmers most likely to consider soil testing is an essential first step for understanding soil condition. While soil testing was broadly perceived as an integral part of data gathering for soil productivity and health, little more than half of farmers are testing their soils, with the frequency of testing varying greatly. Soil tests are considered key indicators for farmers, who also use visual inspections of soils, plant health observations (including weeds), and yields.

When asked to select key challenges on a regional scale, the top issues for farmers in the region were water security, declining soil health and/or soil productivity, and risk to life/property from bushfire or wildfire. The importance of the continual balancing act between destocking and restocking in relation to seasonal and annual variability was evident in the responses. Nearly three quarters of respondents agreed that human activities influence our changing climate, and that landholders in the region should do all they can to reduce carbon emissions. Two-thirds of all respondents agree that climate change will have dire consequences if nothing is done, and that fundamental changes are required to make the region's farming systems resilient. Farmers with a more substantial belief in climate change were more likely to have recently changed their farming operations to reduce carbon emissions while also reducing their dependence on chemicals.

Responding to an open question on what they saw as their greatest challenge in the next ten years, the strongest emergent theme was that of climate change. Many farmers were cognisant of the seasonal variability linked with it, focusing on a broad range of issues such as drought and water storage. The second most common challenge highlighted was that of aging, pending retirement, succession and staying healthy. Input costs, including labour, fuel, fertiliser and chemicals were listed as important issues for farmers. Less common were financial challenges relating to mortgage

repayments and debt. When considering generational differences, the oldest generation was most likely to be satisfied with their farm's income.

In terms of how farmers could be better supported into the future, this report presents opportunities for farming systems groups, NRM organisations and Government agencies in Tasmania to connect with farmers using a mix of events and communications, and particularly younger farmers. Connecting with younger farmers may involve increased engagement with social media and online means, although young farmers are also keen to attend field days. Whereas it may be more difficult for rural agricultural organisations to improve internet services, the results suggest that their lobbying on this front would be supported by farmers. Second to this, farmers are often seeking information, knowledge and skills over new technologies. Improved, accurate and long-range weather forecasting and an increased role for drones and data systems on the farm were, however, raised as desirable by some farmers. Nonetheless, sourcing expertise to facilitate uptake and implementation emerged as a barrier to the use of these innovations.

APPENDIX 1 – DATA TABLES

TABLE X1: MODES AND SOURCES OF OBTAINING INFORMATION FOR ALL LANDHOLDER TYPES 2022 (n=191)

MODE of INFORMATION	Overall %	FTF %	PTF %	HF %	NF %
Websites	48	48	52	55	38
Field days	35	50	42	26	12
Newspapers	33	53	33	29	8
Books	29	28	30	32	24
Television	28	33	22	29	16
Magazines	27	44	14	24	12
Emails	24	38	22	16	12
Radio	22	32	22	18	12
Brochures/ leaflets/ newsletters	22	32	16	21	8
YouTube	17	17	22	22	7
Academic journals/ research papers	12	17	13	9	7
Facebook	10	10	11	9	7
Podcasts	9	8	17	11	3
Instagram	2	1	5	0	4
WhatsApp, Messenger groups	2	4	2	1	0
Twitter	1	2	0	2	0

SOURCE of KNOWLEDGE	Overall %	FTF %	PTF %	HF %	NF %
Other farmers	59	74	72	58	24
My knowledge from my own experience	56	72	56	49	36
Friends/ neighbours/ relatives	44	46	42	48	37
Bureau of Meteorology	37	56	45	25	18
My intuition, gut feeling	31	43	14	36	21
Independent agricultural consultants, agronomists, stock agents	31	55	34	23	1
Commercial agricultural consultants, agronomists, stock agents	27	50	30	16	0
DIPWE, NRE	18	21	20	18	7
NRM	17	22	17	14	11
Landcare	15	19	11	16	15
Other farming system, grower groups	15	23	20	7	5
Universities, TIA, CSIRO	10	19	11	5	1
Environmental organisations e.g. Greening Australia	9	7	13	7	13
Extension officers	7	15	5	5	0
Local council	6	4	3	8	7
Rural R&D e.g. GRDC	5	13	0	0	0
Commodity groups	4	9	2	3	0
Southern Farming Systems	3	8	5	1	0

Soil CRC	2	3	5	1	0
RDA	0	1	0	0	0

TABLE X2: LAND USE & ENTERPRISE MIX, 2022 n=424 - 418)

LAND USE/ ENTERPRISE TYPE	% Yes 2022	Difference by rainfall zone	Difference by landholder type (highest response group)
Cereal	7%	***	### (FTF 21%)
Pasture	45%	Nil	### (FTF 64%)
Dairying	5%	Nil	Nil (FTF 9%)
Beef cattle	44%	***	### (PTF 75%)
Sheep for wool or meat	31%	***	### (FTF 51%)
Bees	6%	Nil	Nil (HbF 8%)
Oil seeds	2%	***	### (FTF 7%)
Other livestock	10%	Nil	### (HbF 21%)
Viticulture	4%	***	### (FTF 9%)
Horticulture: protected berries	2%	Nil	Nil (PTF 3%)
Horticulture: vegetables	14%	Nil	### (FTF 23%)
Horticulture: seed crop	3%	***	### (FTF 10%)
Horticulture: orchard	6%	Nil	### (HF 12%)
Horticulture: other	5%	Nil	Nil (FTF 7%)
Irrigated agriculture	16%	***	### (FTF 40%)
Area remnant native vegetation (e.g. trees, grasslands, wetlands)	43%	Nil	### (NF 53%)
Farm forestry	7%	Nil	### (FTF 11%)
Other tree planting (shelter, habitat, erosion, re-charge control)	24%	Nil	### (FTF 33%)
Farm-base tourism (e.g. B&B, farm stay)	5%	Nil	Nil (PTF 11%)

Heritage agreement, covenant	6%	***	### (FTF 9%)
Growing under contract	6%	Nil	### (FTF 17%)

TABLE X3: VIEW STATEMENT, DATA USE & MANAGEMENT BY LANDHOLDER TYPE 2022 (n=372-380)

VIEW STATEMENT	% AGREE/ STRONGLY AGREE				
	OVERALL	FTF	PTF	HF	NF
Fencing to manage stock access is essential element of protecting health of waterways & native vegetation	87	90	92	90	73
Biological activity is important indicator of the productive capacity of soils	85	94	87	84	71
Soil testing is essential first step in understanding soil condition	83	94	90	82	64
I feel a personal responsibility to maintain the productive capacity of my soil	83	96	100	77	57
I am confident that my land is in a better condition than when I took on the management of this farm	77	91	82	76	46
Primary producers should do all they can to reduce carbon emissions from their activities	73	65	75	75	78
I feel confident working with numbers and managing my farm accounts	69	93	80	65	23
I'm confident managing my farm in the face of increasing change & uncertainty	68	97	79	62	31
Most years I am satisfied with the income from my farm's production	64	89	80	52	17
The costs of applying lime to address soil acidity are justified by increased production	63	89	77	44	29
The costs of establishing perennial pasture are justified by the returns	62	88	78	50	18
I am coping well with the associated stresses & challenges of managing my farm	62	79	77	62	21
I usually include another person or people in my on-farm management decisions	59	81	70	50	30
Decision making needs to be strongly influenced by data	56	63	66	48	44
I am interested in learning more about alternative/ holistic farming approaches	53	48	59	65	42
I'm confident that landholders in this region can adapt to expected changes in rainfall patterns	52	76	45	44	26

Fundamental changes are required to make our regions farming systems more resilient in our region	52	52	48	49	54
The benefits of stubble retention outweigh problems arising from the practice	40	61	53	26	15
I have good systems in place to manage my farm data	39	71	43	22	4
I feel a personal responsibility to be part of a local grower group	36	51	41	30	13
I'm confident that adopting regenerative/ holistic farming practices is justified by the returns	36	35	38	42	29
Internet or mobile phone connectivity is a barrier to my using on-farm data more effectively	34	46	30	26	21
Farming system groups are the best way to drive & direct local research, development & extension	33	51	33	28	8
There is adequate compensation or support for conservation activities on my farm	10	20	12	5	0

TABLE X4: MANAGEMENT PRACTICES OVER TIME, 2022 (n=167 -192)

MANAGEMENT PRACTICE	% At some point (prior to 2017)		% Past 5 years (2017-2022)		% Intend to implement next 5 years	
	FT	PT	FT	PT	FT	PT
Maintaining at least 70% ground cover (in non-drought years)	41	35	58	59	51	56
Use of no-tillage techniques to establish crops or pastures	32	13	41	35	34	27
Testing of soils to understand soil condition	50	27	69	62	58	54
Planting of trees and shrubs (incl. direct seeding)	45	38	39	49	42	44
Remove trees, shrubs	28	14	24	13	11	14
Sowing perennial pastures	50	29	61	44	53	44
Planting legumes or pulses	35	16	50	33	48	25
At least one lime application to arable land	47	35	67	54	53	46
Pasture cropping	26	13	41	27	37	21
Fencing of native bush/grasslands to manage stock access	47	27	39	37	29	33
Reduction of chemical use	18	22	26	40	36	43
Use of precision farming techniques	14	3	35	16	31	16
Use of time controlled, cell or rotational grazing	30	11	35	52	30	37
Increase in chemical use	12	10	22	11	13	11
Integrated pest management	38	13	55	32	47	29
Multi-species pasture cropping	17	13	26	29	30	35
Deep ripping of arable land	25	10	35	16	23	10

Farming practices that you consider to be regenerative practice/s.	10	6	14	14	15	18
At least one gypsum application to arable land	17	6	14	16	15	10
Application of biological soil supplements (e.g. compost tea, effluent)	17	6	29	19	22	35
Preparation of a nutrient budget for all/most of the property	39	16	58	38	54	37
Value-add processes (e.g. on-farm processing, retail)	11	0	14	5	15	11
Organic farming	4	8	5	14	8	14
Carbon farming	5	5	8	6	21	14

TABLE X5: MOST IMPORTANT ISSUES 2022 (n = 384) ### significant difference between landholder types

REGIONAL ISSUES	% AGREE/ STRONGLY AGREE				
	OVERALL	FTF	PTF	HF	NF
Water security ###	72	82	79	72	52
The impact of pest plants and/or animals on native plants and animals	67	68	68	63	66
Changes in weather patterns	66	68	70	68	65
Absence of important services and infrastructure (e.g. health, schools, internet, phone coverage)	64	65	53	66	63
Risk to life and property from wildfires ###	64	53	59	73	73
Declining soil health and/or soil productivity ###	64	72	76	62	49
Public support/opposition for agricultural practices (e.g. GMOs, animal welfare, pesticide use)	62	70	63	57	54
Loss of native plants and animals in the landscape ###	54	48	44	60	66
Herbicide resistance	46	54	33	50	39
Opportunities for irrigation ###	42	65	52	27	18
Non-agricultural land use (e.g. residential, wind farms, mining) encroaching on farming land ###	40	54	48	29	29
Long-term negative impacts of property purchased by absentees	33	33	42	31	29
Risk to life and property from flooding ###	21	27	16	22	10
ON-FARM ISSUES	OVERALL	FTF	PTF	HF	NF
The impact of feral animals or over-abundant native animal species on productivity ###	68	78	77	63	47
The impact of weeds or over-abundant native plant species on productivity ###	65	77	66	59	51

Water quality	60	70	58	58	45
Low level of biological activity in soils ###	44	57	48	37	30
Impact of temperature extremes on farm productivity (i.e., frost, heat damage) ###	40	52	44	40	19
Effects of pesticide use on soil biota	40	47	45	34	31
Waterlogging undermining productive capacity of soils ###	40	48	44	43	22
Declining nutrient status of soils ###	39	46	45	42	17
Soil erosion (e.g. due to wind or water) ###	36	50	33	32	24
Low level of organic carbon in soils ###	36	46	37	33	24
Chemical residue in soils	36	40	36	39	28
The activities of neighbouring landholder (e.g. such as overspray, building dams)	35	34	37	32	40
Uncertain/low returns limiting capacity to invest in my property ###	35	57	47	21	7
Soil-borne diseases ###	34	45	34	30	21
Soil acidity (lower pH) undermining productive capacity of soils ###	31	44	31	28	14
Soil sodicity undermining productive capacity of soils ###	24	36	18	20	16
Salinity undermining productive capacity of soils	16	20	18	14	10

TABLE X6: VIEWS ABOUT RISK, TRUST BY LANDHOLDER TYPE, 2022 n-372-375. Mean out of 5 shading indicates top 3.

VIEW STATEMENT	% AGREE/ STRONGLY AGREE				
	OVERALL (Mean/ 5)	FTF	PTF	HF	NF
I am open to new ideas about farming & land management	88 (4.1)	89	98	87	75
Human activities are influencing changes in climate	75 (4.1)	69	79	72	86
If we do nothing, climate change will have dire consequences for all living things, including humans	69 (3.9)	59	66	70	85
I won't take a risk if my gut/ intuition says no	66 (3.7)	69	61	66	62
It is not too late to take action to address climate change	66 (3.8)	65	69	60	75
Climate change poses a risk to the region	65	57	60	66	82

	(3.8)				
You can't be too careful when dealing with people	59 (3.6)	62	55	54	63
I trust my own intuition over other information when there is risk involved	59 (3.6)	66	55	57	49
People are almost always interested only in their own welfare	48 (3.4)	41	53	46	55
I have sufficient time available to consider changing my practices	47 (3.3)	46	55	49	38
I usually view risks as a challenge to embrace	45 (3.3)	53	52	32	43
Financially, I can afford to take a few risks and experiment with new ideas	44 (3.2)	48	63	35	33
I prefer to avoid risks	41 (3.1)	42	37	39	39
I prefer to see evidence of local success before trying a new practice	40 (3.1)	41	42	40	31
I am usually an early adopter of new agricultural practices and technologies	31 (3.1)	46	37	21	18
This may not be the best farm around, but I see no reason to change	25 (2.7)	28	23	23	22

TABLE X7: VIEWS, BELIEFS REGARDING CLIMATE CHANGE 2022 (n=375-386) ###=sig diff by landholder

VIEW	Mean /5	% Disagree	% Neutral /Don't know	% Agree	% N/A	Landholder type highest rate of agreement
I'm confident that landholders in this region can adapt to expected changes in weather patterns ###	3.6	8	33	52	8	FTF
Primary producers should do all they can to reduce carbon emissions from their activities ###	4.0	6	17	73	4	NF
Fundamental changes are required to make our region's farming systems sustainable ###	3.6	8	36	52	4	NF
BELIEF						
Climate change poses a risk to the region ###	3.8	13	23	65	0	NF
It is not too late to take action to address climate change	3.8	11	24	65	0	NF

Human activities are influencing changes in climate ###	4.1	8	17	75	0	NF
If we do nothing climate change will have dire consequences for all living things including humans ###	3.9	12	20	69	0	NF

Table X8: LONG TERM PLANS BY LANDHOLDER TYPE 2022 (n=375-386) ###=sig diff by landholder

LONG TERM PLANS	% OVERALL	% FTF	% PTF	% HF	% NF
Ownership of the property will stay within the family ###	71	77	79	71	54
Some part of my property will be set aside for conservation purposes	37	31	38	36	44
Have family members interested in taking on your property in the future ###	32	50	36	23	10
A family member will seek additional off-property work to support the farm ###	21	24	29	21	5
Additional land will be purchased ###	19	31	28	12	2
The enterprise mix will be changed to diversify income sources ###	19	23	37	16	3
This is a corporate owned property	19	21	23	20	17
The property will be sold ###	16	13	12	15	26
I will move off the property around/ soon after reaching retirement age	16	17	14	12	19
The enterprise mix will be changed to more intensive enterprises ###	13	20	25	10	2
The property will be subdivided and a large part of the property sold ###	7	10	5	5	5
All or most of the property will be leased or share farmed	7	6	11	8	3
Additional land will be leased or share farmed ###	7	13	7	6	0

APPENDIX 2 – SURVEY

SOiL CRC
Performance through collaboration

SURVEY NO.

SUPPORTING LANDHOLDERS IN TASMANIA

TASMANIAN RURAL LANDHOLDER SURVEY 2022

Southern Cross University
Charles Sturt University
NRM North
nrm SOUTH
SFS
Cradle Coast NRM

TASMANIAN RURAL LANDHOLDER SURVEY 2022

This comprehensive questionnaire is a vital part of efforts to understand the important social and economic factors shaping landholder decision making in Tasmania.

Information you provide will influence how support and information is provided by organisations working with landholders to provide the best outcomes for Tasmanian farmers and landholders. Information collected will also be used to inform the activities of the Australian Soil Cooperative Research Centre (Soil CRC).

We recognise that you may not be involved in decision making for this property. We are seeking the views of the person/s primarily responsible for managing the property. If more than one, you may fill it in together. If you are not involved in the management of the property, please forward this on to the property manager or return it in the postage-paid return envelope. We ask that you only provide information for your property/s in Tasmania.

Questionnaires are being sent to a random sample of landholders with properties in Tasmania, identified via The LIST. Each survey has a serial number that links to the property, enabling us to spatially reference our survey results with soil and weather data (spatial information derived from LISTmap, State of Tasmania). **No specific property or person will ever be identifiable in our reporting.** Our plans are to follow up this survey in about five years, to provide insights into trends over time.

This voluntary survey should take approximately 30-50 minutes to complete. There are no right or wrong answers and there is no need to think at great length about your responses. If you have any questions about the survey, please contact Dr Hanabeth Luke on 1800 317 503 or by email at Hanabeth.Luke@scu.edu.au

You are assured of complete confidentiality. Your name will never be placed on the survey or used in any of the reports. No group outside the research team will have access to the survey data. Information is published at the regional scale and individual data is never published.

Thank you for your assistance,

Dr. Hanabeth Luke
Senior Lecturer & Soil CRC Project Leader
Faculty of Science & Engineering,

Southern Cross University

1. OCCUPATIONAL IDENTITY

Please **circle** the descriptor/term that best describes your **occupational identity:**

Full-time farmer Part-time farmer Hobby farmer Non-farmer

Please circle the **rainfall zone** most relevant to your main/home property:

LOW (Under 600mm) MEDIUM (601-2000mm) HIGH (Over 2001mm)

2. ENTERPRISE / LAND USE MIX

This section is seeking **information about your current land use/enterprise mix.** *Please place a tick besides any relevant response in the 'Situation Now' column.* Please answer with the **land you own and manage** in Tasmania in mind.

ENTERPRISES / LAND USE ON YOUR PROPERTY IN 2022	SITUATION NOW	ENTERPRISES / LAND USE ON YOUR PROPERTY IN 2022	SITUATION NOW
Cereal	○	Horticulture: seed crop	○
Oil Seed	○	Horticulture: orchard	○
Pasture	○	Horticulture: other	○
Dairying	○	Irrigated agriculture	○
Beef cattle	○	Area of remnant native vegetation (e.g. trees, grasslands, wetlands)	○
Sheep	○	Farm forestry	○
Beekeeping	○	Other tree planting (e.g. shelter, habitat, erosion or recharge control)	○
Other commercial livestock enterprises (e.g. goats, pigs, deer, horses, poultry, alpaca, dogs)	○	Farm-based tourism (e.g. farm stays, B&B)	○
Viticulture	○	Heritage agreement/covenant	○
Horticulture: protected (eg. berries)	○	Growing under contract	○
Horticulture: vegetable	○	Other (please specify):	○

3. YOUR ASSESSMENT OF ISSUES

This set of statements seeks your opinion about the importance of a **range of issues that may be affecting your local district and your property.** *Examine each statement in the table individually, then place the number of your response option in each space provided for* ***'Your View'***.

RESPONSE OPTIONS:

NOT IMPORTANT	MINIMAL IMPORTANCE	SOME IMPORTANCE	IMPORTANT	VERY IMPORTANT	NOT APPLICABLE
1	2	3	4	5	6

IMPORTANCE OF ISSUES AFFECTING YOUR LOCAL DISTRICT	YOUR VIEW
Absence of important services and sufficient infrastructure (e.g. phone, schools, internet, roads) **Please specify:**	
Risk to life and property from bushfires/wildfires	
Risk to life and property from flooding	
Long-term negative impacts of property purchased by absentees	
The impact of pest plants and/or animals on native plants and animals	
Loss of native plants and animals in the landscape	
Water security	
Opportunites for irrigation	
Changes in weather patterns	
Public support/opposition for agricultural practices (e.g. GMOs, animal welfare, pesticide use)	
Herbicide resistance	
Non-agricultural land use (e.g. residential, solar farms, mining) encroaching on farming land **Please specify:**	
Declining soil health and/or soil productivity	

IMPORTANCE OF ISSUES ON YOUR PROPERTY	YOUR VIEW
The impact of weeds on productivity **Please indicate the most important:**	
The impact of feral animals or over-abundant native animal species on productivity **Please indicate the most important:**	
The activities of neighbouring landholders (eg. such as overspray, building dams) **Example:**	

IMPORTANCE OF ISSUES ON YOUR PROPERTY	YOUR VIEW
Uncertain returns limiting capacity to invest in my property	
Impact of temperature extremes on farm productivity (e.g. frost, heat damage)	
Soil erosion (e.g. due to wind or water)	
Declining nutrient status of soils, therefore increased inputs required	
Salinity undermining productive capacity of soils	
Soil acidity (lower pH) undermining productive capacity of soils	
Soil sodicity undermining productive capacity of soils	
Low level of organic carbon in soils	
Low level of biological activity in soils	
Soil-borne diseases	
Chemical residue in soils	
Effects of pesticide use on soil biota	
Water quality	
Waterlogging undermining productive capacity of soils	

4. THE PRINCIPLES THAT GUIDE YOUR LIFE

The next set of statements seeks information about the **principles that guide your life.** *Please number each.*

RESPONSE OPTIONS:

NOT IMPORTANT	MINIMAL IMPORTANCE	SOME IMPORTANCE	IMPORTANT	VERY IMPORTANT
1	2	3	4	5

THE PRINCIPLES THAT GUIDE YOUR LIFE	YOUR VIEW
Looking after my family/loved-ones and their needs	
Preventing pollution and protecting natural resources	
Being influential and having an impact on people and events	
Fostering equal opportunities for all community members	
Respecting the earth and living in harmony with nature	
Caring for the weak/vulnerable and correcting social injustice	
Creating wealth and striving for a financially profitable business	

5. WHY YOUR PROPERTY IS IMPORTANT TO YOU

The next set of statements seeks information about the **reasons your property is important to you.** *Examine each statement in the table and place the number for your response in each space provided for* ***'Your View'***.

RESPONSE OPTIONS:

NOT IMPORTANT	MINIMAL IMPORTANCE	SOME IMPORTANCE	IMPORTANT	VERY IMPORTANT
1	2	3	4	5

WHY YOUR PROPERTY IS IMPORTANT TO YOU	YOUR VIEW
Sense of accomplishment from producing food and fibre for others	
Ability to pass on a healthier environment for future generations	
Sense of accomplishment from building/maintaining a viable business	
Provides opportunities to learn new things	
A place or base for recreation	
An asset that will fund my retirement	
A great place to raise a family	
Its native vegetation provides habitat for birds and animals	
An important source of household income	
An attractive place/area to live	
Provides a sense of belonging to a community	
Provides a sense of belonging to a place	
My property is an important part of who I am	
The productive value of the soil on my property	
Native plants and animals make the property an attractive place to live	
An asset that is an important part of family wealth	

Could you please outline/list your main goal/s in relation to your property/farm?

.....

.....

.....

6. YOUR KNOWLEDGE OF DIFFERENT TOPICS

In this section we would like you to provide **an assessment of your knowledge** for a number of different topics. *Examine the response options. For each choice in the table, place the number of your response in the **'Your View'** column.*

RESPONSE OPTIONS:

NO KNOWLEDGE	VERY LITTLE KNOWLEDGE	SOME KNOWLEDGE	SOUND KNOWLEDGE (sufficient to act)	VERY SOUND KNOWLEDGE (can give a detailed explanation)	NOT APPLICABLE
1	2	3	4	5	6

YOUR KNOWLEDGE OF DIFFERENT TOPICS	YOUR VIEW
Preparing a farm/property plan allocating land use according to land/soil characteristics	
The Aboriginal group/s who are connected to the area where your property is located	
The role of remnant vegetation in supporting the natural ecosystem	
Strategies to maintain ground cover to minimise erosion in this area	
Options and strategies to (re)establish perennial pastures (e.g. lucerne/native grasses) in this area	
How to identify the main constraints to soil productivity on your property	
The benefits of applying biological soil supplements (e.g. compost, manure, microbial inoculants)	
The processes leading to soil health decline	
Market mechanisms that support carbon farming (eg. carbon credits)	
The role of soil carbon in maintaining soil health	
How to build soil organic matter/soil carbon	
How land in your district was used and managed before European settlement	
How to use soil testing to inform soil productivity planning processes (e.g. nutrient budget)	
Regenerative agriculture and/or holistic farm management	
How to support the persistence of native grasses in this area	
Emerging and/or cutting-edge agricultural technologies	
Time controlled, holistic or cell grazing strategies	
The role of on-farm biodiversity for supporting soil and landscape health	
The extent and type of biological activity in soils on your property	
Managing soil salinity	
Managing waterlogging	

7. YOUR VIEWS & EXPERIENCE

We would like to know **how closely the statements presented below reflect your views/experience.** *Examine each statement in the table, then place the number for your response in the space provided for* ***'Your view'****.*

RESPONSE OPTIONS:

STRONGLY DISAGREE	DISAGREE	NEUTRAL/ DON'T KNOW	AGREE	STRONGLY AGREE	NOT APPLICABLE
1	2	3	4	5	6

STATEMENTS	YOUR VIEW
The benefits of stubble retention outweigh problems arising from the practice	
I am confident managing my farm in the face of increasing change and uncertainty	
The costs of applying lime to balance soil acidity is justified by increased production	
The costs of establishing perennial pasture are justified by the returns	
Soil testing is an essential step in understanding soil condition	
Biological activity is an important indicator of the productive capacity of soils	
Fencing to manage stock access is an essential element of protecting waterways and native vegetation	
I feel a personal responsibility to be part of a local farming systems group	
I feel a personal responsibility to maintain the productive capacity of my soil	
There is adequate compensation or support provided for improving soil carbon on my farm	
I usually include another person or people in my on-farm management decisions **If agree, please indicate who** (i.e. agronomist, partner):	
I have good systems in place to manage my farm data	
Decision-making needs to be strongly influenced by data	
Internet or mobile phone connectivity is a barrier to my using on-farm data more effectively	
I feel confident working with numbers and managing my farm accounts	
Most years I'm satisfied with my farm's productivity given the seasonal conditions experienced	
I am coping well with the associated stresses and challenges of managing my farm	
Farming systems groups are the best way to drive local research, development and extension	
I am interested in learning more about regenerative/holistic farming approaches	
I'm confident that adopting regenerative/holistic farming practices is justified by the returns	
I'm confident that landholders in this region can adapt to expected changes in rainfall patterns	

STATEMENTS	YOUR VIEW
Primary producers should do all they can to reduce carbon emissions from their activities	
Fundamental changes are required to make farming systems in our region more resilient	
I'm confident that my land is in a better condition than when I took on the management of this farm	
I feel adequately supported to conduct farming and land management activities on my property	

OPEN QUESTIONS

What/who is your main source of support for your agricultural and/or land management activities?

What is the most important influence on your soil health?

What are your soil management goals?

What testing/indicators do you use to assess soil/land health?

Approximately, how often are your soils tested?

◯ At least annually ◯ Every 3-5 years ◯ Once ◯ Never

Where are your soils tested?

◯ One preferred location ◯ Systematically in one paddock ◯ Systematically in many paddocks ◯ Contract directed

To a depth of (tick one only): ◯ 0-10cm ◯ 15cm ◯ 16-30cm ◯ Deeper than 30cm

If you don't soil-test, why not?

Please use the following response options to respond to the statements below:

STRONGLY DISAGREE	DISAGREE	NEUTRAL/ DON'T KNOW	AGREE	STRONGLY AGREE	NOT APPLICABLE
1	2	3	4	5	6

STATEMENTS (indicate the extent to which you agree with the following)	NRE (Gov)	Natural Resource Management organisations (NRMs)	Southern Farming Systems (SFS)
Provides valuable information about soil, agronomy, farm management and/or natural resource management			
Can be relied on to keep landholders' interests in mind when making decisions about research priorities			
Should play an advocacy role/lobby on behalf of my community's needs in regards to research, development & extension (R,D & E)			

What would you most like to see from your local NRMs/NRE/SFS?

8. PREFERRED SOURCES OF INFORMATION

In the past 12 months, what have been your **top sources of information about topics related to the management of your property in the Tasmania region?** *Please place a tick besides your key sources in the table below.*

MODE OF INFORMATION		ORGANISATION/PERSONS	
Television	○	Other farmers	○
Books	○	Southen Farming Systems	○
Magazines	○	NRMs/NRE	○
Newspapers	○	Landcare	○
Emails	○	RDA	○
Radio	○	Local Council	○
Field days	○	Department of Primary Industries, Parks, Water and Environment (DPIPWE/NRE Tas)	○
Websites	○	Soil CRC	○
Instagram	○	Rural R&D corporations (e.g. GRDC)	○
Twitter	○	Environmental organisations (e.g. Greening Australia)	○
Brochures/leaflets/newsletters	○	Commodity groups	○
YouTube	○	Friends/neighbours/relatives	○
Podcasts	○	Universities/ TIA/CSIRO	○
Academic journals/research papers	○	Bureau of Meteorology	○
Facebook	○	**Independent** agricultural consultants, agronomists or stock agents	○
Whatsapp or Messenger groups	○	**Commercial** agricultural consultants, agronomists or stock agents	○
My intuition/gut feeling	○	Other farming system/grower groups	○
Extension officers	○	My own knowledge from my own experiences	○

For your selection/s above, please indicate the title of your preferred top source (e.g. *name* of newspaper or website)

.....

9. YOUR VIEWS ABOUT RISK, TRUST AND CLIMATE

In this section we would like to explore your **views about taking risks, trusting others and climate change.**
*For each statement in the table, place the number of your response in the **'Your view'** column.*

RESPONSE OPTIONS:

STRONGLY DISAGREE	DISAGREE	NEUTRAL/ DON'T KNOW	AGREE	STRONGLY AGREE
1	2	3	4	5

STATEMENTS	YOUR VIEW
You can't be too careful when dealing with people	
I am usually an early adopter of new agricultural practices and technologies	
People are almost always interested only in their own welfare	
I trust my own intuition over other information when there is risk involved	
This may not be the best farm around, but I see no reason to change	
I prefer to see evidence of local success before trying a new practice	
I prefer to avoid risks	
I am open to new ideas about farming and land management	
I usually view risks as a challenge to embrace	
I won't take a risk if my gut/intuition says no	
Financially, I can afford to take a few risks and experiment with new ideas	
I have sufficient time available to consider changing my practices	
CLIMATE CHANGE	
Climate change poses a risk to the region	
Human activities are influencing changes in climate	
It is not too late to take action to address climate change	
If we do nothing, climate change will have dire consequences for all living things, including humans	

10. MANAGEMENT PRACTICES ON YOUR PROPERTY

This section asks about **practices undertaken** on your main or 'home' property in Tasmania during the full period of your management; and the past 5 years. *Tick all relevant.*
Some actions may not be relevant to your situation: Please ignore those topics.

PRACTICES IMPLEMENTED ON YOUR MAIN OR "HOME" PROPERTY IN THE TASMANIA REGION	AT SOME POINT PRIOR TO 2017	PAST 5 YEARS (2017-present)	INTEND TO IMPLEMENT/ CONTINUE IN NEXT 5 YEARS
Planting of trees and shrubs (incl. direct seeding)	○	○	○
Removal of an area of trees and shrubs	○	○	○
Fencing of native bush/grasslands to manage stock access	○	○	○
Use of time-controlled, cell, or holistic grazing	○	○	○
Sowing perennial pastures	○	○	○
Use of no-tillage techniques to establish crops or pastures	○	○	○
Use of precision farming techniques for cropping	○	○	○
At least one lime application to arable land	○	○	○
At least one gypsum application to arable land	○	○	○
Application of biological soil supplements (eg. compost-tea, effluent)	○	○	○
Deep ripping of arable land	○	○	○
Maintaining at least 70% groundcover (in non-drought years)	○	○	○
Testing of soils to understand soil condition	○	○	○
Preparation of a fertiliser budget/plan for all/most of the property	○	○	○
Integrated pest management	○	○	○
Reducing chemical/fertiliser use	○	○	○
Increasing chemical/fertiliser use	○	○	○
Plant legumes/pulses	○	○	○
Pasture cropping	○	○	○
Multi-species pasture cropping	○	○	○
Value-add processes (eg. on-farm processing, retail)	○	○	○
Organic farming	○	○	○
Carbon farming	○	○	○
Farming practices you consider to be regenerative **Example/s:**	○	○	○

11. YOUR PROPERTY AND YOU

BACKGROUND INFORMATION	PLEASE TICK OR FILL IN YOUR RESPONSE
In hectares, what is the total area of land you own in Tasmania? (excluding land you manage but do not own)	..... total Ha owned
Is this Tasmanian property your principal place of residence?	◯ No ◯ Yes
What area of additional land do you manage (lease/sharefarm/agist from others) in Tasmania (additional to the figure you provided above)?	..... additional Ha managed
How long have you or your family owned or managed all/some part of your property?	..... years
How many rural properties do you own **within** Tasmania?	..... No. of properties
What area of your property is leased, share farmed or agisted by others?	..... Ha

INFORMATION ABOUT YOU AND YOUR MAIN OR 'HOME' PROPERTY	PLEASE TICK OR FILL IN YOUR RESPONSE
Has this enterprise bought additional land in this region in the past 20 years?	◯ No ◯ Yes
Have you subdivided or sold part of your property in this region over the past 20 years?	◯ No ◯ Yes
Estimate the number of **hours per week** that you worked on farming/property related activities (average over the past 12 months).	..... hrs/week
What is your age?	..... years
What is your gender (tick both if filling this in together)? ◯ Male ◯ Female ◯ Non-binary	
Do you identify as Aboriginal and/or Torres Strait Islander?	◯ No ◯ Yes
What is your main occupation (e.g., farmer, teacher, investor, retiree)?	
What is the highest level of formal education you have completed? ◯ Trained in life but no formal quals ◯ Year 10 ◯ Year 12 ◯ Vocational Certificate ◯ Tertiary/Uni	
Are other **family members** working on your property on a daily or weekly basis? **If yes, please indicate who they are:** ◯ Partner ◯ Child/ren ◯ Parent/s ◯ Sibling/s ◯ Other/s	◯ No ◯ Yes
Have you prepared/are you preparing a property management or whole farm plan that involves a map or other documents that address the existing property situation and include future management and development plans?	◯ No ◯ Yes
Is any proportion of your land presently lost to production due to soil problems? If yes, how many hectares have been lost ..... Ha **Please specify the issue:**	◯ No ◯ Yes

11. YOUR PROPERTY AND YOU (CONT)

INFORMATION ABOUT YOU AND YOUR MAIN OR 'HOME' PROPERTY	PLEASE TICK OR FILL IN YOUR RESPONSE
In the past 12 months have you changed your financial or on-property operations as a result of seasonal changes in weather patterns?	◯ No ◯ Yes
In the past 12 months have you changed your operations to increase the soil carbon on your property (e.g. generating wind power, improved grazing practices)	◯ No ◯ Yes
In the past 12 months have you changed your on-property operations as a result of considering opportunities to reduce carbon emissions (e.g. generating wind power, improved grazing practices)	◯ No ◯ Yes
Did you earn income from agriculture on your Tasmanian property during the 2020/2021 financial year?	◯ No ◯ Yes
Did your Tasmanian property return a net profit during the 2020/2021 financial year? (i.e. income exceeded all expenses before tax)	◯ No ◯ Yes
If yes, was your net 2020/2021 agricultural income above $50,000?	◯ No ◯ Yes
Did you or your spouse/partner receive a net off-property income (after expenses and before tax) in the financial year (2020/2021)?	◯ No ◯ Yes, me ◯ Yes, my partner
If yes, was the total off-property income for you and/or your spouse above $50,000?	◯ No ◯ Yes
In the 2020/2021 financial year, what percentage of you and your spouse's income was earned off farm? (eg. from shares, rental income, employment, other business)	..... %
Estimate the number of **days** you were involved in paid **off-property** work in the **past 12 months**	..... days per year
Has your Tasmanian property returned a net profit over the last 10 years? (i.e. income exceeded all expenses before tax, on balance, over the 10 year period)	◯ No ◯ Yes
In the past 5 years have you or your partner completed a short course/workshop relevant to property management? (e.g. financial planning, integrated pest management)	◯ No ◯ Yes, me ◯ Yes, my partner
In the last 12 months, did you attend field days, farm walks and demonstrations focused on soil health and productivity?	◯ No ◯ Yes

On average, what time-frame influences are most critical to your strategic decisions on the farm? (tick all that apply)
◯ Opportunistic ◯ Seasonal ◯ Year to year ◯ Up to 5 years ◯ 6-20years ◯ Over 20 years ◯ Over 100 yrs

In the last **12 months**, what **management decision** was the most important influence on your **profitability?**

.....

Over the last **10 years**, what **management decision** was the most important influence on your **profitability?**

.....

In the **next 10 years**, what would you see as likely being your biggest **challenge** and/or **opportunity?**

.....

Is there a **particular technology/tool/innovation/knowledge** that would support your farm management goals?

.....

12. LONG-TERM PLANS FOR YOUR PROPERTY

Please indicate the possibility that your long-term plans for your property in the **next 10 years** will involve each of the choices in the table below. *Examine the response options underneath this paragraph. For each choice in the table, place the number of your response option in the **'Your view'** column.*

RESPONSE OPTIONS:

HIGHLY UNLIKELY	UNLIKELY	UNSURE	LIKELY	HIGHLY LIKELY
1	2	3	4	5

LONG TERM PLAN OPTIONS	YOUR VIEW
Ownership of the property will stay within the family	
The property will be sold	
The property will be subdivided and a large part of the property sold	
I will move off the property around/soon after reaching retirement age	
All or most of the property will be leased or share farmed	
Additional land will be purchased	
Additional land will be leased or share farmed	
The enterprise mix will be changed to diversify income sources	
The enterprise mix will be changed to more intensive enterprises	
A family member will seek additional off-property work to support the farm	
Some part of my property will be set aside for conservation purposes	
Buying property outside of my current area to mitigate increased seasonal variability	

Is this a corporate-owned farm? Please tick your answer. ◯ No ◯ Yes

Do you have **family members interested in taking on your property in the future**? Please tick your answer.

◯ No ◯ Yes ◯ Unsure/too early to know

If Yes, does your family have a **succession plan** underway? Please circle your answer.

Not started Early stages Halfway Well advanced Completed/Ongoing

OTHER COMMENTS AND THANK YOU FOR YOUR TIME

Do you have any other comments about any of the topics covered in the survey, or other aspects of land and water management in Tasmania? Please use the space provided to write your comments or attach additional sheets. Your comments will be recorded by the research team.

We appreciate the time you have spent answering the questions. **Please return the completed survey in the postage-paid envelope provided**.

If you need assistance with the survey, wish to make specific comments about it, or receive a copy of results, please contact Dr Hanabeth Luke via **1800 317 503**.

If you would like to be contacted as a part of further research, please write your email address or other contact here: