SOiL CRC

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Rural Landholders of North Central Victoria Social Benchmarking Report 2025

Project 1.2.007

Soil CRC Social Benchmarking of Rural Landholders Across Australia

Murdoch University

North Central CMA

Charles Sturt University

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CONTACT DETAILS

Associate Professor Hanabeth Luke

Email: Hanabeth.Luke@murdoch.edu.au

DISCLAIMER

The views expressed in this report are solely the authors', and do not necessarily reflect the views of Murdoch University, the Cooperative Research Centre for High Performance Soils (Soil CRC) or the people consulted during the research project.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGMENTS

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Finally, we would like to thank all the landholders who took the time to complete the survey.

LIST OF ACRONYMS

CMA – Catchment Management Authority

CSU – Charles Sturt University

DIPWE/NRE – Department of Natural Resources and Environment

FTF – Full-time Farmer

GIS – Geographic Information System

HF – Hobby Farmer

LGA – Local Government Area

NF – Non-farmer

NRM – Natural Resource Management

PTF – Part-time Farmer

SCU – Southern Cross University

Soil CRC – Cooperative Research Centre for High Performance Soils

RCS – Regional Catchment Strategy

VFF – Victorian Farmer's Federation

LEGEND

Significant difference by farmer type

* Significant difference by LGA

^ Significant difference by generation

EXECUTIVE SUMMARY

A program of Surveying On-Farm Practices, supported by the Cooperative Research Centre for High Performance Soils (Soil CRC), was initiated in 2019 to implement surveys in partnership with local farming and natural resource management (NRM) organisations across multiple Australian states, providing 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 Associate Professor Hanabeth Luke of Murdoch University.

The overall survey design builds on the work of Professor Allan Curtis. The general approach is that questionnaires are physically mailed to landholdings over ten hectares (10 ha) in the selected region, either to a systematic, random selection or to all landholders, 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, farmer values, and self-assessed knowledge of, and confidence in, current recommended (best) practices, as well as 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 through a number of customised questions. Each survey is customised through collaboration with regional partners to ensure local relevance.

The 2024 North Central Victoria social benchmarking survey contributes to the national Soil CRC program. Murdoch University researchers partnered with Charles Sturt University and North Central CMA to develop and undertake the survey. Associate Professor Luke conducted a workshop with representatives of North Central CMA in Bendigo in December 2023. This workshop identified key topics and questions, with a focus on the complexities involved in decision-making about farms and NRM, 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, NRM practices and drivers of increased productivity, including carbon and biology, how soil testing takes place, and what regional interest there may be in regenerative agriculture. A questionnaire was drafted and piloted with local partners and a small group of rural landholders. Some minor revisions were made following this. The final questionnaire is presented in Appendix 2.

In mid-2024, a survey booklet was mailed to a sample of 2343 rural property owners holding land in North Central Victoria over 10 ha in size. Following removal of return to senders and opt-outs, the final sample size was 1611, of which 395 questionnaires were returned, resulting in a response rate of 25%. 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 following highlights the findings.

PROFILE OF FARMING

When compared with the results from a similar survey undertaken in 2014 (Curtis and Mendham, 2015) and 2019 (Curtis and Luke, 2019), it is apparent that the agricultural landscape in North Central Victoria has undergone significant changes over the past decade. There is a notable decline in full-time farmers from 52% of landholder respondents in 2014 to 49% in 2019 and 36% in 2024, while lifestylers (hobby and non-farmers) have grown to 44% of surveyed landholders. In 2024, land use priorities vary by landholder type, with full-time farmers primarily focusing on sheep production (63%), pasture (60%), and cereal crops (56%), whereas part-time and hobby farmers place greater emphasis on mixed agricultural activities and recreational land use. Land management trends reflect an aging demographic, with the average landholder age increasing from 59 in 2014 to 65 in 2024. Full-time farmers remain the most engaged, working an average of 54 hours per week, with 97% earning income from agriculture and 72% reporting a net profit. In contrast, hobby farmers and non-farmers dedicate significantly less time to their properties and generate minimal agricultural income (Figure 1.).

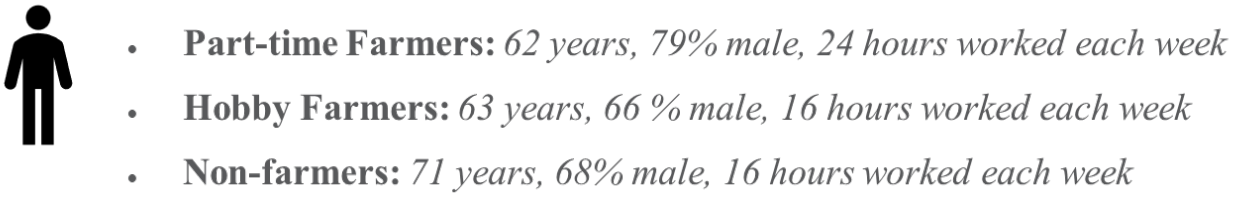

Figure 1. Characteristics of landholder groups in North Central Victoria 2024.

Farmers' goals reflect a balance between economic sustainability, environmental responsibility, and long-term land stewardship. Full-time and part-time farmers focus on financial viability, intergenerational succession, and productivity, aiming to improve soil health, biodiversity, and farm infrastructure while adapting to climate challenges. Economic stability remains a priority, with farmers investing in efficiency and resilience to ensure profitability. Hobby and non-farmers, by contrast, prioritise conservation, sustainability, and personal enjoyment. Many seek to regenerate land, enhance biodiversity, and create self-sufficient properties for food production and recreation. Across all landholder groups, there is a growing emphasis on environmental stewardship, with 86% prioritising passing on a healthier environment to future generations (Figure 2.). Personal and family identity remains central to full-time farmers with 82% stating the property is '*an important part of who I am*', while recreational land use has increased among hobby farmers. Broader guiding principles highlight shifting values, with 89% of all landholders focusing on resource protection and pollution prevention, while economic aspirations such as wealth creation have declined. These

trends underscore the evolving priorities in the region, where sustainability, lifestyle, and legacy increasingly shape landholder decisions.

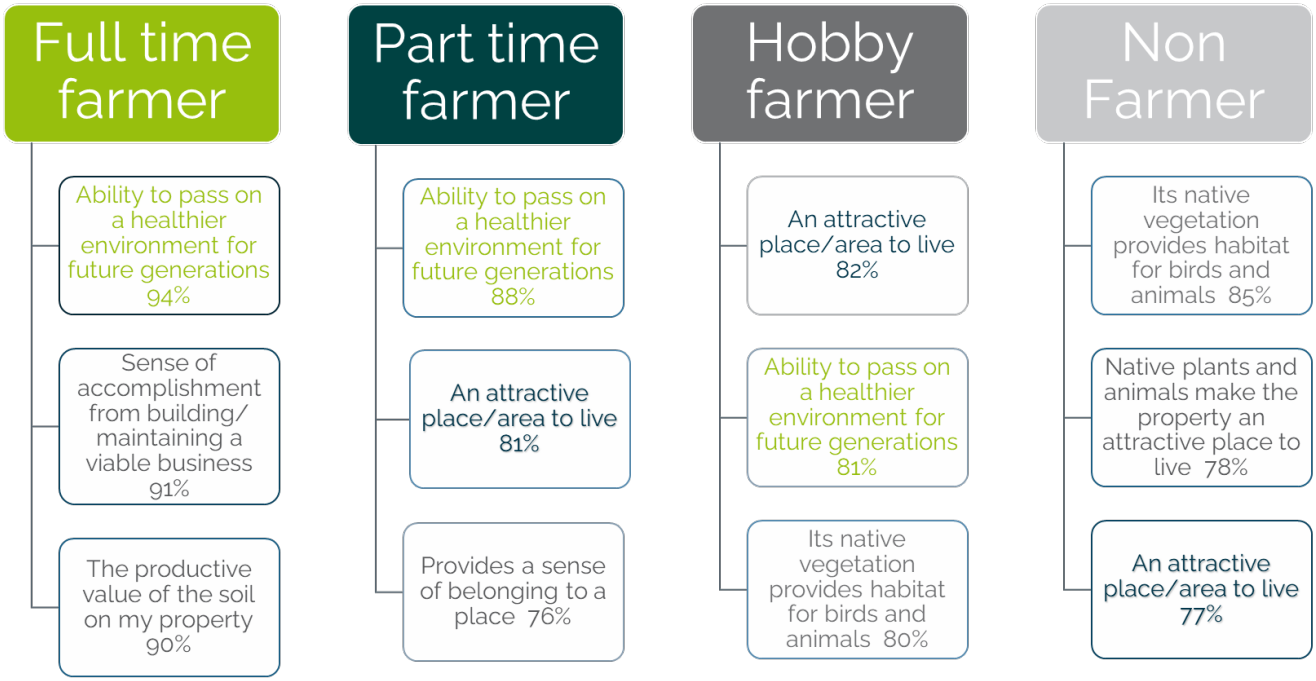

Figure 2. Values landholders associate with their North Central Victoria properties 2024.

COMPLEX DECISIONS IN FARMING & LAND MANAGEMENT

Farmers in North Central Victoria are increasingly adopting sustainable/regenerative land management practices, prioritising soil health, productivity, and environmental resilience. For full-time and part-time farmers, maintaining at least 70% groundcover (60%), implementing no-tillage or minimum tillage (55%), and planting legumes (53%) reflect a goal of improving soil structure and moisture retention. Soil testing (52%) and perennial pasture sowing (46%) indicate a strong focus on land monitoring and long-term sustainability. While traditional conservation efforts such as tree planting (49%) have slightly declined, this may be due to prior completion rather than reduced interest. Future intended practices suggest continued adoption of no-tillage farming (44%) and fertiliser budgeting (34%), alongside growing interest in regenerative techniques like multi-species pasture cropping (28%) and biological soil supplements (27%). What is regarded as best-practice is not necessarily static, and we surveyed a number of practices that are considered best practices within a number of different farming systems (Figure 3). Notably, the lowest rate of adoption was carbon farming, at just 4%. A lack of confidence in markets appeared to be an important driver of this low rate of adoption.

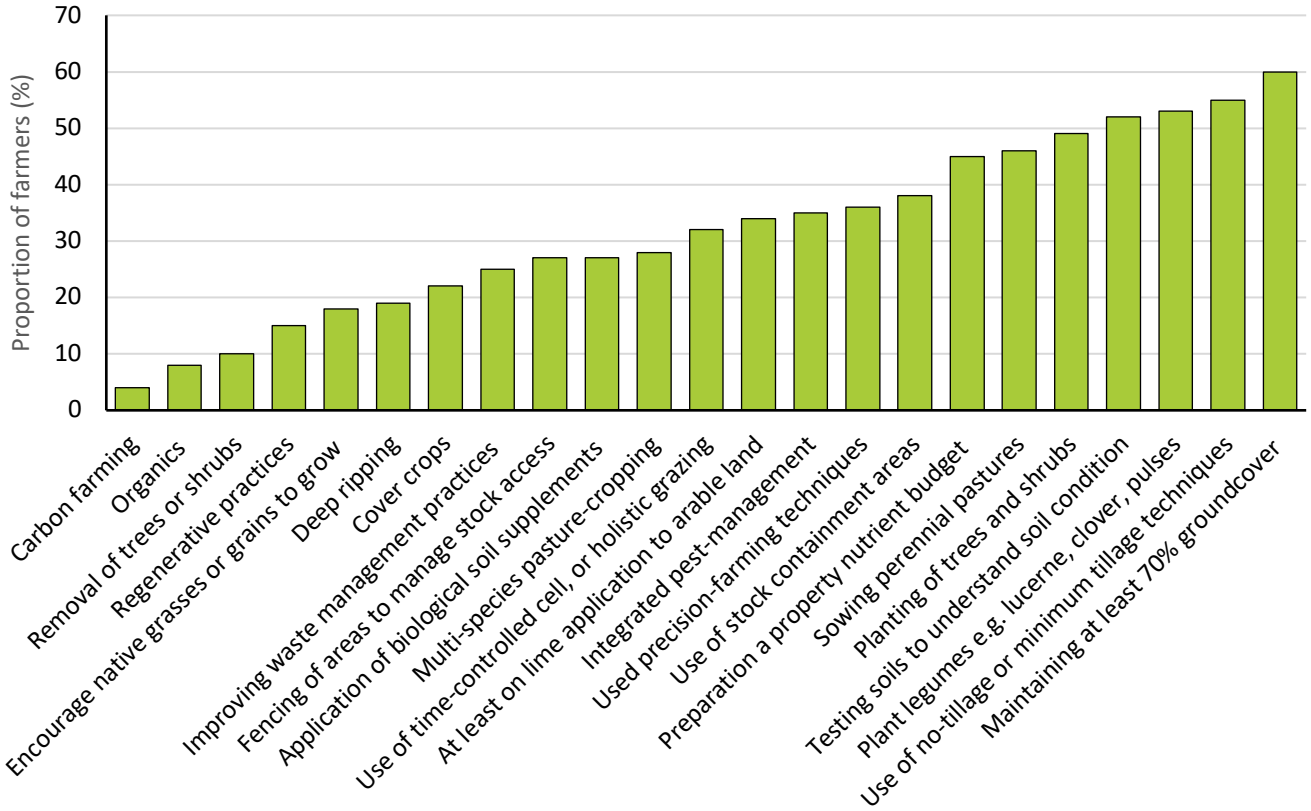

Figure 3: Practice-implementation in last five years. Please note that two items, which were fencing and planting trees, were very high in a longer time period and once in place, tend to remain in place. See Section 3.1 of report for full results.

Confidence in best-practice implementation was found to vary, with 80% of landholders recognising soil testing as essential, though actual testing rates remain lower. Economic constraints influence decision-making, with only 47% feeling financially able to take risks. While 41% prefer to avoid risk, an equal proportion embrace it, with full-time farmers (51%) more likely to adopt new practices early. Strategic planning generally follows a medium-term approach, with 34% planning on a year-to-year basis and 21% considering up to five years. Lifestylers (non-farmers and hobby farmers) show a wider range of perspectives, with some focusing on short-term flexibility (12%) and others on very long-term conservation goals (15%). Decision-making is often shared between landholders and their partners (49%), or between multiple generations (31% among full-time farmers), while a third are undertaking decision-making independently (33%).

Over the past five years, key management decisions by landholders across the region have focused on cost reduction, optimising fertiliser and irrigation use, and improving soil health through crop rotation and regenerative practices. Investments in infrastructure such as irrigation systems and fencing have enhanced productivity, while external factors like market fluctuations and climate variability have shaped adaptive strategies. Many farmers have leveraged agronomic advice and emerging technologies, including precision agriculture, to optimise resource use. While 94% acknowledge the value of soil testing, only 52% have conducted tests in the past five years, highlighting a gap between awareness and implementation.

The analysis included linear and logistical regression modelling. In this model, the use of biological soil supplements was linked with being concerned about soil carbon, and that they were taking on-property actions to reduce emissions, were decreasing the use of synthetic inputs per ha and considered themselves to have a high level of knowledge of holistic land management, or regenerative agriculture.

Despite limited knowledge of carbon farming markets, some farmers are already adopting soil carbon-enhancing practices. Understanding carbon markets was, however, identified as a key driver for those implementing carbon farming. Conversely, a lack of understanding of carbon markets was identified as a barrier to implementation.

Interest in regenerative agriculture is growing, though reported adoption rates remain low, with just 15% of full-time and part-time farmers agreeing that they are implementing practices they 'consider to be regenerative'. However, when specific practices that are closely linked with regenerative farming are considered, there is a different story. For example, considering the key principle of keeping soil covered, 60% of farmers were maintaining over 70% ground cover, 53% were planting legumes, 32% were undertaking time-controlled grazing and 28% reported to be implementing multi-species pasture cropping. Rather than a low rate of adoption, these figures suggest a lack of comfort with the use of the term, especially considering that a third of all landholders were confident that implementing regenerative practices were justified by the returns, with confidence levels higher for part-time and hobby farmers (39% of part-time farmers and 42% of hobby farmers). Just under half, 45% of farmers, were interested in learning more about regenerative practices, which also means that over half of farmers were not open.

Analysis showed that farmers who reported implementing regenerative agriculture worked closely with their spouses and reported to be decreasing their overall use of synthetic inputs. They had a high level of reported knowledge about the environmental importance of wetlands and were planting trees for various purposes including shelter, habitat, erosion, recharge control or carbon. There was a strong link with having recently changed their operations to increase the soil carbon on their property and also a high emphasis on knowledge of how to allocate land according to land class.

ENGAGING LANDHOLDERS

The survey highlights opportunities for engaging landholders by addressing gaps in knowledge and supporting the adoption of innovative practices. While farmers report strong practical knowledge in areas such as preparing for extreme weather events and managing riverbank vegetation for flood mitigation, there is limited awareness of emerging topics like carbon and biodiversity market mechanisms. Full-time farmers demonstrate higher overall knowledge of farming best-practices than other landholders, particularly in relation to practices aimed at building farm resilience, and regenerative agriculture, yet they also show gaps in understanding market mechanisms that support the building of carbon and biodiversity on the land. This indicates a need for tailored engagement strategies that address both practical and emerging knowledge areas.

Effective engagement must also consider landholders' priorities for innovation and support tools that align with their management goals. Farmers express a strong interest in technologies that improve efficiency and sustainability, such as precision agriculture tools, soil moisture monitoring, and livestock automation. However, the cost of these technologies poses a significant barrier to adoption. Beyond technology, landholders value access to knowledge-based resources, including education in composting, carbon credits, and biodiversity management, alongside financial benchmarking and succession planning. Providing affordable access to both technological and educational resources will be critical in fostering widespread adoption of sustainable practices.

Engagement strategies should also leverage landholders' preferred sources of information and support networks. The survey indicates that farmers rely heavily on peer networks (58%), personal experience (53%), and professional advisors (23%), such as agronomists and consultants. While traditional media like newspapers (36% down 22% since 2014) and field days (36% down 7% since 2014) remain important, digital tools are increasingly used, particularly among younger generations (50% of Generation Y and younger use websites compared to only 35% of Baby Boomers and older) (Figure 4.). To effectively engage landholders, strategies should combine peer-to-peer learning with accessible online resources and targeted professional support. Additionally, addressing the widespread perception of inadequate support for sustainable land management practices will be crucial in fostering long-term commitment to regenerative and environmentally responsible farming.

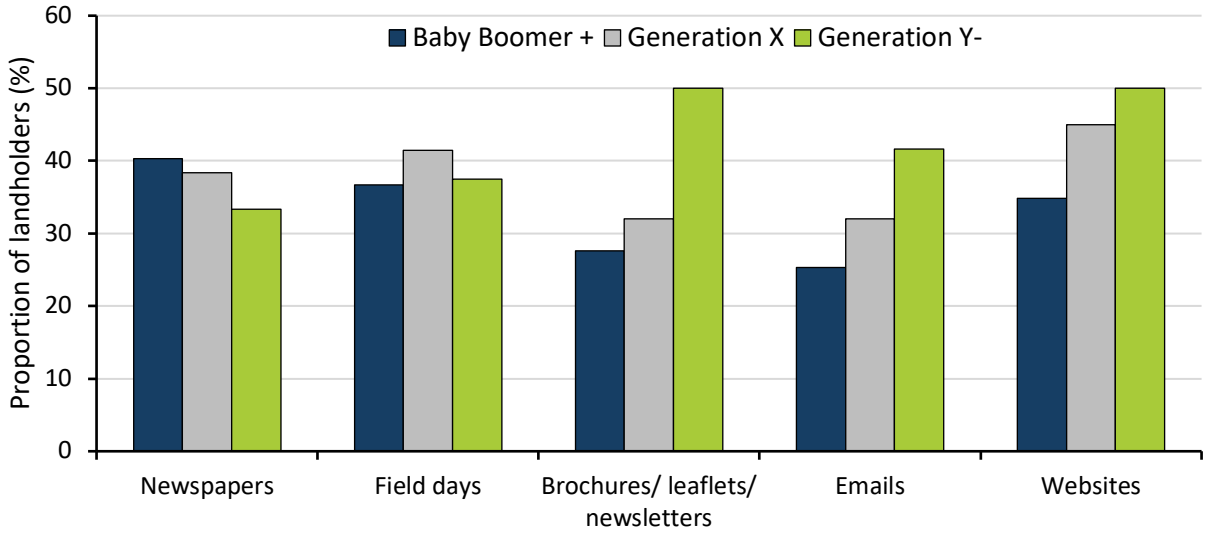

Figure 4: Information sources used by generation. Note Baby Boomers and older (Baby Boomer+) (pre 1964, are brought together due to low n numbers for the group pre-boomers), Generation X (1965-1980) is included as the middle group, with Generation Y and younger brought together in the youngest generational group (Gen Y-) (1981 and younger, coupled due to low n numbers in the group post Gen Y).

LAND MANAGEMENT CHALLENGES

The 2024 North Central Victoria Landholder Survey identifies water security, soil health, and climate variability as the most pressing concerns across all landholder groups. Water access was the top issue for full-time (77%) and part-time farmers (81%), while

declining soil health was a key concern for 66% of full-time farmers and 70% of hobby farmers. Figure 5 highlights key issues across all landholder groups. The impact of changing weather patterns was similarly emphasised across all groups (61%-67%). Biodiversity conservation also emerged as a significant priority, particularly regarding the effects of pest plants and animals on native species. Additionally, the risks posed by wildfires and declining water quality during drought were of concern, especially for non-farmers and hobby farmers. These findings highlight the broader environmental challenges that landholders face in maintaining sustainable land management practices.

Economic sustainability and property-level issues were also significant, particularly for full-time and part-time farmers, who prioritised concerns such as rising input costs (92% and 76%, respectively) and uncertain financial returns (71% and 67%). Hobby farmers and non-farmers, while still concerned about weeds and pest animals, placed greater emphasis on climate variability, including temperature extremes and changing rainfall patterns. One of the surveys open-ended questions revealed that water rights uncertainty and regulatory burdens were major challenges for full and part-time farmers, impacting long-term planning and investment. However, opportunities exist in regenerative agriculture, which was recognised as a viable pathway to enhancing resilience, improving soil health, and optimising land use efficiency. Farmers expressed a need for policies that support sustainable agriculture without imposing excessive restrictions or financial burdens.

Soil health remains a major challenge, with water-holding capacity (59%), declining nutrient status (47%), and low biological activity (47%) ranked as the most critical issues. Full-time farmers were particularly concerned about soil erosion (44%), low permeability of subsoil (52%), and organic carbon depletion (48%). Approximately 18% of farmers reported losing productive land due to soil degradation, with erosion, salinity, and sodicity frequently cited as contributing factors. The findings underscore the importance of interventions such as regenerative agriculture, improved grazing management, and precision farming techniques to address soil-related issues. Landholders have already adopted various soil improvement measures, including lime application, multi-species pastures, and no-till practices, reflecting a shift toward more sustainable land management strategies.

Climate change perceptions and adaptation strategies varied among landholder groups. While belief in human-caused climate change has increased from 53% in 2014 to 62% in 2024, optimism about the potential to mitigate its impacts has declined. Non-farmers and hobby farmers generally showed higher concern and support for climate action, while full-time farmers expressed greater confidence in their ability to adapt. Farmers (both full- and part-time combined) are increasingly implementing climate-responsive practices, with 34% focusing on soil carbon improvements and 29% making operational adjustments due to changing weather conditions. In the analysis, agreeing that climate change is due to human activity closely linked with the view that climate change was a risk to the region, that it was not too late to take action to mitigate climate, and that landholders should manage their properties in expectation of a highly

variable climate. These factors were also linked with the intention of landholders to set aside land for conservation (adjusted R squared for model = 0.64, see section 5.3).

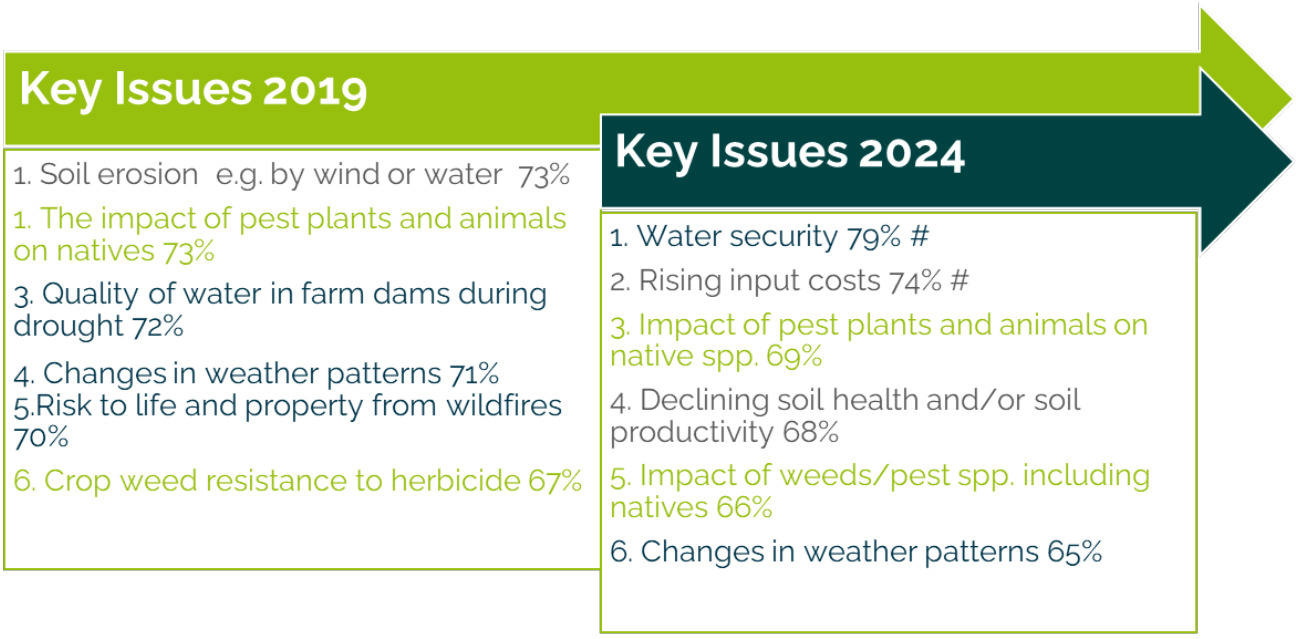

Figure 5. A comparison of key issues facing North Central Victoria landholders 2019-2024.

THE FUTURE OF FARMING

Succession remains a top challenge in Australian agriculture, with more farming landholders wanting to keep the farm in the family (75%) than those who have a successor (45%), with less than 20% having a well-established succession plan in place, as can be seen in Figure 6:

Figure 6: Succession planning progress for farmers in the North Central Victoria region.

Therefore, having a successor in place was modelled with a range of related factors. A strong model identified that having offspring working on the property and a succession plan in place also linked closely with awareness of North Central CMA, decreasing use of synthetic inputs per hectare, and wanting to be a part of positive change in farming (R squared = 0.51).

The survey results reveal clear generational differences in farming knowledge, particularly in business planning, regenerative agriculture, and ecological management. Despite a smaller sample size, Generation Y- reported the highest familiarity with farm

planning based on land and soil conditions (60%) compared to Generation X (49%) and Baby Boomer+ (40%). They also had the greatest knowledge of incorporating legumes and pulses (52%) and the role of biodiversity in soil and landscape health (44%). However, all generations demonstrated low awareness of financial market mechanisms supporting carbon and biodiversity, with Generation Y- showing the least familiarity (4%). In contrast, Baby Boomer+ and Generation X exhibited greater knowledge of historical land-use practices before European settlement, reflecting a shift in focus from traditional land management to contemporary sustainability approaches among younger landholders.

Regarding soil knowledge, Generation Y- exhibited the highest awareness of soil health strategies, including building soil organic matter (56%) and using biological soil supplements (68%), surpassing Generation X (43% for both) and Baby Boomer+ (39% and 42%). They also showed the strongest understanding of erosion prevention through groundcover maintenance (72%), exceeding Generation X (58%) and Baby Boomer+ (56%). Awareness of soil degradation processes (48%) and the use of soil testing for productivity planning (48%) was also highest among Generation Y-, while Baby Boomer+ reported the lowest familiarity. However, knowledge of soil carbon and microbiology's role in soil health was relatively consistent across generations. These findings suggest that younger landholders prioritize scientific and regenerative approaches to soil management, in contrast to older generations, who may rely more on traditional farming experience.

Generational differences were also evident in the adoption of land management practices. While maintaining groundcover and tree planting for environmental purposes were common across all groups, younger landholders demonstrated a greater uptake of innovative techniques. Generation Y- reported the highest use of no-tillage or minimum tillage (60%), precision farming (40%), and soil testing (64%), compared to lower adoption rates among Generation X and Baby Boomer+. Additionally, younger landholders were more likely to engage in multi-species pasture cropping (36%), integrated pest management (IPM) (48%), and cover cropping (28%). Despite these trends, carbon farming and organic agriculture remained underutilised across all generations. Succession planning also emerged as a significant challenge, with 41% of landholders yet to begin the process, an increase from 2019. While more landholders are initiating succession planning, fewer are successfully completing it, highlighting the need for greater support in farm transition strategies.

1. INTRODUCTION

A program of Surveying On-Farm Practices, funded by the Cooperative Research Centre for High Performance Soils (Soil CRC), was initiated in 2019 to implement surveys in partnership with local farming and NRM organisations across multiple Australian states, providing 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 current project, presented in this report, is led by Associate Professor Hanabeth Luke of Murdoch University.

This report presents the development, administration and analysis of the social benchmarking survey, its instrument, and its results. A detailed discussion of the results and their potential use is also provided.

1.1 CONCEPTUAL FRAMEWORK

The theoretical foundation of this project acknowledges the intricacies of human behaviour and decision-making, which are characterised by complexity, multiple layers, and interconnectedness. This complexity necessitates careful consideration when aiming to facilitate changes in rural land management practices. Key drivers influencing these practices include governance frameworks, climatic conditions, property prices, and demographic dynamics, alongside farmers' perceptions of what is important, their understanding of best-practices, and their roles as land stewards. As Lockwood (1999) notes, the absence of well-understood causal relationships between these decision-making drivers diminishes the potential success of efforts to support practice change.

Values, beliefs, and personal norms—defined as patterns of accepted behaviour and decision-making—play critical roles in mediating or moderating these drivers. However, altering these deeply ingrained personal attributes is challenging in the short to medium term (Lockwood, 1999). Despite this, understanding the values and beliefs of landholders is essential for effective engagement. The Value-Belief-Norm Theory (VBN) provides a theoretical approach to explaining the relationships between values and behaviour, particularly in human-environment interactions and land management contexts. McIntyre et al. (2008) distinguish between 'held' or intrinsic values—abstract principles deemed important by individuals—and 'assigned' values, which refer to the importance landholders attach to their land and farms. Furthermore, value orientations, described by Axelrod (1994) as the prioritisation of one set of held values over others, influence personal decision-making, with individuals often holding more than one orientation simultaneously (Lockwood, 1999).

Practical strategies to encourage investment in current recommended practices (CRP) and innovative approaches can be improved by identifying effective 'levers' for change. According to Lockwood (1999), if landholders are unaware of an approach, technology, or practice, or if they lack confidence in its effectiveness, they are unlikely to adopt it. Similarly, high costs or perceived complexity can further hinder uptake. Thus, surveys must assess not only landholders' knowledge and confidence in best-practice land and

farm management but also their personal norms regarding responsibility for land and soil stewardship. Curtis and Luke (2019) emphasise that personal norms related to risk tolerance significantly influence the likelihood of practice change, with those more willing to take risks being more inclined to adopt new methods.

Identifying effective extension or information-sharing approaches is another critical step in engaging rural property owners. Understanding how landholders perceive and trust local and regional organisations is particularly important for fostering learning, dialogue, and action (Luke, 2017). Landholder typologies, such as those developed by Groth et al. (2014), offer valuable insights into how different priorities shape land management practices. This study's questionnaire, which categorises respondents as full-time farmers, part-time farmers, hobby farmers, or non-farmers, builds on this typology. The approach has been validated in peer-reviewed research (Groth et al., 2014) and applied across all phases of the Soil CRC social benchmarking program (Curtis and Luke, 2019), highlighting its utility in tailoring strategies to support practice change in diverse landholder groups.

1.2 SURVEY DEVELOPMENT

The key topics and priorities relevant to North Central Victoria were collaboratively developed through a facilitated workshop in December 2023 led by Associate Professor Hanabeth Luke in partnership with North Central CMA staff. During the workshop, participants identified and refined critical topics and questions to inform survey development, building on insights from previous surveys conducted in the region. A comprehensive list of issues facing farmers in North Central Victoria was compiled, highlighting challenges such as landholder belief in climate change, changing land management and enterprise types and drivers of decision-making for NRM and farming.

Discussions explored the multifaceted roles of farmers as business operators and land managers, including balancing production goals with effective soil and land stewardship. Other key themes included managing uncertainty, farm planning, and succession strategies. A priority emerged to better understand how landholders access information on critical issues such as climate change, finance, and soil management challenges (e.g., waterlogging, salinity, erosion, soil biology, and regenerative practices). The group also discussed how to engage farmers, including barriers to accessing and applying information.

The workshop's outcomes were synthesised into six main priority topics:
A) Profile of farming in North Central Victoria
B) The complexities of decision-making in land management
C) Challenges on the land
D) How to engage land managers
E) The future of farming in the region.

Based on these priorities and on previous similar surveys undertaken in 2014 (Curtis and Mendham, 2015) and 2019 (Curtis and Luke, 2019), the project team developed the survey instrument. The survey included sections addressing significant issues faced by landholders, their values, practices, experiences, and understanding of various topics,

as well as their confidence in adopting best-practices for soil, farm, and land management. A draft of the survey was circulated to workshop participants for feedback and refinement. The revised version was piloted with local partners and a small group of rural landholders. The final questionnaire is provided in Appendix 2.

1.3 SURVEY ADMINISTRATION AND RESPONSE RATE

In June 2024, prior to the survey launch, advanced notices were mailed to 3,000 randomly selected properties over ten hectares across North Central Victoria. Property addresses were identified using spatially referenced landholder data obtained from local councils (Ballarat, Buloke, Central Goldfields, Gannawarra, Greater Bendigo, Hepburn, Loddon, Macedon Rangers, Mitchell, Mount Alexander, Pyrenees and Swan Hill). The number of properties selected in each Local Government Area (LGA) was proportional to the total number of landholders within that LGA. However, Moorabool and Yarriambiack LGAs were excluded due to a limited number of landholders. Additionally, while eligible, the council of Campaspe declined to provide landholder information citing privacy concerns, resulting in its exclusion from the survey. In the Northern Grampians, the council opted to distribute a single survey themselves, leaving spatial data unavailable for that region.

The advanced notices included a link to an online survey hosted on the Soil CRC website, allowing for some refinement of the mailing list. In July 2024, 2,343 comprehensive survey booklets were mailed out to landholders. This initial mailing was followed by two reminder notices, a second survey booklet, and a final reminder, targeting all eligible LGAs except the Northern Grampians. After accounting for non-delivered returned mail and opt-outs, the final sample size was 1,611 landholders.

Of the distributed surveys, 327 were returned in booklet form, with an additional 62 completed online, yielding a response rate of 24.2%. A total of 389 surveys were collected across the region and analysed, with 371 used in this report. Four additional surveys were received after the statistical analysis was completed (Table 1.).

Table 1. The distribution of landholder responses by local government area for 2024 North Central Victoria Landholder Survey (N=389). Note: Findings are based on small sample sizes (n numbers), which may limit generalisability. Interpret with caution.

LGA	2019 Count	2024 Count	Percent 2024
Ballarat	10	7	2
Buloke	32	30	8
Central Goldfields	33	2	1
Gannawarra	56	34	9
Greater Bendigo	91	82	21
Hepburn	54	37	10
Loddon	111	58	15
Macedon Ranges	38	33	9
Mitchell	8	6	2
Mount Alexander	64	31	8
Northern Grampians	52	20	5
Pyrenees	33	29	8
Swan Hill	18	20	5

1.4 DATA ANALYSIS

We employed three primary methods to analyse the data: descriptive statistics, tests for statistically significant pairwise relationships, and multivariate relationships using linear and logistic regression modelling. Descriptive statistics, including frequencies, means, and medians, were used to summarise responses to all survey items, with "not applicable" and missing responses excluded from the means and further analysis. Further analysis examined statistically significant differences across self-identified landholder groups, which were full-time farmers, part-time farmers, hobby farmers, and non-farmers; and generational cohorts, which included the Baby Boomers and older (Baby Boomer+) (pre 1964, coupled due to low n numbers for the group pre boomers), Generation X (1965-1980), and Generation Y and younger (Gen Y-) (1981 and younger, coupled due to low n numbers in the group post Gen Y).

To assess differences across groups, Kruskal-Wallis rank sum tests were applied for continuous or Likert scale variables (e.g., age or agreement with an issue) based on a grouping variable (e.g., farmer identity). Likert responses were condensed into two categories (1–2 and 4–5) for reporting percentage agreements. For nominal data, such as Yes/No responses (e.g., Landcare participation), Pearson's chi-squared test with simulated values was used to identify differences by grouping categorical variables. Chi-squared goodness-of-fit tests assessed dependencies between two grouping variables. Pairwise comparisons explored relationships—both positive and negative—between variables that could influence the adoption of best-practice management, which often relates to sustainable or regenerative agriculture and natural resource management. Respondents were given the option to select "Don't know/Not

applicable" for all relevant questions, allowing for context-specific responses; the proportion choosing this option varied across items.

A p-value below 0.05 was considered statistically significant, indicating that the likelihood of the observed relationship or difference occurring by chance was less than 5%. All statistical analyses were conducted using the R statistical software package and Microsoft Excel. Pairwise comparisons were carefully reviewed to exclude statistically significant but irrelevant or nonsensical relationships, allowing the research team to narrow the analysis to approximately 30 independent variables associated with each best-practice management model. All combinations of these variables were modelled against best-practice implementation. The models were ranked using the Akaike Information Criterion (AIC), with any models exhibiting multicollinearity flagged for further consideration.

Logistic regression modelling was employed to examine the extent to which a limited set of independent variables contributed to the presence or absence of best-practice implementation. Only models achieving an accuracy of over 70% were considered. While the rejection of models with multicollinearity reduces statistical redundancy (e.g., when two variables have similar effects), it may also lead to the exclusion of conceptually significant relationships. For instance, pairwise comparisons might show a meaningful relationship between best-practice implementation and both participation in a soil health group and property size. If these two variables are correlated, regression modelling may exclude one, potentially overlooking important insights.

The following sections detail the survey results and their implications.

2. A PROFILE OF FARMING IN NORTH CENTRAL VICTORIA

2.1 AN AGRICULTURAL LANDSCAPE

The farming profile in North Central Victoria has shifted significantly over the past decade, marked by a steady decline in full-time farming and a notable increase in hobby farming and non-farming landholders. In 2014, full-time farmers constituted 52% of landholders, while part-time farmers accounted for 30%, and hobby or non-farmers made up 18% (Figure 7.). By 2019, full-time farmers had decreased slightly to 49%, with part-time farmers dropping to 19%, and hobby or non-farmers increasing to 32%.

By 2024, full-time farmers represented only 36% of landholders, while hobby and non-farmers grew to 44%, and part-time farmers remained relatively stable at 20%. These changes reflect a shift toward more diverse landholder profiles, which may influence land management practices and the adoption of agricultural innovations in the region.

Note: For this section and all sections below, refer to Appendix Table X1 for a breakdown of key attributes (respondent & property, farm data & decision-making, values & principles, attitudes, confidence & beliefs, risk & trust, challenges, soil-knowledge & challenges, climate change knowledge & challenges, information & landholder knowledge, future of farming etc.) by LGA

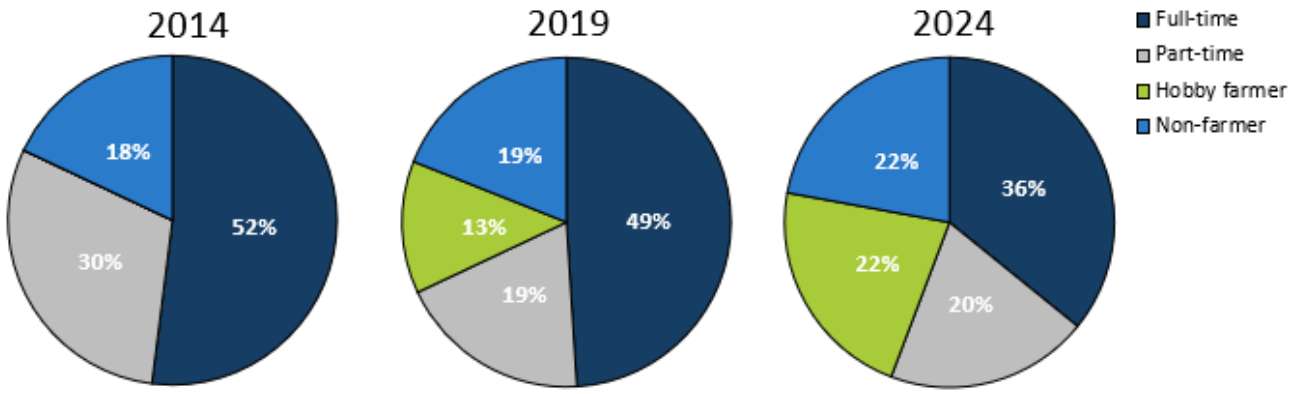

Figure 7. Proportion of landholder types in the North Central Victoria region identified in the 2014 (n=773), 2019 (n=663) and 2024 (n=371) Landholder Surveys. Note: data from 2014 only classified landholders as either 'full-time', 'part-time' or 'non-farmer.'

The 2024 North Central Victoria Landholder Survey examined the distribution of landholder identities across various Local Government Areas (LGAs) in the region (Figure 8.). The data categorises landholders into four groups—full-time farmers, part-time farmers, hobby farmers, and non-farmers—providing insight into the varying composition of land use and engagement in agricultural activities across different municipalities. The survey results highlight the proportions of each landholder type within each LGA, offering a detailed overview of the diversity in land management and ownership structures across North Central Victoria.

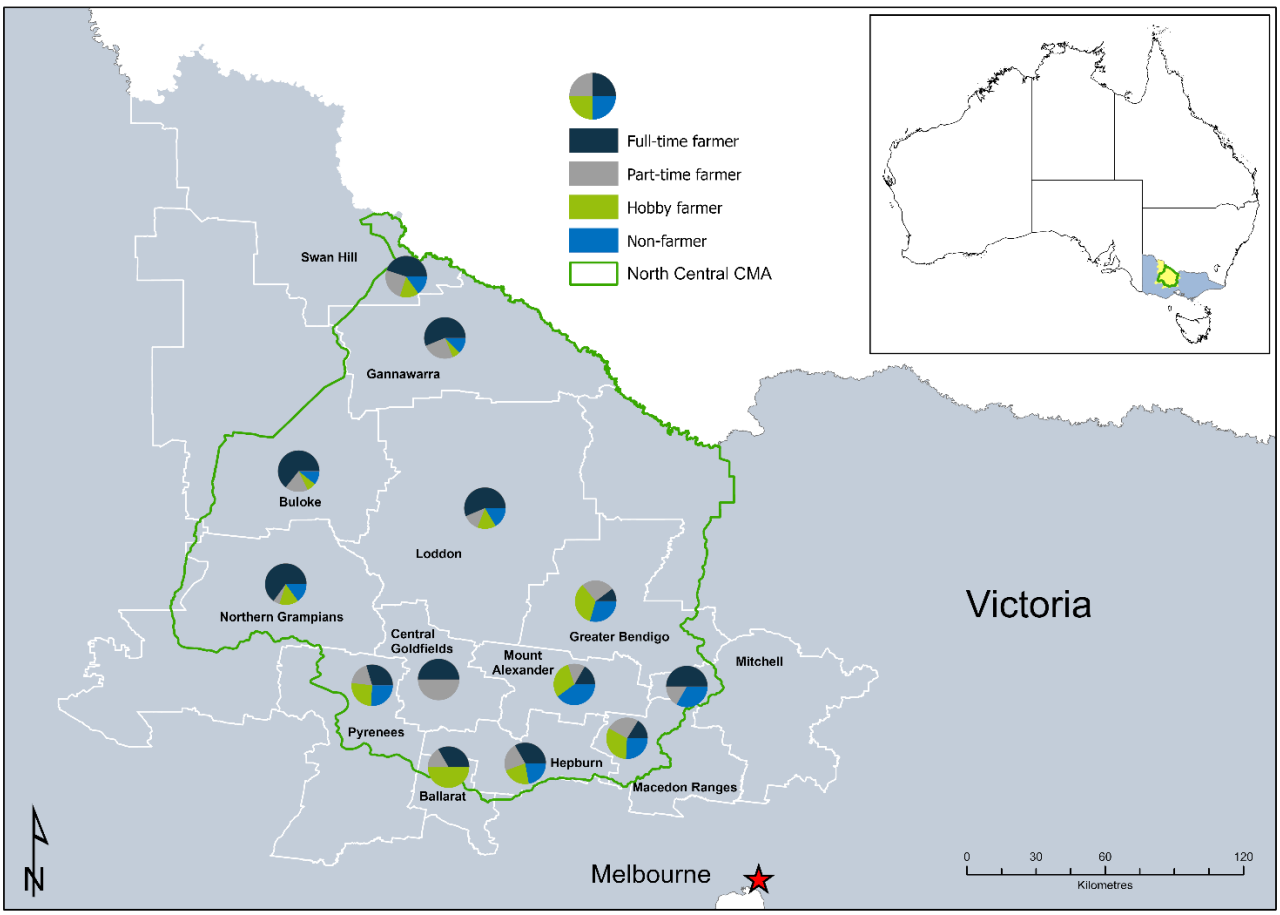

Figure 8. The distribution of landholder categories by local government area identified in the North Central Victoria Landholder Survey 2024 (n=371). (Simon McDonald)

Across North Central Victoria, land use priorities highlight the region's diverse agricultural focus, with sheep production for wool or meat being the most significant activity overall (43.1%), followed by pasture (38.4%) and areas designated for living or recreation (38.2%) (Figure 9.). These preferences vary notably between the four stakeholder groups (full-time farmers, part-time farmers, hobby farmers and non-farmers), reflecting differences in farming intensity and land management goals.

Full-time farmers prioritise productive agricultural uses, with sheep for wool or meat (63.2%), pasture (60.2%), and cereal production (56.4%) as their top land uses. In contrast, part-time farmers also favour sheep production (48.6%) and pasture (39.2%) but place greater emphasis on beef cattle (35.1%). This variation underscores the importance of tailoring land management strategies to align with the distinct priorities and capacities of different landholder groups.

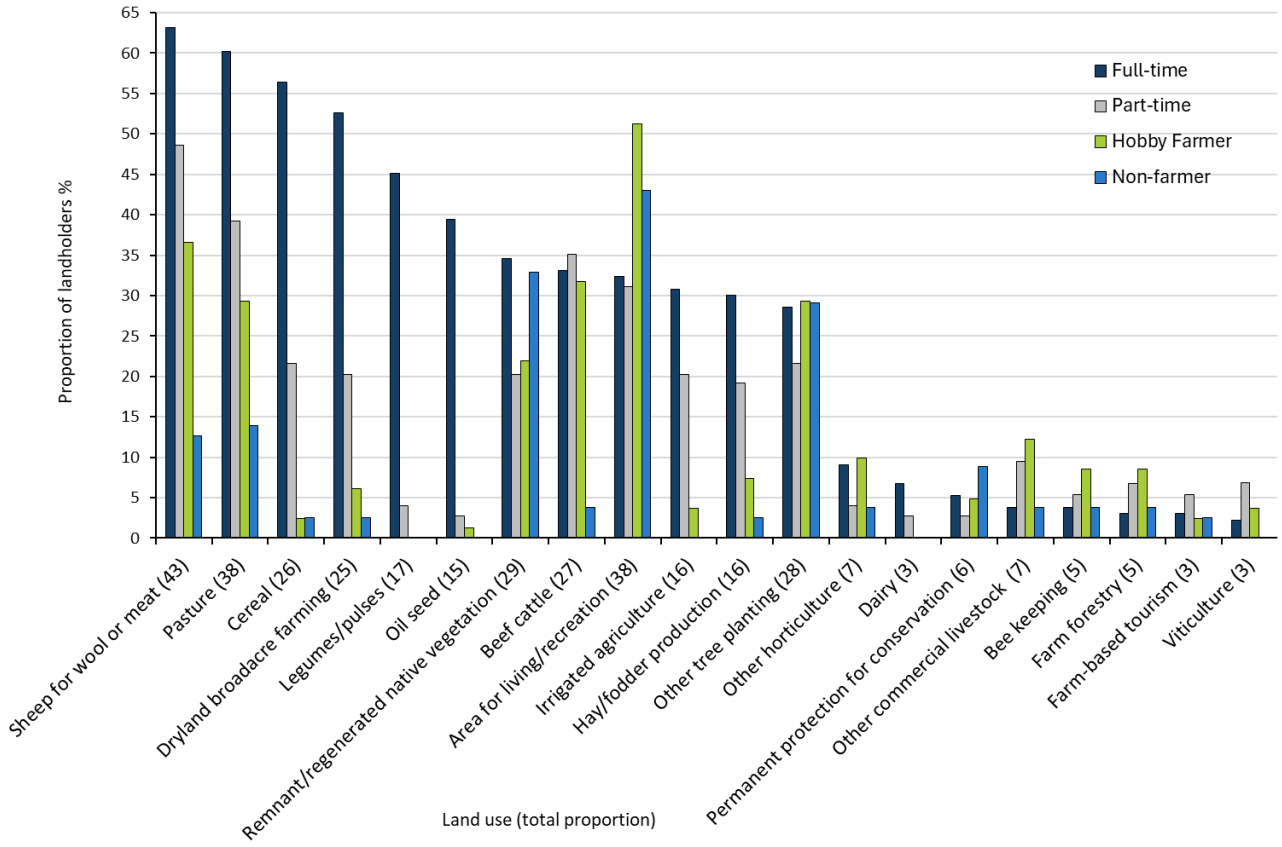

Figure 9. Land use in the North Central Victoria region by landholder type (n=383-386). Overall land use for 2014, 2019 and 2024 are given in Appendix Table X2. Brackets represent average of all landholders.

2.2 FARM MANAGEMENT

Between 2014 and 2024, the average age of landholders in North Central Victoria increased from 59 years in 2014 to 62 years in 2024, reflecting the aging demographic of the farming community (Table 2.). The findings align with data produced by the Australian Independent Rural Retailers group (AIRR), who found the average age of broadacre farmers in 2021 to be 63 years old (Whitelaw, 2025). Alongside this, the proportion of landholders who had subdivided or sold part of their property has remained relatively stable, with a slight increase from 15% in 2014 and 2019 to 17% in 2024, indicating a relatively consistent level of property transactions. The percentage of landholders residing on their properties, from 72% in 2014 to 74% in 2024, indicates that the percentage of landholders maintaining a residence on their property has been fairly constant. A deeper dive into each of the four landholder types provides a more refined overview of landholders in North Central Victoria.

Full-Time Farmers in North Central Victoria: Key Demographics and Attributes

Full-time farmers in North Central Victoria have an average age of 64 years, with 7% of respondents identifying as female. A majority, 84%, reside on their properties, and they own an average of 968 hectares of land in the region. Family ownership averages 80 years, with 79% of full-time farmers reporting that other family members work on the

property. Full-time farmers work an average of 54 hours per week on their farms. Additionally, 59% have a property management or whole farm plan in place, and 63% attended a soil health or productivity field day in the last 12 months.

Part-Time Farmers in North Central Victoria: Key Demographics and Attributes

Part-time farmers in North Central Victoria have an average age of 62 years, with 16% of respondents identifying as female. About 67% of part-time farmers reside on their properties, and they own an average of 217 hectares of land in the region. Family ownership averages 26 years, with 56% of farmers reporting that other family members work on the property. Part-time farmers work an average of 24 hours per week on their farms, and 39% have a property management or whole farm plan in place. Around a third (32%) attended a soil health or productivity field day in the last 12 months. While 76% earn income from agricultural activities, just 31% reported a net profit in the last financial year.

Hobby Farmers in North Central Victoria: Key Demographics and Attributes

Hobby farmers in North Central Victoria have an average age of 63 years, with 30% of respondents identifying as female. Approximately 73% of hobby farmers reside on their properties, and they own an average of 31 hectares of land in the region. Family ownership averages 20 years, and 48% of hobby farmers report that other family members work on the property. Hobby farmers work an average of 16 hours per week on their farms, and 26% have a property management or whole farm plan in place. Additionally, 41% attended a soil health or productivity field day in the last 12 months. While 30% earn income from agricultural activities, only 13% reported a net profit in the last financial year. Off-property income is common, with 35% of hobby farmers or their partners earning off-property income.

Non-Farmers in North Central Victoria: Key Demographics and Attributes

Non-farmers in North Central Victoria have an average age of 71 years, with 31% of respondents identifying as female. Approximately 62% of non-farmers reside on rural properties, with an average property size of 43 hectares. Family ownership averages 16 years, and 41% report that other family members work on the property. Non-farmers work an average of 5 hours per week on their properties. Only 17% have a property management or whole farm plan in place, and 15% attended a soil health or productivity field day in the last 12 months. While 7% earn income from agricultural activities, only 5% reported a net profit from their property in the last financial year.

Table 2. Key attributes summary table by landholder type for the 2024 North Central Victoria Landholder Survey (N=389) and overall, for the 2014 (N=794), 2019 (N=663) and 2024 survey years. Medians shown in brackets to compare with previous reporting.

Key attributes (mean, with median in brackets)	Overall 2014	Overall 2019	Overall 2024	Full-time 2024	Part-time 2024	Hobby Farmer 2024	Non-Farmer 2024
Age of respondent (Years)	(59yrs)	(62yrs)	65yrs (64yrs)	64yrs (62yrs)	62yrs (64yrs)	63yrs (64yrs)	71yrs (65yrs)
[1] % Female respondent	17%	22%	18%	7%	16%	30%	31%
Resident on property (% Yes)	72%	73%	74%	84%	67%	73%	62%
[1] Total area owned in region	(253ha)	(228ha)	402ha (60ha)	968ha (720ha)	217ha (85ha)	31ha (20ha)	43ha (19ha)
[1] Bought additional land in region in past 20yrs (% Yes)	47%	45%	33%	60%	43%	6%	6%
Subdivided or sold part of property in past 20 yrs (% Yes)	15%	15%	17%	22%	23%	9%	9%
Mean area of property leased, share farmed or agisted by others	80ha	45ha	37ha (0ha)	59ha (0ha)	65ha (0ha)	3ha (0ha)	13ha (0ha)
Mean area of property leased, share farmed or agisted from others	200ha	225ha	130ha (0ha)	315ha (40ha)	31ha (0ha)	7ha (0ha)	0.2ha (0ha)
Length of family ownership	NA	(46yrs)	51yrs (31yrs)	82yrs (80yrs)	44yrs (26yrs)	24yrs (20yrs)	33yrs (24yrs)
[1] Other family members working on the property (% Yes)	30%	30%	59%	79%	56%	48%	41%
Paid off-property work in the last 12 months	(150) days	(65) days	87 (5) days	26 (0) days	136 (150) days	124 (30) days	106 (50) days
Hours work on-property per week	(40hrs)	(32hrs)	32hrs (25hrs)	54hrs (50hrs)	24hrs (20hrs)	16hrs (12hrs)	16hrs (5hrs)
Earnt income from agriculture on NC property (last financial year) (% Yes)	NA	69%	59%	97%	76%	30%	7%
[1] Earned net profit from NC property (last financial year) (% Yes)	57%	24% >$50K	38%	72%	31%	13%	5%
Received off-property income in the last financial year	59%	70% me, 30% spouse	18% me, 16% spouse	15% me, 31% spouse	32% me, 6% spouse	15% me, 20% spouse	16% me, 1% spouse
[1] Completed short course related to property management past 5 years	23%	19%	14% me, 2% spouse	18% me, 3% spouse	12% me, 3% spouse	13% me, 1% spouse	4% me
[1] Attended soil health/productivity field day in last 12 months (% Yes)	40%	32%	42%	63%	32%	41%	15%
Property management or whole farm plan underway or completed (% Yes)	33%	28%	38%	59%	39%	26%	17%

[1] question not included in some surveys or slight difference in wording between survey years - see appendix

2.3 LANDHOLDER GOALS AND VALUES

In this section, data from full time and part time farmers are pooled (farmers), as are the data from hobby and non-farmers (lifestyler).

Farmer goals (Full and Part-time farmers)

Farmers' goals reported in the survey largely revolve around sustainability, financial viability, and intergenerational succession (Table 4.). Many prioritise environmental stewardship, aiming to leave their land in better condition through soil health improvements, biodiversity enhancement, and regenerative agricultural practices. The desire to pass down a sustainable and profitable farm to future generations is a recurring theme, with investments in infrastructure and strategic planning seen as essential. Economic stability remains a major concern, as rising costs and market challenges make financial security crucial. Farmers emphasise productivity and operational efficiency, focusing on increasing yields, optimising resource use, and maintaining profitability. Additionally, personal fulfillment and a deep connection to the farming lifestyle are key motivators, with many strongly valuing the rural way of life. Climate resilience also emerges as a priority, with investments in drought-proofing and irrigation strategies considered essential for long-term sustainability. Overall, farmers seek to balance economic success, environmental responsibility, and family legacy in their agricultural pursuits.

Lifestyler goals (Hobby and Non-farmers)

For hobby and non-farmers, the property and farm goal results reveal a strong emphasis on conservation, sustainability, and personal fulfillment (Table 4.). Many respondents prioritised environmental stewardship, seeking to regenerate degraded land through tree planting, soil improvement, and habitat creation for native wildlife. Others focus on self-sufficiency, aiming to produce food for personal consumption, family, and community while maintaining minimal environmental impact. A recurring theme is the desire to maintain or enhance the land for future generations, ensuring its viability and ecological health. Lifestyle considerations, such as relaxation, recreation, and connection to nature, are also significant, with many viewing their properties as sanctuaries from urban life. Additionally, while some respondents aim for modest financial returns through sustainable agriculture, most prioritise the intrinsic value of their land as a place of belonging, legacy, and environmental responsibility.

The data highlights important distinctions between altruistic, biospheric, and egoistic values associated with property ownership. Altruistic values emphasise personal identity and emotional connections to the property, such as a sense of belonging and family-raising potential, which are particularly strong among full-time farmers. Biospheric values focus on environmental stewardship, including passing on a healthier environment (86% overall) and preserving native habitats. In contrast, egoistic values prioritise economic and personal benefits, such as the productive value of soil and generating household income, which are highly valued by full-time farmers but less so by hobby farmers and non-farmers in relation to their properties. These differences reflect varied motivations, with full-time farmers prioritising both practical and

emotional connections, while others place differing emphasis on environmental or economic factors.

The following section describes landholder values as both guiding life principles, and as values landholders associate with, or attach to their properties. Several of these items have been modelled with associated items from the survey.

Biospheric Values

Within this survey and indeed across other regions surveyed, there is a consistent high importance placed on environmental stewardship and biodiversity for all landholders. Specifically, the ability to pass on a healthier environment for future generations has seen an increase in importance across all four farmer types, with 86% of landholders considering it important in 2024 (Table 4.), up from 82% in 2014. This trend is particularly strong among full-time farmers (94%) and has a significant difference when compared to non-farmers. Similarly, the importance of native vegetation providing habitat has risen significantly, reaching 75% in 2024, emphasising a growing environmental consciousness among respondents, especially those who do not farm their land (85%).

Biospheric values in our survey—such as preventing pollution and protecting natural resources—have significantly increased in importance over the past decade. In 2014, 74% of respondents prioritised these values; by 2024, this figure had risen to 89%, with non-farmers expressing the highest levels of prioritisation at 92%. Similarly, the value of "respecting the earth and living in harmony with nature" rose from 62% in 2014 to 77% in 2024, with hobby farmers showing the strongest endorsement at 84%.

When environmental values were modelled as a guiding life principle, particularly the notion of living in harmony with nature, a number of key correlations emerged. This value was strongly associated with the desire to leave the property in a better condition for future generations. It also correlated with heightened concern about changing weather patterns and support for First Nations peoples' rights to access cultural sites on private land. Individuals endorsing this principle tended to report high levels of knowledge regarding the role of wetlands in supporting a healthy landscape and were more likely to reside on smaller landholdings (R^2 = 0.35).

Pairwise analysis of this survey item revealed strong associations with other biospheric and altruistic values, such as the intention to pass on a healthier environment to future generations, compassion for vulnerable groups, care for animals, and the promotion of equality within the community. It was specifically linked to knowledge about wetland and river health (0.01164) and agreement with the right of First Nations groups to access cultural sites. Furthermore, it correlated with trust in the Catchment Management Authority (CMA) and a belief in evidence-based, science-driven decision-making. This environmental value orientation was also tied to deep concerns about soil health, biodiversity loss, water availability, and climate-related challenges. Respondents with these values typically believed in the anthropogenic origins of climate change and supported adaptive land management practices in response to climate variability. These individuals were more likely to work fewer hours on smaller land parcels, reduce chemical use per hectare, and express confidence in regenerative agriculture.

Additionally, they demonstrated high levels of interpersonal trust and supported environmental water allocations under the Murray-Darling Basin Plan. They were also more likely to view the North Central CMA as an accurate representative of landholder interests.

Egoistic Values

Economic and personal benefits connected to respondent properties remain crucial, although they show varied trends. The productive value of soil has declined slightly from 77% in 2014 to 66% in 2024, reflecting changing economic conditions and possibly environmental concerns (Table 4.). However, properties continue to be seen as important for family wealth, with 64% in 2024 highlighting its significance, albeit showing a decline from 74% in 2019. Inversely, properties are increasingly being seen as a place for recreation, rising from 55% in 2014 to 62% in 2024.

Egoistic values as guiding life principles remain focused on family, with 95% overall in 2024 prioritising "looking after family and loved ones", a consistently high value across groups. However, creating wealth has declined in importance from 65% in 2014 to 59% in 2024, with full-time farmers still emphasising it more (80%) compared to hobby farmers (46%) and non-farmers (32%). The desire for influence remains a lower priority, with slight increases to 37% in 2024 but still most notable among full-time farmers (47%).

Modelling wealth as a guiding principle: When 40 key significant items were modelled against “Creating wealth” as a guiding principle, two reasonably strong models indicated a common use of independent agricultural advisors and a concern about uncertainty of returns limiting capacity to reinvest, as key correlated factors. One of the models also linked strongly with a sense of belonging to a community; their property being a part of their identity; and with seeing themselves as an early adopter (R squared=0.32). The second model was similar in strength (R squared=0.31) and also included a concern about social license to operate, satisfaction with the productivity of their farm, and a desire to be a part of positive change in farming.

- ⇒ Very strongly linked with attached values related to wealth, identity, family and connection to community, and also the ability to pass on a healthier environment for future generations and be a part of positive change in farming (3.988E-06)
- ⇒ Creating wealth linked with 24 issues that were mostly focussed on soil, but also water security, social license and absence of services (0.003432)
- ⇒ Practice implementation of 11 sustainable/regenerative farming techniques (0.006757).
- ⇒ Having a property/whole farm plan in place (0.02935).
- ⇒ Knowledge about farming and soil health (0.005023).
- ⇒ Linked with personal norms about private property rights being upheld and personal responsibility to take care of their soil and be in a soil-health group (0.005072).

⇒ Correlated weakly with attitude (0.01627).

Creating wealth as a driving principle linked with a particular set of agricultural practices, which include maintaining groundcover, IPM, planting legumes, sowing perennial pastures, no/minimum-till, precision-farming, preparing a property-wide nutrient budget, fencing, and an intention to implement time-controlled grazing in the future. It linked with use of a particular set of information sources, including other farmers, independent agronomists/stock agents, commodity groups, rural Research and Development (R&D) groups and agricultural government departments, with emails and field days key modes of accessing information.

Farmers with wealth creation as a driving factor were likely to be younger, have family working on the farm (particularly their children), expanding their land, male, and be increasing their use of synthetic inputs per hectare.

This value item correlated negatively with understanding that climate change is anthropogenic; using environmental organisations for information and a belief that there is sufficient support provided for environmental stewardship.

Modelling capacity to influence as a guiding principle: This correlated with a concern about absence of regional services and social license for farming, along with knowledge about the role of native vegetation on water quality, a desire to be a part of positive change in farming, and having a succession plan in place (Rsquared=0.35). A slightly weaker model included all of the same factors, with the exception of social license being swapped out for confidence managing their farm in the face of uncertainty (Rsquared=0.33).

Practices were not included in the model inputs, but this guiding principle did link with several other key factors in the pairwise comparisons:

⇒ Having implemented 6 different practices, which included precision-farming, no-till, time-controlled grazing, planting legumes, and having cleared an area of land. It also linked with intention to implement organics in the future.

⇒ Significantly linked with 22 knowledge items (0.005932). Strongest link with having a high level of knowledge about systems and resources to inform farming (2.91803E-05), with a high confidence in the importance of soil testing.

⇒ Attitudinal factors were significantly linked (0.009394), with the strongest being confidence in managing their farm using data-driven decision-making (4.210E-05), and in the face of uncertainty (1.655E-05). There was also a significant link with personal norms about responsibility for soil health and involvement with NRMs (0.004132).

⇒ The practical considerations of time and money also correlated significantly (0.004843), as did personal wellbeing (0.004703).

⇒ This item correlated with three knowledge sources, being North Central CMA, Landcare and other environmental groups, as well as their own experience, with emails being the only significant mode of accessing information (0.02225).

Altruistic Values

The data reveals several key insights into the altruistic values associated with property ownership. Properties are strongly tied to personal identity, with 75% of all respondents in 2024 emphasising this connection, particularly full-time farmers (82%) (Table 3.). While the view of rural properties as a "great place to raise a family" has declined slightly over time, it remains highly valued by full-time farmers (87%) compared to hobby farmers (62%) and non-farmers (54%). Opportunities for learning new skills are moderately important, especially for full-time farmers (77%), but less so for non-farmers (44%). However, the sense of belonging to a community has diminished over time, with only 53% overall in 2024 valuing this aspect compared to 61% in 2019, suggesting that properties may play a declining role in fostering community ties, especially among less engaged groups like hobby farmers and non-farmers.

Altruistic values as guiding life principles showed moderate growth, particularly in caring for vulnerable people and correcting social injustices, which rose from 40% in 2014 to 59% in 2024, with non-farmers emphasising this more (70%) than other groups. Fostering equal opportunities remains less prioritised overall (45% in 2024), with non-farmers showing slightly higher concern (49%) than others. These trends highlight a broadening emphasis on environmental and social responsibility alongside personal and family-centred values.

Overall, the findings underscore a shift towards valuing properties not just for economic benefits but also for environmental stewardship and personal fulfillment. This shift is particularly pronounced among those directly engaged in full-time farming, highlighting a growing awareness of sustainability and broader community impacts.

Table 3. Attached values by landholder type for the 2024 North Central Victoria Landholder Survey (n=309-359) and overall, for the 2014 (n=686-746), 2019 (n= 641-651) and 2024 surveys. Means (out of 5) are given in brackets and percentages reflect the proportion of landholders that indicate important or very important for each statement. Orange shading highlights the top three values by percentage, with the darkest shade reflecting the most important value.

Attached values: Why is your property important to you?	% Important / very important						
	Overall (2014)	Overall (2019)	Overall (2024)	Full-time (2024)	Part-time (2024)	Hobby Farmer (2024)	Non-Farmer (2024)
BIOSPHERIC							
Ability to pass on a healthier environment for future generations	82% (4.2)	85% (4.5)	86% (4.4) #	94% (4.6)	88% (4.4)	81% (4.3)	73% (4.1)
An attractive place / area to live	78% (4.1)	83% (4.3) #	83% (4.2)	89% (4.3)	81% (4.1)	82% (4.3)	77% (4.1)
Native vegetation provides habitat for birds and animals	62% (3.7)	70% (4.0) #	75% (4.1) #*	71% (3.9)	63% (3.9)	80% (4.2)	85% (4.4)
[1] Provides sense of belonging to a place	NA	NA	72% (3.9)	71% (3.9)	76% (4.0)	69% (3.9)	68% (3.8)
[1] Native plants & animals make the property an attractive place to live	58% (3.6)	66% (4.0) #	67% (3.9) #	65% (3.8)	55% (3.7)	66% (3.8)	78% (4.1)
EGOISTIC							
The productive value of the soil on my property	77% (4.0)	75% (4.2) #*	66% (3.8) #*	90% (4.4)	72% (4.1)	58% (3.6)	27% (2.7)
[1] An asset that is an important part of family wealth	NA	74% (4.1) #	64% (3.8) #	82% (4.3)	69% (3.9)	59% (3.6)	34% (2.9)
A place or base for recreation	55% (3.5)	51% (3.6) #*	62% (3.7) #	54% (3.5)	55% (3.6)	77% (4.1)	66% (3.9)
Sense of accomplishment from building / maintaining a viable business	74% (3.9)	69% (4.3) #	61% (3.5) #*	91% (4.5)	65% (3.9)	51% (3.1)	10% (1.9)
An asset that will fund my retirement	54% (3.4)	55% (3.8)	56% (3.5) #*	71% (3.9)	54% (3.5)	49% (3.3)	39% (2.9)
Working on the property is a welcome break from my normal occupation	41% (2.8)	35% (3.6) #*	53% (3.3) #	28% (2.5)	64% (3.7)	75% (3.9)	54% (3.3)
[1] An important source of household income	NA	62% (4.0) #	49% (3.2) #^*	88% (4.4)	56% (3.6)	19% (2.2)	4% (1.6)
ALTRUISTIC							
[1] Sense of accomplishment from being a part of a positive change in farming	NA	NA	48% (3.2) #*	62% (3.7)	59% (3.6)	42% (3.1)	17% (2.0)
Sense of accomplishment from producing food and fibre for others	69% (3.8)	67% (4.1) #	61% (3.6) #*	89% (4.4)	76% (4.0)	44% (3.2)	14% (1.9)
[1] My property is an important part of who I am	NA	NA	75% (4.1) #*	82% (4.3)	75% (4.0)	70% (4.1)	69% (3.9)
[1] A great place to raise a family	73% (3.9)	71% (4.3) #	70% (3.8) #^	87% (4.4)	64% (3.8)	62% (3.6)	54% (3.3)
Provide opportunities to learn new things	59% (3.6)	67% (3.9)	62% (3.7) #	77% (4.0)	55% (3.6)	65% (3.8)	44% (3.2)
[1] Provide a sense of belonging to a community	NA	61% (3.7)	53% (3.6) #*	62% (3.8)	58% (3.6)	46% (3.4)	41% (3.2)

Significant difference by landholder type; * Significant difference by LGA ^ Significant difference by generation [1] Slight difference in wording or not included in some surveys - see appendix.

Note: significant differences were determined using a Kruskal-Wallis rank sum test with $p<0.05$. 2024 data were tested for significant differences by LGA, generation and landholder type. 2019 data were tested for significant differences by landholder type and LGA. No significant differences were calculated in 2014.

The findings reveal distinct trends in the principles guiding individuals' lives across biospheric, egoistic, and altruistic values (Table 4.).

Table 4. Principles that guide life by landholder type for the 2024 North Central Victoria Landholder Survey (n=360-367) and overall for the 2014 (n=737-743), 2019 (n=618-663) and 2024 surveys. Means (out of 5) are given in brackets and percentages reflect the proportion of landholders that indicate important or very important for each statement. Orange shading highlights the top three values by percentage, with the darkest shade reflecting the most important principle.

Principles that guide your life	% Important / very important						
	Overall mean (2014)	Overall mean (2019)	Overall mean (2024)	Full-time (2024)	Part-time (2024)	Hobby Farmer (2024)	Non-Farmer (2024)
BIOSPHERIC							
Preventing pollution & protecting natural resources	74% (4.0)	83% (4.2) #	89% (4.4) ^#	88% (4.2)	91% (4.3)	88% (4.4)	92% (4.6)
[1] Respecting the earth & living in harmony with nature	62% (3.8)	72% (4.0) #*	77% (4.1) #	74% (3.9)	72% (4.0)	84% (4.2)	79% (4.4)
EGOSTIC							
[1] Looking after my family / loved ones and their needs	92% (4.6)	95% (4.8) #	95% (4.8) ^	96% (4.7)	99% (4.8)	90% (4.7)	92% (4.7)
Creating wealth & striving for a financially profitable business	65% (3.7)	65% (3.9) #*	59% (3.6) ^#*	80% (4.1)	68% (3.9)	46% (3.2)	32% (2.9)
Being influential and having an impact on people and events	32% (2.9)	35% (3.1)	37% (3.1) *	47% (3.3)	31% (2.9)	38% (3.1)	29% (2.9)
ALTRUISTIC							
Fostering equal opportunities for all community members	36% (3.1)	47% (3.4) #	45% (3.3)	44% (3.3)	46% (3.3)	43% (3.2)	49% (3.5)
[1] Caring for vulnerable people and correcting social injustice	40% (3.2)	55% (3.6) #	59% (3.7) #	53% (3.6)	51% (3.5)	62% (3.7)	70% (4.0)

Significant difference by landholder type

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

Note: significant differences were determined using a Kruskal-Wallis rank sum test with $p<0.05$. 2024 data were tested for significant differences by LGA, generation and landholder type. 2019 data were tested for significant differences by landholder type and LGA. No significant differences were calculated in 2014.

3. COMPLEX DECISIONS IN FARMING & LAND MANAGEMENT

3.1 LAND MANAGEMENT PRACTICES

When assessing the data from all landholders, notable shifts in farming practices are observed between 2014 and 2024 (Figure 10.). Soil testing, no-tillage techniques, and the use of time-controlled or holistic grazing have all seen decreases, with the most significant drop observed in time-controlled grazing, which fell from 46% in 2014 to just 27% in 2024. The use of precision farming techniques and deep ripping also shows a decline, On the other hand, the preparation of a fertiliser or nutrient budget has seen an increase, rising from 19% in 2019 to 28% in 2024. These changes reflect a broader shift in farming approaches. Overall, these trends suggest a reduction in certain sustainable and precision practices, coupled with an increase in focus on nutrient budgeting in recent years.

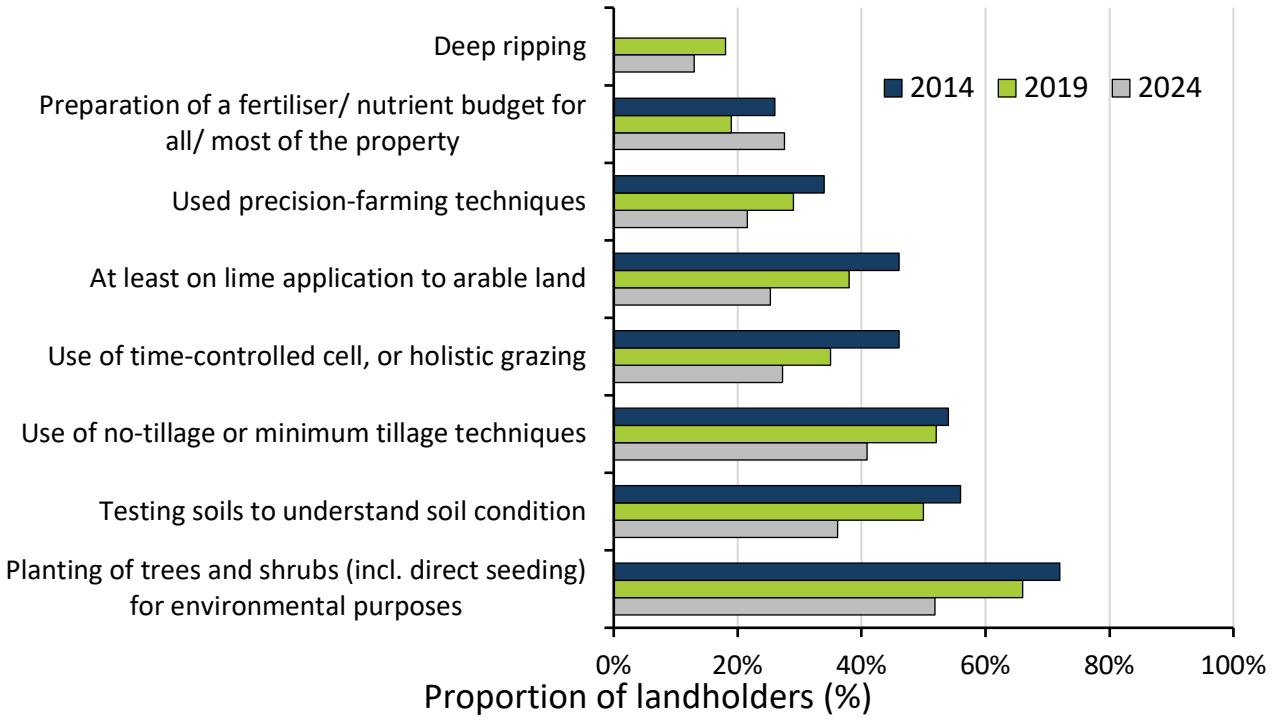

Figure 10. Practices implemented by all landholders from the 2014, 2019 and 2024 North Central Victoria Landholder Surveys. NOTE: there is quite a lot of differences between wording of the survey questions and timeframe of implementation. For example, all of the 2019 data is from full period of management, 2014 data consists of implementation over the past 12 months, 5 years and full period of management while 2024 is strictly past 5 years.

3.1.1 Farmers practice change

The adoption of sustainable and regenerative farming practices has increased among full and part-time farmers in North Central Victoria, with a strong focus on soil health, productivity, and environmental resilience (Figure 11.). Maintaining at least 70% groundcover saw the highest implementation in the past five years (60% compared to 40% pre-2019), followed by no-tillage or minimum tillage techniques (55% compared to

39% pre-2019) and planting legumes (53% compared to 35% pre-2019), indicating a shift toward practices that improve soil structure and moisture retention. Additionally, soil testing (52% compared to 42% pre-2019) and sowing perennial pastures (46% compared to 29% pre-2019) highlight a growing emphasis on land condition monitoring and pasture longevity. The increasing adoption of precision-farming techniques (36% compared to 20% pre-2019) and integrated pest management (35% compared to 22% pre-2019) suggests a greater reliance on technology and sustainable pest control strategies.

While some long-standing conservation practices, such as planting trees and shrubs (49% down from 63%) and fencing of native vegetation (27% down from 41%), have seen declines compared to pre-2019 levels (which may be due to previously completing these tasks), farmers continue to prioritise sustainable land use. Future intentions indicate continued commitment to no-tillage farming (44%), fertiliser/nutrient budgeting (34%), and perennial pastures (33%), reflecting a focus on efficiency and resilience. Although newer initiatives like carbon farming (9%) and organics (12%) remain relatively low, there is growing interest in regenerative practices, with multi-species pasture-cropping (28%) and biological soil supplements (27%) gaining traction. Overall, the findings reflect a balance between traditional conservation efforts and the adoption of innovative, climate-adaptive agricultural techniques.

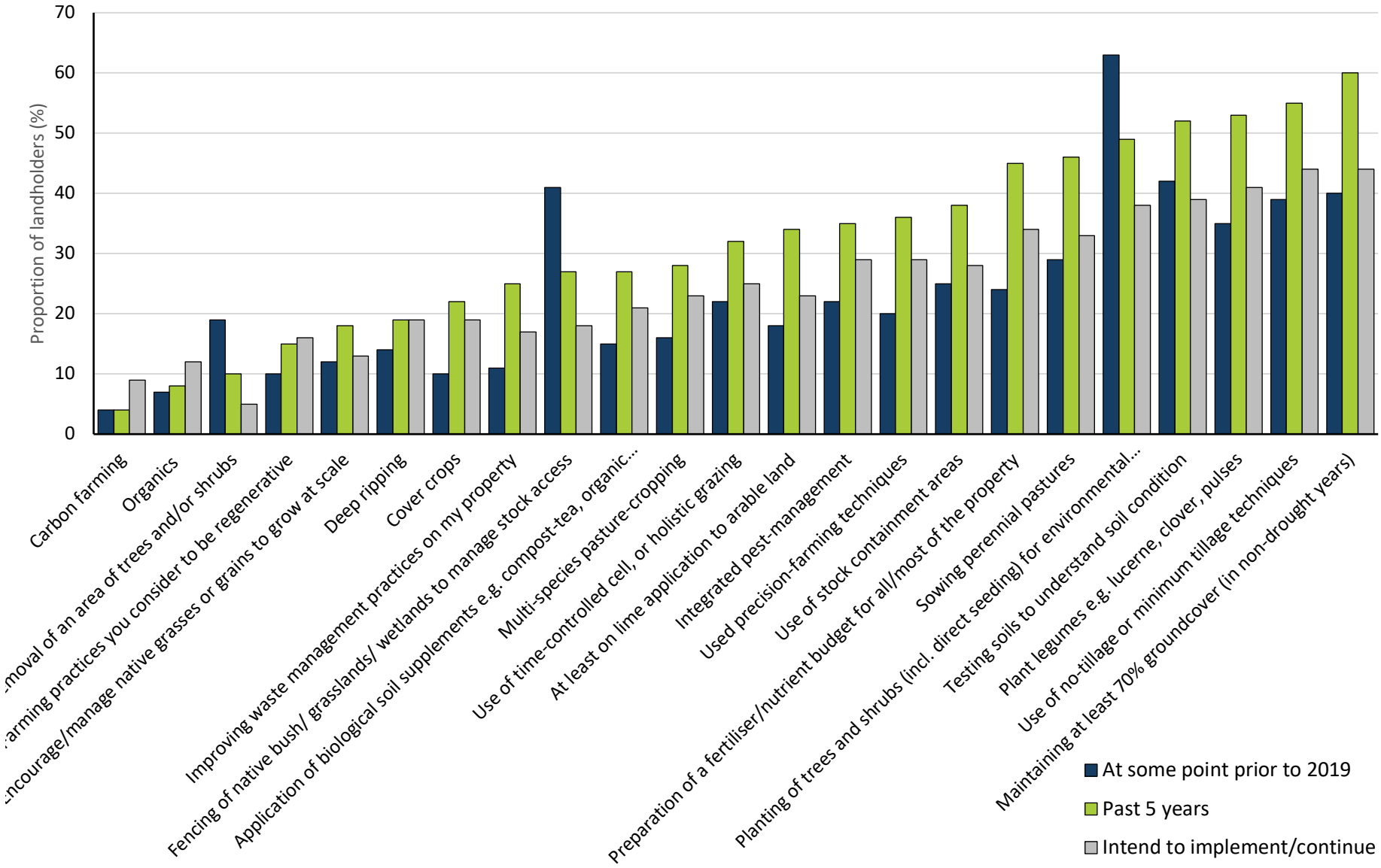

Figure 11. Practices implemented by Full and Part Time farmers across time as identified in the 2024 North Central Victoria Landholder Survey (n=355-357

3.2 CONFIDENCE IN THE IMPLEMENTATION OF BEST-PRACTICE

The data highlighted key trends in land management perspectives, particularly regarding soil health, waterway protection, and the economic or other justification for implementing various practices (Table 5.). There was strong agreement (80%) that soil testing is essential for soil management, with full-time (86%) and part-time farmers (83%) valuing it most. Similarly, over three quarters (76%) of landholders agree that biological activity is an important soil productivity indicator, though non-farmers (55%) place less emphasis compared to full-time farmers (85%). The importance of fencing for managing stock access was widely accepted (79%), with part-time and hobby farmers (88% and 85%) showing stronger agreement than full-time farmers (75%).

Economic trade-offs for long-term sustainability were moderately accepted, with 66% agreeing that short-term reductions in production are justified for long-term benefits, particularly among hobby farmers (77%), while non-farmers (47%) were understandably less concerned because their land is not used for a farming business. The costs of deep tillage and subsoil modification had lower levels of confidence (23%), with only 35% of full-time farmers having confidence in its application. Confidence in regenerative farming practices was low overall (32%), with hobby farmers (42%) more optimistic than full-time farmers (31%) and non-farmers (14%) that it was worth the effort. Views on water allocation under the Murray-Darling Basin Plan were divided, with only 33% agreeing it would improve waterways, and full-time farmers (22%) showing the most scepticism. Overall, the research finds that full-time and part-time farmers in this study are more likely to support soil health management and financially justified practices, while non-farmers and hobby farmers show more variability in their views.

Table 5. Proportion of landholders who agree or strongly agree with views and experiences statements by landholder type for the 2024 North Central Victoria Landholder Survey (n=357-362). Means (out of 5) are given in brackets and orange shading highlights the top three statements by percentage, with the darkest shade reflecting the highest proportion

Views & Experience Statement	% Agree / strongly agree				
	Overall (2024)	Full-time (2024)	Part-time (2024)	Hobby Farmer (2024)	Non-Farmer (2024)
Soil testing is an essential step in understanding soil condition	80% (4.2)	86% (4.3)	83% (4.1)	78% (4.1)	66% (4.1)
Fencing to manage stock access is an essential element of protecting waterways and native vegetation	79% (4.3)	75% (4.2)	88% (4.2)	85% (4.3)	72% (4.4)
Biological activity is an important indicator of the productive capacity of soils	76% (4.1)	85% (4.2)	83% (4.2)	72% (4.1)	55% (3.9)
Reduced production in the short-term is justified where there are long term benefits	66% (3.9) #*	68% (3.8)	69% (3.8)	77% (4.1)	47% (3.9)
Intensive grazing for short periods is usually better for the health of native vegetation along waterways and wetlands than set stocking	51% (3.7) #*	58% (4.0)	57% (3.7)	53% (3.7)	30% (3.3)
The benefits of stubble retention outweigh problems arising from the practice	47% (3.8) ^*	71% (4.2)	46% (3.6)	38% (3.6)	15% (3.2)
The costs of establishing perennial pastures are justified by the returns	47% (3.6) ^	58% (3.9)	61% (3.7)	38% (3.4)	19% (3.3)
The costs of applying lime to balance soil acidity is justified by increased production	46% (3.7) #^	58% (3.9)	56% (3.6)	44% (3.5)	16% (3.3)
The increased allocation of water for the environment under the Murray-Darling Basin Plan will improve the health of waterways & wetlands	33% (3.0) #*	22% (2.6)	38% (2.9)	38% (3.3)	43% (3.6)
I am confident that adopting regenerative/holistic farming practices is justified by the returns	32% (3.2) #	31% (3.1)	39% (3.3)	42% (3.4)	14% (3.3)
The cost of deep-tillage and subsoil modification are justified by increased production	23% (3.2) ^	35% (3.5)	29% (3.2)	14% (2.9)	5% (3.0)

Significant difference by landholder type

* Significant difference by LGA

^ significant difference by generation

Note: 2024 data were tested for significant differences by LGA, generation and landholder type using a Kruskal-Wallis rank sum test where p<0.05.

3.3 RISK AND OPENNESS TO CHANGE

The survey responses highlight key themes regarding openness to change, risk tolerance, and trust, particularly among full-time and part-time farmers (Table 6.). Overall, there is strong openness to new ideas about farming and land management (84%), with full-time farmers (89%) being the most receptive of all landholder types. However, financial constraints limit experimentation, with only 47% feeling they can afford to take risks. Full-time farmers report higher financial flexibility (57%) than part-

time farmers (41%), suggesting that economic stability plays a role in adopting new practices.

Risk attitudes vary, with 41% of landholders preferring to avoid risks, while a similar proportion (41%) see risks as a challenge to embrace. Full-time farmers are more likely to take risks (51%) compared to part-time farmers (36%) and are more likely to be early adopters of new agricultural practices (42%) compared to part-time farmers (27%). Many farmers in North Central Victoria prefer to see local success before trying new practices (full-time 43%, part-time 48%).

Trust in others is moderate across all groups, with a combined 56% agreeing that most people are trustworthy, with 44% also believing that people primarily focus on their own welfare. Meanwhile, 25% of respondents express contentment with their farm's status, with full-time farmers (29%) being the least likely to see a need for change. These findings suggest that while many farmers are open to new ideas, financial constraints, risk preferences, and trust levels influence their willingness to adopt change.

Table 6. Proportion of landholders that agree or strongly agree with risk and openness statements overall and by landholder type for the 2024 North Central Victoria Landholder Survey (n=342-355). Means (out of 5) are given in brackets. Orange shading highlights the top three statements by percentage, with the darkest shade reflecting the highest proportion.

Risk and openness to change	% Agree / strongly agree				
	Overall (2024)	Full-time (2024)	Part-time (2024)	Hobby Farmer (2024)	Non-Farmer (2024)
I am open to new ideas about farming and land management	84% (4.0) #^	89% (4.1)	87% (4.0)	87% (4.0)	70% (3.7)
Most people are trustworthy	56% (3.3)	56% (3.3)	53% (3.3)	53% (3.3)	62% (3.4)
Financially, I can afford to take a few risks and experiment with new ideas	47% (3.2) *	57% (3.3)	41% (3.0)	40% (3.1)	42% (3.1)
People are almost always interested in their own welfare	44% (3.2)	47% (3.3)	45% (3.2)	45% (3.1)	39% (3.0)
I have sufficient time available to consider changing my practices	42% (3.2)	44% (3.2)	41% (3.1)	44% (3.2)	35% (3.0)
I prefer to avoid risks	41% (3.1)	39% (3.0)	47% (3.2)	40% (3.0)	41% (3.1)
I usually view risks as a challenge to embrace	41% (3.1)	51% (3.3)	36% (3.1)	35% (3.0)	37% (3.1)
I prefer to see evidence of local success before trying a new practice	37% (3.1) #	43% (3.2)	48% (3.3)	27% (2.8)	27% (3.0)
I am usually an early adopter of new agricultural practices and technologies	28% (3.0) #	42% (3.2)	27% (3.0)	21% (3.0)	11% (2.8)
This may not be the best farm around, but I see no reason to change	25% (2.7) ^	29% (2.6)	24% (2.8)	23% (2.6)	20% (3.0)

Significant difference by farmer vs not-farmer

Note: 2024 data were tested for significant differences by LGA, generation and landholder type using a Kruskal-Wallis rank

* Significant difference by LGA

^ Significant difference by generation

sum test where p<0.05.

3.4 TIMING OF STRATEGIC DECISION MAKING

The survey indicates that farmers (full-time and part-time) tend to take a more medium-term approach to strategic decision-making, with the majority (34%) planning on a year-to-year basis, compared to only 18% of non-farmers who are planning year to year (Figure 12.). Both groups show similar proportions considering up to five years (21%) and six to twenty years (9% for farmers, 8% for non-farmers). However, non-farmers are more likely to take either a very short-term (opportunistic, 12%) or very long-term (over 100 years, 15%) perspective, compared to farmers (8% and 5%, respectively). This suggests that while farmers focus on practical, shorter-term operational planning, non-farmers may adopt either highly flexible or long-term conservation-oriented outlooks.

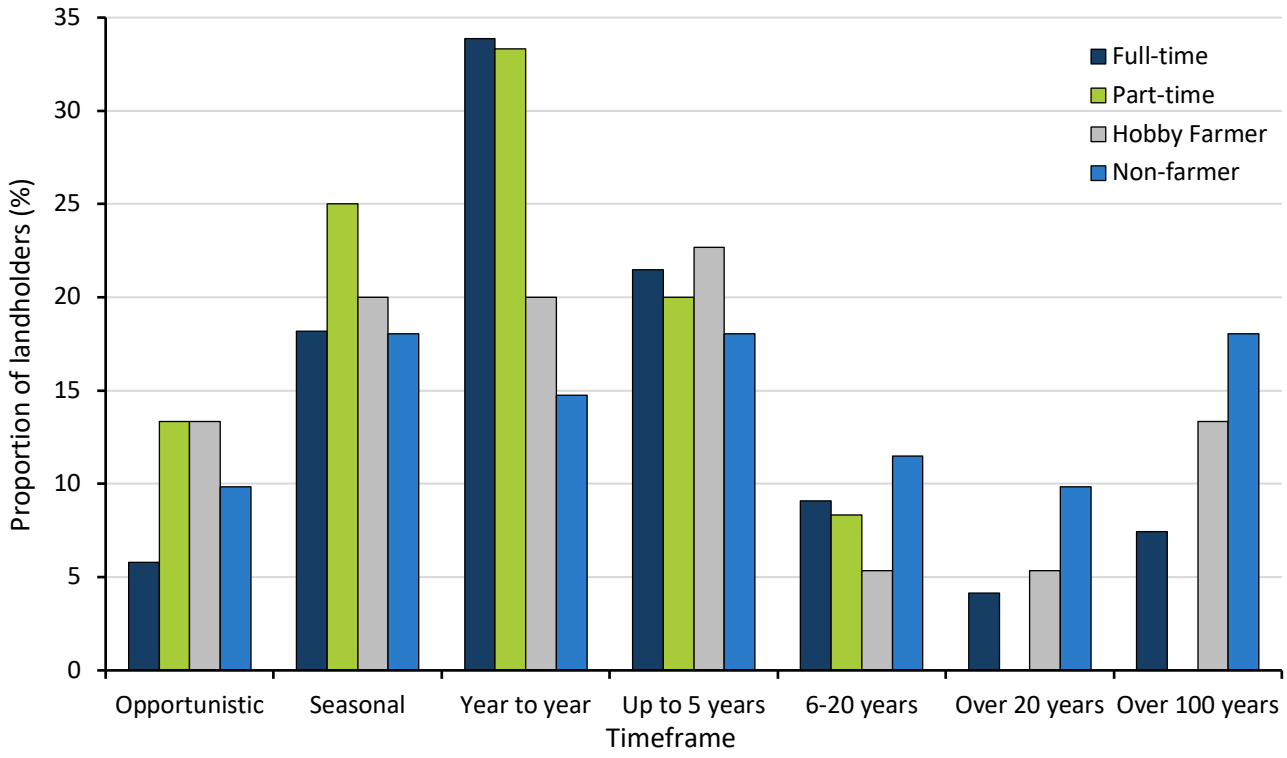

Figure 12. Timeframes that influence strategic decision making for each landholder type as identified in the 2024 North Central Victoria Landholder Survey (n=327).

3.4.1 The decision-making team

The survey reveals that decision-making on properties is most commonly shared between landholders and their partners (49% overall), with this being even more common among non-farmers (61%) and hobby farmers (55%) (Figure 13.). A significant proportion of respondents make decisions alone (33%), with hobby farmers (39%) being the most independent. Multi-generational decision-making is more prevalent among full-time farmers (31%) than other groups, where it is much lower (14% overall). The involvement of property managers, agronomists, and farm business as the most important advisor is minimal across all landholder types, with only a small proportion of part-time farmers (6%) engaging property managers as a primary source in decision-

making. These findings indicate that most landholders rely on either independent decision-making or collaboration with their partners, with full-time farmers being the most likely to engage family members.

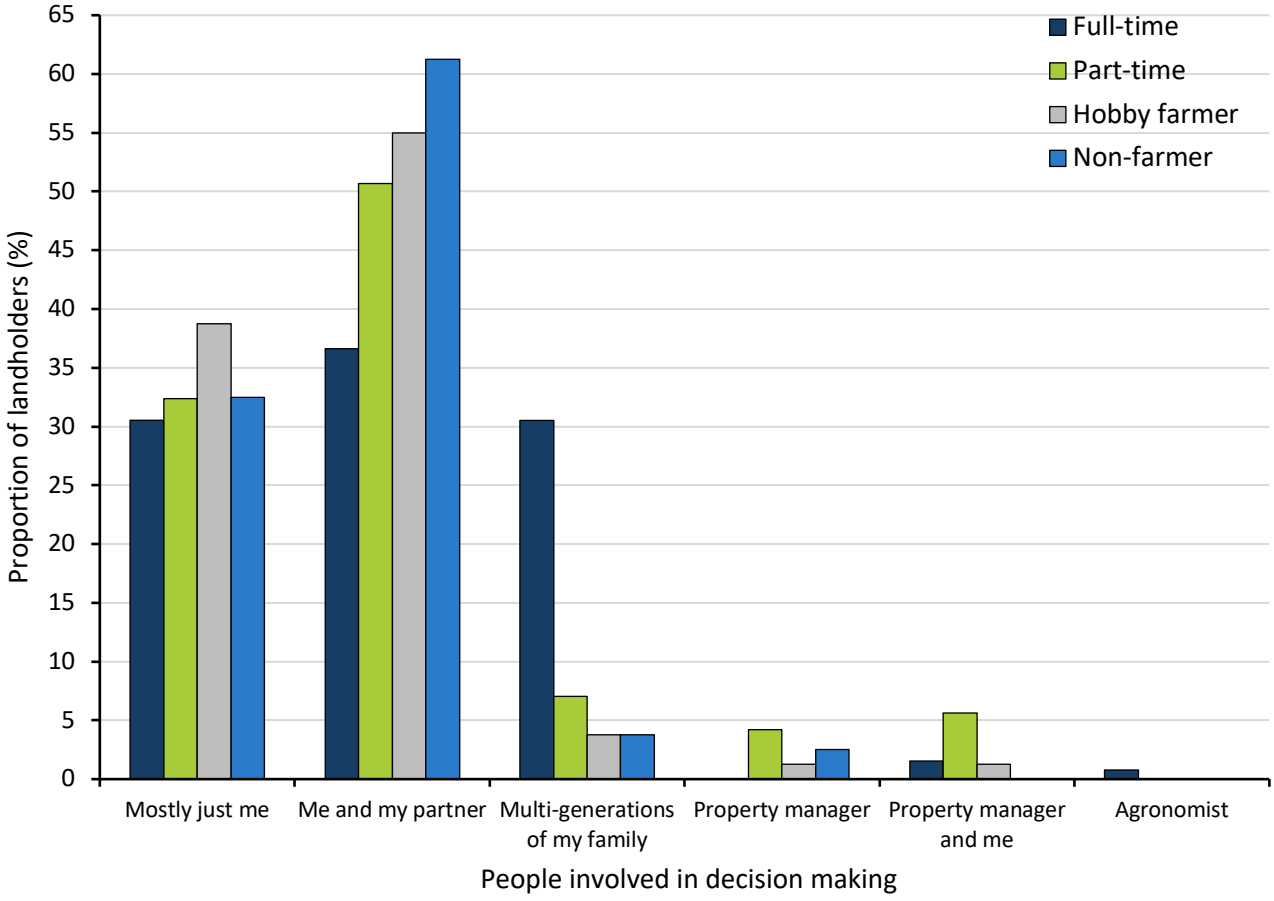

Figure 13. The most important people involved in strategic decision-making by landholder type as identified in the 2024 North Central Victoria Landholder Survey (n=366).

3.4.2 Management decision leading to profitability in the last 12 months

Landholders were asked several open questions about their farm and land management, with responses detailed below.

Full- and Part-Time farmers

Over the previous 12 months, farmers reported a range of management decisions that had significantly influenced their profitability (Figure 14.). Many focused on cost management strategies, such as reducing input costs, optimising fertiliser and chemical use, and adjusting stocking rates. Crop and livestock management decisions were also crucial, including changes in sowing times, crop rotations, and stock sales to align with market trends and weather conditions. Investments in infrastructure, such as fencing, equipment upgrades, and irrigation systems, were made to enhance operational

efficiency and long-term productivity. Additionally, farmers leveraged agronomic advice, improved pasture management, and experimented with new crop varieties to maximise yields and profitability.

External factors such as market fluctuations, extreme weather events, and regulatory changes were also reported to play a significant role in decision-making. Many farmers adapted by timing their sales strategically, purchasing or leasing land, and adjusting their grazing and feed strategies to maintain profitability despite challenges such as droughts, floods, and declining commodity prices. Some sought alternative income sources through off-farm work or diversification, while others embraced new technologies like precision agriculture to optimise resource use.

Figure 14. Word cloud representation of landholder responses to the question: 'In the last 12 months, what management decision was the most important influence on your profitability?' from the 2024 North Central Victoria Landholder Survey (N=389). Each word is emphasised in relation to the number of responses. Source: wordclouds.com

3.4.3 Management decision leading to profitability in the last five years

Full- and Part-Time farmers

As discussed above, the main groups making a profit from their land were full- and part-time farmers. These farmers reported a range of management decisions that they viewed had significantly influenced their profitability over the previous five years (Figure 15.). Many of these decisions aligned with those made in the past 12 months, particularly

in cost management, crop and livestock strategies, and infrastructure investments. Farmers focused on minimising production costs, optimising fertiliser and irrigation use, and improving soil health through applications of lime, gypsum, and nitrogen. Crop rotation, timing of sowing, and weed control remained crucial, as did decisions regarding stocking rates and pasture improvement. Investments in equipment, such as new tractors and irrigation systems, were also common, as they contributed to long-term efficiency and productivity. Additionally, some farmers shifted toward integrated cropping and livestock systems, organic farming, or self-sufficiency to reduce reliance on external contractors and input costs.

Beyond operational efficiencies, broader strategic decisions shaped long-term profitability. Some farmers expanded their land holdings through purchases or leasing, while others transitioned to different production systems, such as moving from sheep to continuous cropping or adopting multi-species pastures to improve soil health and reduce fertiliser needs. Succession planning was a key factor for some, with property transfers influencing decision-making. The impact of external factors, including market fluctuations, extreme weather events, and changing business conditions (such as COVID-19 and international trade), required farmers to remain adaptable. Decisions around water access, financial management, and securing reliable markets were also highlighted as critical to maintaining resilience.

Figure 15. A word cloud representation of landholder responses to the question 'Over the last 5 years, what management decision was the most important influence on your profitability?' from the 2024 North Central Victoria Survey (N=389). Each word is emphasised in relation to the number of responses. Source: wordclouds.com

3.5 DATA MANAGEMENT

The survey reveals that full-time farmers are the most frequent soil testers, with 21% conducting tests at least annually and 57% testing every 3–5 years (Table 7.). Part-time farmers also engage in regular soil testing, though at lower rates, with 48% testing every 3–5 years and only 4% testing annually. Hobby farmers and non-farmers test significantly less frequently, with 46% and 77%, respectively, never conducting soil tests.

Table 7. Frequency of soil testing by landholder type for the 2024 North Central Victoria Landholder Survey (n= 351).

Landholder type	% Landholders that conducted soil testing			
	At least annually	Every 3-5 years	Once	Never
Full-time farmer	21%	57%	10%	11%
Part-time farmer	4%	48%	22%	26%
Hobby farmer	5%	23%	26%	46%
Non-farmer	3%	3%	17%	77%

3.5.1 Influences on soil health

Responding to another open question, the most important influences on soil health reported among full- and part-time farmers revolved around three key themes: water availability, land and livestock management, and input applications (Figure 16.). Rainfall, irrigation, and moisture retention were frequently cited as critical factors, as water availability directly impacts soil structure, biological activity, and overall fertility. Many farmers emphasised the importance of maintaining ground cover through stubble retention, perennial pastures, and controlled grazing practices to reduce erosion, retain moisture, and support soil microbiology. In addition to natural factors, human management decisions were reported to play a vital role in soil health. Crop rotation and minimum tillage were key strategies employed to maintain soil structure, prevent nutrient depletion, and enhance resilience to changing seasonal conditions. Landholders also highlighted the importance of fertilisers, lime applications, and organic matter additions, such as manure and compost, for improving soil nutrition and structure. Regular soil testing and agronomic advice were also deemed crucial in guiding decisions about nutrient balance and soil amendments. Some farmers focused on regenerative farming practices, aiming to balance productivity with sustainability by avoiding synthetic fertilisers, integrating livestock, aiming to foster soil carbon sequestration. Ultimately, profitability, knowledge, and access to resources were key reported factors influencing ability to implement soil health strategies, with many farmers recognising their own management choices as the most significant factor in maintaining long-term soil vitality.

Figure 16. Word cloud representation of landholder responses to the question 'What is the most important influence on your soil health?' from the 2024 North Central Victoria Landholder Survey (N=389). Each word is emphasised in relation to the number of responses. Source: wordclouds.com

3.5.2 Testing/indicators to assess soil/land health

Farmers reported using a combination of scientific testing and observational methods to assess soil and land health. Many respondents reported engaging laboratory soil tests to measure key indicators such as pH, organic matter, nutrient levels, sodicity, and salinity. Deep soil testing at various depths (e.g., 10 cm and 60 cm) was common, along with use of moisture probes to assess water retention. Some relied on agronomists or agricultural advisors for soil analysis, while others conduct leaf tissue and petiole tests to gauge plant nutrient uptake. Historical soil test data was also referenced for tracking changes over time, particularly in relation to crop yields and productivity.

Beyond scientific tests, many farmers emphasised the importance of visual assessment and practical field observations. Factors such as plant health, pasture growth, crop productivity, and the presence of diverse vegetation were frequently used by these farmers as indicators of soil condition. Some monitored biodiversity, including bird and insect activity, as a reflection of soil ecosystem health. Observing soil structure through digging and checking moisture content with a shovel is another common practice. While some farmers conduct regular testing, others rely primarily on experience,

intuition, and long-term land knowledge, citing cost and accessibility as barriers to frequent soil analysis.

3.5.3 Implementation of management practices

The survey indicates that while many full- and part-time farmers engage in key management practices, there remain notable gaps between implementation, confidence, and knowledge (Table 8.). Soil testing is widely recognised as essential, with 94% of respondents agreeing on its importance. However, only 52% have conducted soil testing within the past five years, and just 54% feel knowledgeable about using soil test results to create a nutrient budget. Although 45% have prepared a nutrient budget during the same period and 84% report confidence in making data-driven decisions, only 53% feel they possess sound knowledge in identifying soil productivity constraints. Similarly, while 51% of farmers have undertaken property management planning and 62% agree that decisions should be informed by scientific evidence, only 64% report having sound knowledge of land-use planning based on soil characteristics.

In addition to these planning and decision-making practices, the data also highlights inconsistencies in knowledge and action regarding landscape and waterway protection. While 68% of respondents have fenced areas to manage stock access, 80% recognise fencing as essential for protecting waterways and native vegetation. However, only 34% demonstrate awareness of the ecological role that wetlands and native vegetation play in filtering water before it enters rivers, lakes, or streams. This suggests that while there is general agreement on the importance of certain land and water management practices, there are gaps in understanding the underlying ecological functions. Collectively, these findings point to a strong foundation of confidence and partial implementation, but also a clear need for targeted knowledge-building to enable more effective and ecologically informed land stewardship.

Table 8. Implementation of management practices compared to related confidence and knowledge in the practice for full-time and part-time farmers (data amalgamated) identified in the 2024 North Central Victoria Landholder Survey (n=351-361).

Management Practice	% Farmers undertaking practice	Confidence	% Agree or strongly agree	Knowledge	% Sound or very sound
Testing soils to understand soil condition	52%	Soil testing is an essential first step in understanding soil condition	94%	How to use soil testing to prepare a nutrient budget that will increase soil productivity	54%
Preparation of a nutrient budget for all/most of the property	45%	I am confident making management decisions based on data from my farm	84%	How to identify the main constraints to soil productivity on your property	53%

Prepared/ preparing a property management or whole farm plan	51%	Decision making needs to be strongly influenced by data/scientific evidence	62%	How to prepare a farm/property plan allocating land use according to land/ soil characteristics	64%
Fencing of areas to manage stock access at some stage	68%	Fencing to manage stock access is an essential element of protecting waterways and native vegetation	80%	The role of wetlands and native vegetation for filtering water entering rivers, lakes or streams	34%

3.5.4 Implementing regenerative agriculture

The survey results indicate a moderate level of engagement with regenerative agriculture and holistic farm management among both farmers (full-time and part-time) and non-farmers (hobby farmers and non-farmers). Among respondents, 15% of full and part-time farmers reported implementing farming 'practices they considered regenerative' compared to 9% of non-farmers

Confidence in the economic viability of these practices was slightly higher among farmers (full- and part-time), with 34% believing that regenerative or holistic farming practices are justified by financial returns, compared to 28% of non-farmers. Knowledge levels on the topic were significantly higher among farmers, with 29% reporting familiarity with regenerative agriculture and holistic management, compared to just 14% of lifestylers. However, self-assessed knowledge and use of regenerative farming may be underestimated as evidenced by consideration of specific practices. For example, considering the key principle of keeping soil covered, 60% of farmers were maintaining over 70% ground cover, 53% were planting legumes, 32% were undertaking time-controlled grazing and 28% reported to be implementing multi-species pasture cropping. Rather than a low rate of adoption, these figures suggest a lack of comfort with the use of the term 'regenerative', especially considering that a third of all landholders were confident that implementing regenerative practices were justified by the returns. Notably, confidence levels were higher for part-time and hobby farmers (39% of part-time farmers and 42% of hobby farmers). While reported adoption rates are relatively low, there is notable interest in learning more about these approaches. A nearly equal proportion of farmers (45%) and non-farmers (46%) expressed a desire to gain further knowledge on regenerative and holistic farming methods, suggesting a growing curiosity and potential for wider implementation in the future. It also means that over half of farmers were not open to learning more.

These findings highlight a gap between awareness and implementation, suggesting that while interest in regenerative farming practices is strong among some groups, further education and practical support may be needed to encourage broader adoption. There may also be an issue with acceptance of the terminology itself.

3.6 STATISTICAL ANALYSIS AND BEST-PRACTICE MODELLING

Pairwise analysis was undertaken to show relationships between best-practice implementation and other factors. The pairwise data was then used to inform linear and logistical regression modelling for a number of best-practices and farming systems by inputting around 30-40 potential associated factors into a modelling program, which then identified the most salient and strong connecting factors influencing the recent implementation of that practice (within the past five years). A strong model has an R squared of over 0.4, with 0.2 being considered a moderate model. The sections below describe outcomes of the pairwise relationships, as well as the linear and logistical regression modelling.

Carbon farming

Implementing carbon farming was more likely if farmers had a high level of knowledge of carbon market mechanisms to support it, were growing pastures and planting legumes, but facing salinity issues. Their property was also likely to be an important part of their identity (R^2 = 0.55). Other important relationships that emerged in the pairwise comparisons were that they were likely early adopters connected with Landcare as an information source, and had a generally high self-reported knowledge of soil management for improving biology and carbon levels.

Whole farm planning

A strong model indicates that farmers undertaking whole farm planning had a good knowledge of how to use time controlled, holistic or cell grazing strategies and resources to support business planning. They also made decisions over a longer time frame, had a succession plan in place and were managing a larger area of land in addition to the main property (R^2=0.54). Using pairwise analysis, whole farm planning is generally found to correlate strongly with best-practice implementation. For this survey, these practices were: planting legumes, trees and multi-species pastures, preparation of a nutrient budget, precision-farming, soil testing, maintaining good groundcover, IPM and use of a stock containment area. As is usual in other social benchmarking surveys, this question also correlated strongly with a high level of knowledge of best-practice farming approaches. The pairwise relationships identified that the most important knowledge for whole farm planning was how to allocate landuse according to land class (p=7.5E13). Other important knowledge was how to manage for soil-health; understanding of on-farm and soil biodiversity; time controlled-grazing techniques and holistic farm management. Those undertaking whole-farm planning commonly sourced their information from independent consultants, North Central CMA, Landcare, scientific sources, commodity groups and emails.

Soil testing

Farmers undertaking soil testing tended to see risks as a challenge to embrace and had high confidence that both liming and maintaining stubble were justified by returns. This also linked with a strong knowledge of how to (re)introduce more legumes/pulses into their enterprise mix and having been profitable in the previous financial year (R^2=0.39). A second, very similar model also linked soil testing with having good systems in place to

manage farm data (R^2=0.38). Other strong pairwise relationships were having knowledge of identifying soil constraints; how to use soil testing to create a nutrient budget; how to allocate land use according to land class, and valuing the productive value of the soil on their property, which was viewed as an important source of household income. Rising input costs, weed resistance to herbicides and concerns about low levels of organic carbon in soils were the three most salient issues for those undertaking soil testing.

Precision farming

Farmers undertaking precision-farming had a strong production focus, and were likely to want to be a part of positive change in farming. Associated practices were no-till, soil testing, IPM, liming, deep ripping, cover cropping, planting legumes and preparation of a nutrient budget. They were more likely to have more land under their management and be bringing in an income from agriculture, however, in the previous financial year, were less likely to be making a profit than those not undertaking precision-farming. This may be because of rising fertiliser costs, combined with the finding that they were likely to be increasing their use of synthetic inputs per hectare. They were likely to be using farm consultants, emails, newspapers and R&D agencies such as the Grains Research and Development Corporation (GRDC) as important information sources. They were also less likely to have strong environmental values or be of a view that landholders should manage their properties in expectation of a highly variable climate, or have a part of their property set aside for conservation purposes. A strong model showed that precision-farmers in our study were keen to be a part of positive change in farming. They had a good knowledge of resources to support business planning, with high confidence that maintaining stubble is justified by the returns. They were more likely to be managing additional land to their main property and didn't view the provisions of funds by North Central CMA to support environmental stewardship as a priority (R^2=0.46).

Regenerative agriculture

Farmers implementing regenerative agriculture commonly worked closely with their spouses and reported to be decreasing their overall use of synthetic inputs. They had a high level of reported knowledge about the environmental importance of wetlands; were planting trees for various purposes including shelter, habitat, erosion, recharge control or carbon. One item differed between the strongest two models, with one model emphasising a strong link with having recently changed their operations to increase the soil carbon on their property (R^2=0.29), while the other put a high emphasis on knowledge of how to allocate land according to land class (R^2=0.28), suggesting both of these factors play an important role in the implementation of regenerative agriculture, consistent with previous research (Alexanderson, Luke and Lloyd, 2024). The pairwise analysis confirmed that they had strong environmental values, with other associated practices being a high level of ground cover, time-controlled grazing, planting legumes, trees and multi-species pastures, native grains, use of biological soil supplements, IPM and fencing, with an intention to undertake carbon farming in the future. They were more likely to be reducing their use of synthetic inputs per hectare. The information sources they preferred were books, independent consultants, journal

articles and podcasts. They were less likely to be bringing in an income from their properties, and more likely to have a supplementary income from elsewhere.

Time-controlled grazing

A strong regression model indicates that farmers using time-controlled, holistic or cell grazing had a strong knowledge of how to undertake these strategies and a high confidence that this practice is worth the returns. They were overall decreasing the use of synthetics per hectare, had a succession plan in place and were keen to be a part of positive change in farming (R^2=0.58). The pairwise comparisons also revealed a related emphasis on the importance of planting perennials and legumes, as well as knowledge of how to do it. There was a close association with whole farm planning and how to allocate land according to land class, as is mentioned above.

Application of biological amendments

In a moderate model ($R^2$0.27), the use of biological soil supplements was linked with being concerned about soil carbon, and that farmers were taking on-property actions to reduce emissions, were decreasing the use of synthetic inputs per hectare and considered themselves to have a high level of knowledge of holistic land management, or regenerative agriculture. The pairwise comparisons also revealed that this occurs more on smaller properties for farmers who were younger who had been farming for less time. They were more likely to be innovators and not need to see local success before trying something new. Their main issues of concern related to soil health including water holding capacity and low biological activity, and their main sources of information were podcasts, YouTube and newspapers.

Native grasses

Knowledge of holistic/regenerative farm management and the role of wetlands and native vegetation for filtering water entering rivers, lakes or streams were the top two pairwise associations with establishment of native grains. This practice linked closely with other practices that included fencing, maintaining high groundcover, use of IPM and regenerative farming. It also strongly correlated with significantly higher reported knowledge of how land was used and managed prior to European settlement, and using environmental organisations as an information source. Farmers growing native grains at scale were on average five years younger.

In the regression modelling, two weaker models both indicated that landholders encouraging native grasses to grow at scale believed that fundamental changes are required to make farming systems in our region more resilient. They had a good understanding of the importance of riparian zones and were interested to learn more about regenerative/holistic farming approaches. One of the models emphasised the importance of knowledge of holistic farm management, indicating a strong link with wanting to set land aside for conservation (R^2=0.19), while the other linked with a strong value of passing on a healthier environment for future generations and attending field days, farm walks or demonstrations focused on soil health and productivity (R^2=0.18).

Planting trees

The top associations with having planted an area of trees were: having knowledge of on-farm biology, being concerned about low biodiversity in soils, having high environmental values, and using environmental organisations as an information source. Those planting trees had, on average, the farm in the family for 20 years less than those not planting trees – which could be a reflection that those who had the farm longer had planted trees previous to this. This practice correlates strongly with regarding reduced production in the short term to be 'justified where there are long term benefits,' and a belief in the importance of evidence-based decision-making. It also correlated with smaller land size and having the view that landholders should manage their properties in expectation of a highly variable climate. Properties of those planting trees were 40% smaller than those not planting trees (514 ha vs 30 ha), however, the pairwise analysis revealed that landholders planting trees were on average loosing six times more land to soil issues than those who were not (32 ha lost compared with 5 ha lost). Bringing those averages together amounts to 6.2% of land lost to production vs 1.5% of land lost to production. These landholders did not need to see local evidence of success prior to acting.

Removing an area of trees

In the pairwise data, having removed an area of trees or shrubs in the previous five years correlated strongly with having removed an area of trees in the past, and the intention to remove more areas of trees in the future. Those who were removing trees typically had the farm for 12 years less than those who had *not* removed trees in the previous 5 years. They were on average three years younger, with land half the size of those who were not removing trees. They had a view on the importance of private-property rights and tended to have a lower level of trust for North Central CMA, were coping less well and felt less supported. They were also less likely to believe that retaining stubble was worth the returns, and likely to view salinity as an issue on their land.

4. ENGAGING FARMERS

4.1 KNOWLEDGE OF CURRENT RECOMMENDED PRACTICE

The 2024 survey highlights considerable variation in farmers' self-assessed knowledge across key land management topics (Table 9.). Overall, knowledge remains strongest in practical areas, such as preparing for extreme weather events (64%) and understanding the role of riverbank vegetation in flood mitigation (40%). However, knowledge of emerging or complex topics, such as market mechanisms for carbon and biodiversity (7%) and historical land use before European settlement (13%), remains low.

Among full-time farmers, knowledge levels are generally higher than the overall average for most items. They report the strongest understanding in areas critical to farm resilience and planning, such as preparing for extreme weather events (76%) and farm/property planning based on soil and land characteristics (76%). They also demonstrate above-average knowledge of regenerative agriculture (32%) and time-controlled grazing strategies (40%). However, full-time farmers report relatively low knowledge of carbon and biodiversity market mechanisms (12% reporting sound knowledge), and Aboriginal groups connected to their land (13% reporting sound knowledge).

These findings suggest that while practical and production-related knowledge is relatively strong, there are gaps in awareness of emerging sustainability and historical land use topics.

Table 9. Self-assessed sound or very sound knowledge by landholder type for the 2024 North Central Victoria Landholder Survey (n = 342-355) and overall, for the 2014 (n=765-773), 2019 (n=612-627) and 2024 survey years. Means (out of 5) are given in brackets and orange shading highlights the top three knowledge topics by percentage, with the darkest shade reflecting the highest proportion.

Knowledge topics	% Sound / very sound						
	Overall mean (2014)	Overall mean (2019)	Overall mean (2024)	Full-time (2024)	Part-time (2024)	Hobby Farmer (2024)	Non-Farmer (2024)
[1] How to prepare for an extreme weather event such as fire or flood	N/A's	N/A's	64% (3.7) #	76% (4.0)	69% (3.9)	60% (3.7)	45% (3.3)
[1] Preparing a farm/property plan allocating land use according to land/soil characteristics	47% (3.3)	47% (3.4) #*	44% (3.3) #	76% (4.0)	43% (3.4)	28% (3.0)	7% (2.2)
[1] The importance of riverbank vegetation for minimising damage from flood waters	N/A's	N/A's	40% (3.3) #	45% (3.6)	42% (3.5)	41% (3.3)	30% (2.9)
[1] Options and strategies to (re)establish perennial pastures (e.g. lucerne/native grasses) in this area	57% (3.4)	53% (3.6) #*	37% (3.0) #*	58% (3.7)	38% (3.2)	28% (2.8)	10% (1.9)
[1] The role of on-farm biodiversity for supporting soil and landscape health	N/A's	N/A's	33% (3.0) #	44% (3.4)	42% (3.2)	25% (2.9)	17% (2.4)

[1] How to (re)introduce more legumes/pulses into your enterprise mix	N/A's	N/A's	33% (2.9) #*	62% (3.8)	28% (3.0)	19% (2.5)	3% (1.7)
[1] The role of wetlands and native vegetation for filtering and slowing down water entering rivers & lakes	N/A's	N/A's	32% (3.1) #	34% (3.3)	37% (3.2)	34% (3.1)	23% (2.7)
[1] The role of logs and riverside vegetation for supporting native fish populations	27% (2.9)	35% (3.2)	31% (3.1) #	34% (3.4)	33% (3.3)	30% (3.1)	28% (2.8)
[1] The use of time-controlled, holistic or cell grazing strategies	N/A's	N/A's	26% (2.8) #	40% (3.4)	30% (3.0)	24% (2.6)	3% (1.5)
[1] Regenerative agriculture and/or holistic farm management	N/A's	N/A's	23% (2.8) #	32% (3.1)	25% (3.0)	19% (2.6)	8% (2.1)
The effect of fertiliser application on the persistence of native grasses in this area	25% (2.8)	27% (2.9) #*	22% (2.7) #	31% (3.0)	30% (2.9)	15% (2.7)	8% (2.1)
[1] Resources to support business planning, such as Plan2 Farm initiative	N/A's	N/A's	18% (2.4) #	38% (3.0)	14% (2.5)	9% (2.2)	4% (1.6)
The Aboriginal group/s who are connected to the area where your property is located	14% (2.2)	21% (2.5) *	13% (2.2) #	13% (2.3)	14% (2.3)	11% (2.0)	17% (2.3)
[1] How land in your district was used and managed before European settlement	N/A's	14% (2.4) #*	13% (2.2) #	13% (2.4)	12% (2.2)	13% (2.0)	13% (2.0)
[1] Market mechanisms that provide funds to support the building of carbon and biodiversity	N/A's	N/A's	7% (2.2)	12% (2.5)	6% (2.2)	3% (2.0)	7% (1.9)

Significant difference by landholder type

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

Note: significant differences were determined using a Kruskal-Wallis rank sum test with $p<0.05$. 2024 data were tested for significant differences by LGA, generation and landholder type. 2019 data were tested for significant differences by landholder type and LGA. No significant differences were calculated in 2014.

4.1.1 Innovations to support farm management goals

When asked the open-ended question what technology, innovation or knowledge would best support their farm management goals, the top three themes to emerge were more accurate and long-term weather forecasting, reduced chemical usage through sustainable practices, and technological advancements such as robotic milking, drone monitoring, and precision farming tools.

Accurate and reliable weather forecasting emerged as a key priority, with many farmers emphasising the need for better long-term predictions to aid in decision-making around planting, grazing, and input use. Tools such as soil moisture monitoring, cereal protein mapping, and improved input and production mapping were seen as valuable for optimising farm management. Precision agriculture technologies, including GPS mapping, spot spray machines, and direct drilling, were also highlighted as beneficial for improving efficiency while reducing chemical reliance. Some respondents

expressed interest in robotic milking systems, calf feeding automation, and mastitis detection technology to streamline dairy operations. Others mentioned a need for advancements in herbicide resistance testing, weed control methods, and sustainable water management, such as cost-effective desalination of bore water.

Beyond technological innovations, knowledge-based improvements were also frequently mentioned. Succession and retirement planning, financial benchmarking, and education in composting, carbon credits, and biodiversity management were considered important for long-term sustainability. Farmers also emphasised the value of accessing reliable online resources, webinars, and agronomic advice to stay informed. While some noted they were still adapting to digital tools, others sought advanced evaluation tools and investment strategies to improve their operations. Additional areas of interest included livestock automation, drone technology for stock monitoring and veterinary support, and support for ongoing improvements in sustainable farming practices such as no-till, rotational grazing, and support for native pastures. However, financial constraints were a recurring theme, with many stating that while useful innovations exist, affordability remains a significant barrier to adoption.

4.1.2 Knowledge of soil processes and management

The 2024 survey highlights key trends in self-assessed soil knowledge across different landholder types, with full-time farmers consistently reporting the highest levels of confidence. Overall, knowledge of soil-related topics has remained relatively stable since 2014, with some modest increases and decreases across different areas. The largest of these being a decrease in understanding how to identify the main constraints of soil productivity on your property (dropping from 49% in 2019 to 36% in 2024) (Table 10.).

Full-time farmers demonstrated the strongest understanding across all topics, particularly in maintaining groundcover to minimise erosion (80%), using soil testing to inform planning (63%), and identifying constraints to soil productivity (63%). In contrast, part-time farmers reported lower knowledge levels, though they still performed better than hobby farmers and non-farmers. Non-farmers exhibited the lowest knowledge levels across all areas, with only 6% indicating sound knowledge of soil testing for productivity planning and just 10% understanding how to identify soil constraints. Hobby farmers fall between part-time farmers and non-farmers, with moderate levels of knowledge, but still much lower than full-time farmers.

Overall, the findings indicate that soil knowledge remains strongest in practical land management topics, such as maintaining groundcover and using biological soil supplements. However, knowledge of more technical aspects, such as soil carbon dynamics, nutrient budgeting, and constraints to productivity, remains low, particularly among non-farmers and hobby farmers.

Table 10. Self-assessed sound or very sound soil knowledge by landholder type for the 2024 North Central Victoria Landholder Survey (n=350-353) and overall, for the 2014 (n= 768-772), 2019 (n=612-627) and 2024 survey years. Means (out of 5) are given in brackets and orange shading highlights the top three knowledge topics by percentage, with the darkest shade reflecting the highest proportion.

Knowledge topic	% Sound / very sound						
	Overall mean (2014)	Overall mean (2019)	Overall mean (2024)	Full-time (2024)	Part-time (2024)	Hobby Farmer (2024)	Non-Farmer (2024)
Strategies to maintain groundcover to minimise erosion in this area	56% (3.5)	62% (3.8) #*	59% (3.6) #	80% (4.0)	59% (3.7)	50% (3.5)	32% (3.0)
[1] The benefits of applying biological soil supplements e.g. compost, manure, microbial inoculants	NA	48% (3.4) #	44% (3.4)	50% (3.4)	50% (3.5)	44% (3.5)	32% (2.9)
[1] How to build organic matter/soil carbon	NA	NA	42% (3.3) #	58% (3.6)	44% (3.4)	31% (3.1)	25% (2.6)
[1] How to use soil testing to inform planning to increase soil productivity such as a nutrient budget	33% (2.9)	33% (3.0) #*	37% (3.0) #	63% (3.8)	38% (3.2)	23% (2.7)	6% (1.9)
[1] The role of soil carbon/microbiology (e.g. bacteria & fungi) in soil health	32% (3.0)	38% (3.1) #*	36% (3.1) #	48% (3.4)	39% (3.2)	30% (2.9)	20% (2.5)
[1] How to identify the main constraints to soil productivity on your property	NA	49% (3.4) #*	36% (3.0) #*	63% (3.7)	37% (3.2)	22% (2.7)	10% (2.1)
[1] The processes leading to declining soil health or structure in this area	42% (3.2)	39% (3.2) #*	34% (3.1) #*	53% (3.6)	31% (3.2)	28% (2.8)	11% (2.4)

Significant difference by landholder type

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

Note: significant differences were determined using a Kruskal-Wallis rank sum test with $p<0.05$. 2024 data were tested for significant differences by LGA, generation and landholder type. 2019 data were tested for significant differences by landholder type and LGA. No significant differences were calculated in 2014.

4.2 ACCESSING INFORMATION

An assessment of the groups by modes of information reveals clear differences in information source preferences among landholder types (Figure 17.). Full-time farmers primarily rely on field days (57%), newspapers (50%), emails (48%), websites (42%), and radio (30%). Part-time farmers favour websites (38%), newspapers (37%), brochures (37%), and field days (37%), with less reliance on emails (22%). Hobby farmers most frequently use websites (49%) and television (30%), while non-farmers prefer television (29%) and newspapers (22%), with minimal engagement in traditional agricultural information channels like field days (9%) or emails (8%). Across all groups, digital platforms such as YouTube, social media, and podcasts remain less prominent compared to traditional sources.

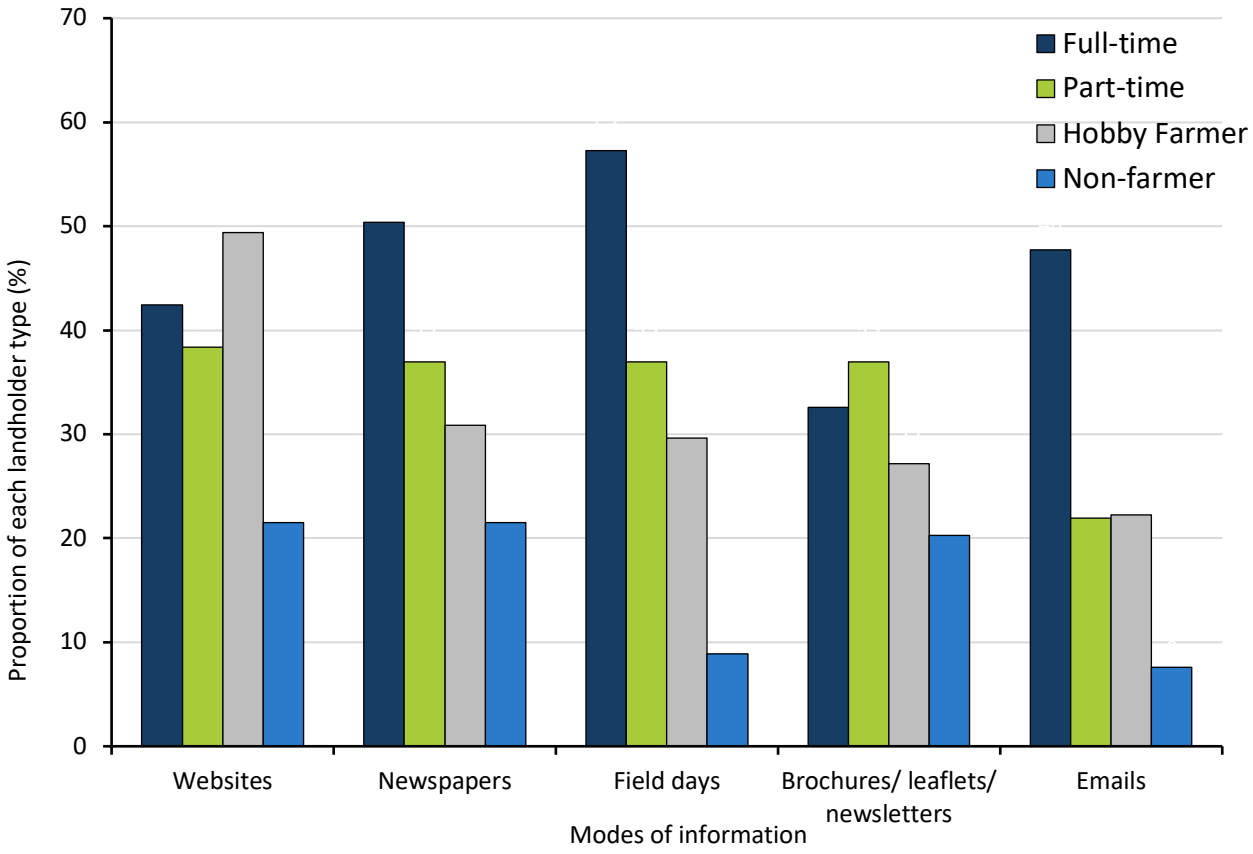

Figure 17. Top five modes of information overall by landholder type for the 2024 North Central Victoria Landholder Survey (n=381-382).

An assessment of the groups by sources of information reveals clear differences in the preferred sources among landholder types (Figure 18.). Full-time and part-time farmers rely heavily on other farmers (73% and 70%, respectively) and their own experience (69% and 53%). Hobby farmers also value personal experience (53%) and input from friends, neighbours, and relatives (53%), while non-farmers lean more on social networks (34%) and personal knowledge (32%). Independent and commercial agricultural consultants are significant sources for full-time farmers (45% and 43%), but their influence declines sharply among hobby farmers and non-farmers. Government bodies like the Bureau of Meteorology are moderately utilised across all groups, while organisations such as Landcare and Agriculture Victoria have more limited reach.

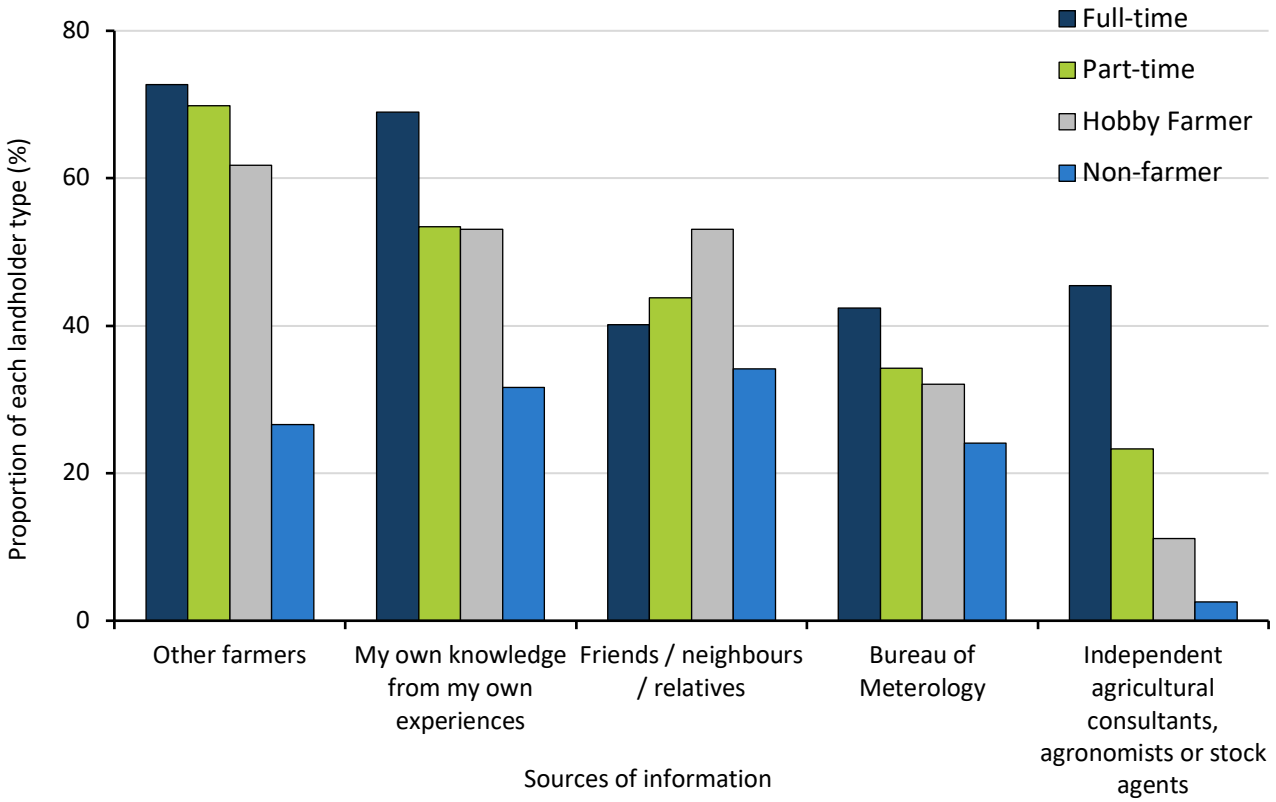

Figure 18. Top five sources of information by landholder type for the 2024 North Central Victoria Landholder Survey (n=379-382).

4.2.1 Information as accessed by generation

An analysis of the data reveals distinct preferences for information sources among the three generational cohorts surveyed in the 2024 North Central Victoria Landholder Survey (Figure 19.). For the Baby Boomer+ generation, the top five modes of information are Newspapers (40%), Field days (37%), Websites (35%), Television (29%), and Brochures/leaflets/newsletters (28%). This ranking indicates a strong reliance on traditional media such as newspapers and television, while also acknowledging the growing influence of digital platforms like websites, which is complemented by participatory modes such as field days and printed informational materials.

For Generation X, the preferences shift slightly toward digital and interactive formats. The top five modes of information for this group are Websites (45%), Field days (41%), Newspapers (38%), Emails (32%), and Brochures/leaflets/newsletters (32%). This distribution suggests that while Generation X continues to value traditional sources such as newspapers and printed materials, they are increasingly incorporating digital communication channels like websites and emails into their information consumption practices, with field days remaining a notable in-person method of engagement.

Generation Y minus (Gen Y-) exhibits a further shift in communication preferences, with a notable emphasis on digital and printed materials. It's worth noting the analysis of Gen Y- has a limited n number (n=25). The leading five sources for Gen Y- are Brochures/leaflets/newsletters (50%), Websites (50%), Emails (42%), Field days (38%), and Newspapers (33%). This pattern underscores a significant preference for digital and

on-demand content, while still retaining a measure of interest in conventional channels such as newspapers and field days, thus suggesting use of a blended approach to information acquisition that balances immediacy and accessibility.

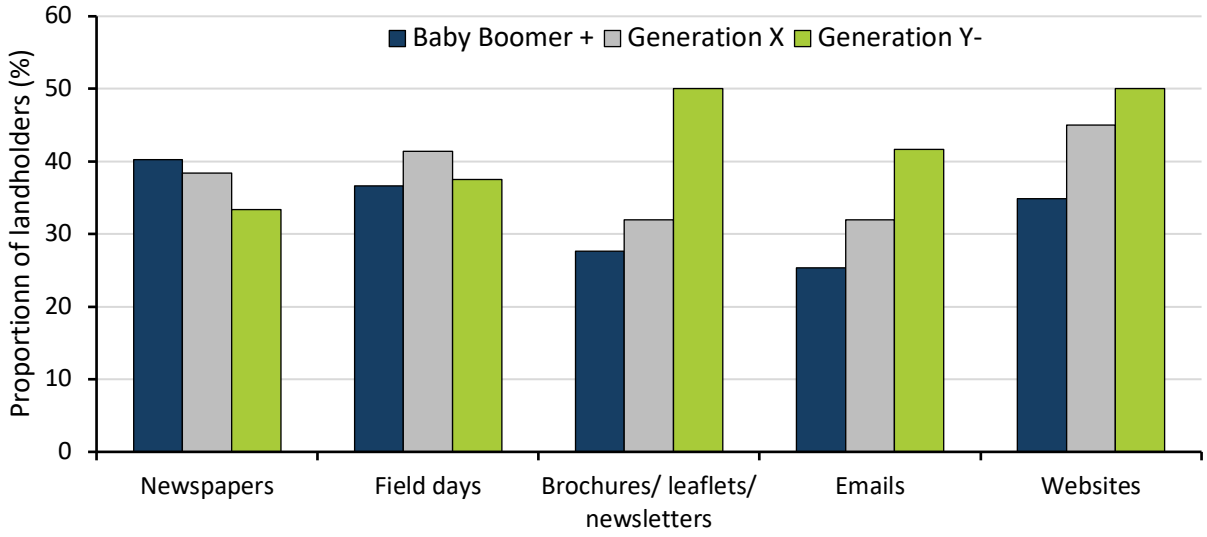

Figure 19. Top five modes of information overall by Baby Boomer+ (n=213), Generation X (n=99) and Generation Y- (n=24) for the 2024 North Central Victoria Landholder Survey (N=389).

An analysis of the overall data for the 2024 North Central Victoria Landholder Survey indicates that the top three sources of information are "other farmers" (58%), "my own knowledge from my own experiences" (53%), and "friends/neighbours/relatives" (42%) (Figure 20.). These figures highlight the predominant reliance on interpersonal networks and personal experiential learning among landholders. The emphasis on community-derived insights suggests that informal information channels play a critical role in shaping decision-making processes in the agricultural sector.

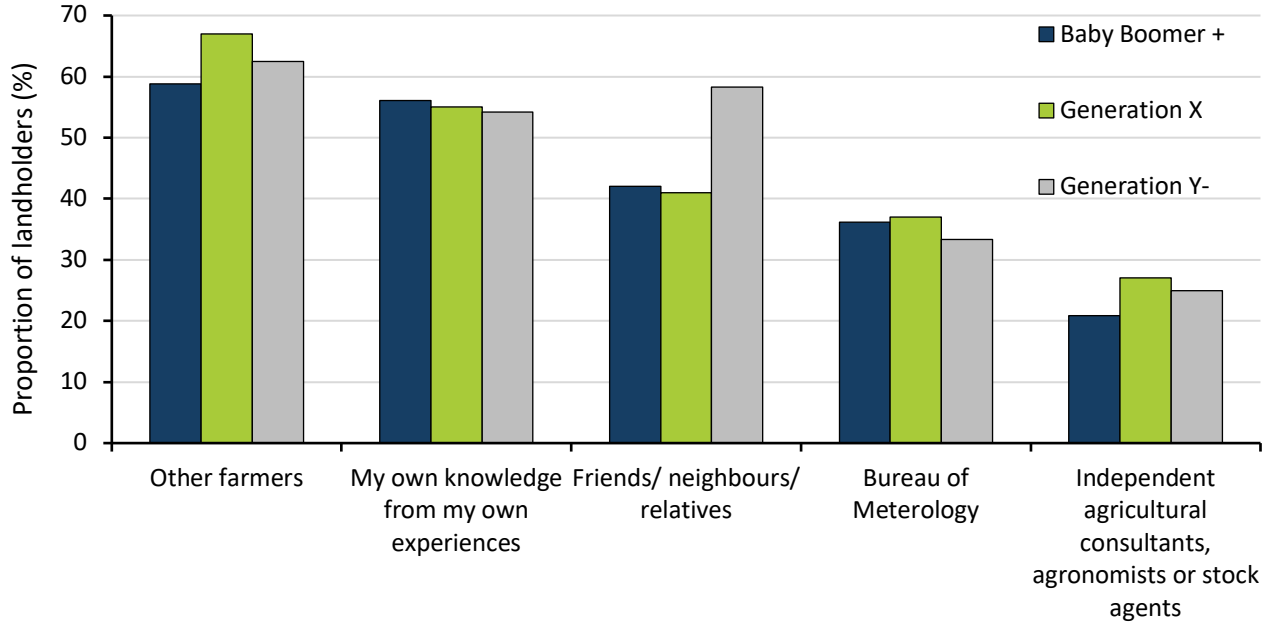

Figure 20. Top five sources of information overall by Baby Boomer+ (n=213), Generation X (n=99) and Generation Y- (n=24) for the 2024 North Central Victoria Landholder Survey (N=389).

4.2.2 Information consumption across survey years

The data shows notable shifts in how farmers gather information over the years, with certain sources exhibiting significant declines (Figure 21.). For example, "Other farmers" (58%) and "My own knowledge from my own experiences" (53%) were not included in the analysis as they were not comparable across the sample years. Traditional sources like newspapers saw a sharp decline from 76% in 2014 to 36% in 2024, with other sources like television and radio also experiencing reductions. Television dropped from 45% in 2014 to 26% in 2024, while radio declined from 54% to 23% over the same period. Meanwhile, the use of websites increased slightly from 40% in 2014 to 45% in 2019, before decreasing to 38% in 2024. Emails, which were not measured in 2014 and 2019, emerged as a source at 28% in 2024.

Additionally, more specialised sources such as the Bureau of Meteorology saw an increase from 52% in 2014 to 64% in 2019, though it dropped to 34% in 2024. The use of consultants, agronomists, or stock agents increased from 23% in 2014 to 45% in 2019, before dropping again to 23% in 2024. The use of friends, neighbours, and relatives dropped from 71% in 2014 to 42% in 2024, reflecting a move away from interpersonal sources.

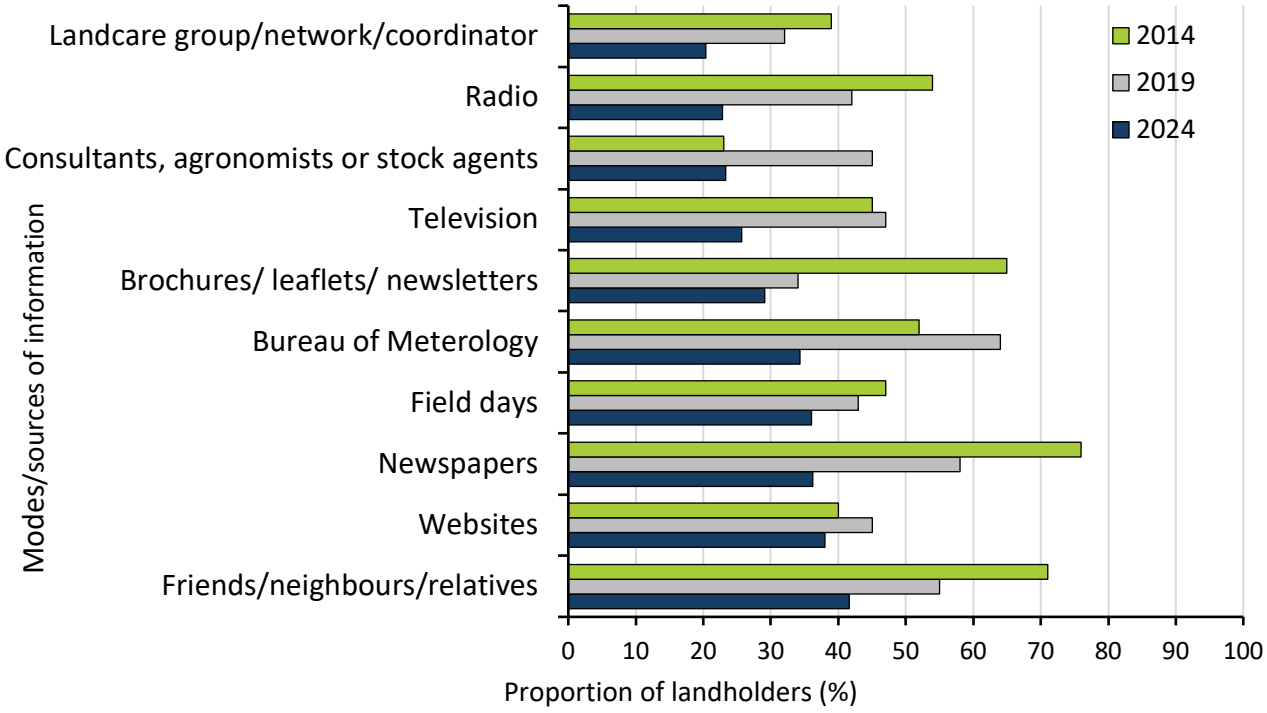

Figure 21. Comparison of the top five sources and modes of information for landholders overall across the 2014, 2019 and 2024 North Central Victoria Landholder Survey years. Note 'other farmers' (58%) and 'my own knowledge from my own experiences' (53%) were not included due to not being comparable across the sample years.

4.3 SOURCES OF SUPPORT

The data indicate that overall, 45% of respondents agree or strongly agree that they feel adequately supported to conduct farming and land management activities on their property, with full-time farmers reporting a higher level of support at 59% (Table 11.). This suggests that while less than half of all surveyed landholders feel adequately supported, those who are engaged in farming on a full-time basis perceive considerably more support. Such a disparity may be reflective of differing resource access, expectations, or policy impacts across varying landholder types.

In contrast, the sentiment regarding compensation or support for good land or soil stewardship is markedly less positive. Overall, only 7% of respondents agreed or strongly agreed with the statement, and among full-time farmers this figure is marginally higher at 12%. These low levels of agreement underscore a general dissatisfaction with the existing measures for incentivising sustainable land management practices, potentially highlighting an area in need of policy reform and additional targeted support.

Table 11. North Central Victoria landholders' views and experiences on support for farming and soil stewardship.

Views & experience statement	% Agree / strongly agree				
	Overall (2024)	Full-time (2024)	Part-time (2024)	Hobby Farmer (2024)	Non-Farmer (2024)
I feel adequately supported to conduct farming and land management activities on my property	45% (3.4) #^	59% (3.4)	57% (3.4)	40% (3.3)	21% (3.3)
There is adequate compensation or support for good land or soil stewardship	7% (2.5) #^	12% (2.4)	4% (2.4)	8% (2.6)	0% (2.7)

significant difference by landholder type (2019) or farmer vs not-farmer (2024)

* Significant difference by LGA

^ significant difference by generation

Note: 2024 data were tested for significant differences by LGA, generation and landholder type determined using a Kruskal-Wallis rank sum test with $p<0.05$.

Farmers primarily rely on a combination of personal networks and professional advice for support in their agricultural and land management activities. Friends, family, neighbouring farmers, and local peer groups are the most frequently cited sources, highlighting the value of community knowledge-sharing and collaboration (Figure 22.). Professional agronomists, agricultural advisors, and consultants also play a significant role in providing technical expertise. Additionally, groups like Landcare, Best Wool/Best Lamb, and other farming networks contribute to collective learning and resource sharing. While government bodies and agricultural organisations offer formal support, many farmers also turn to online resources, research publications, and self-education to guide their practices.

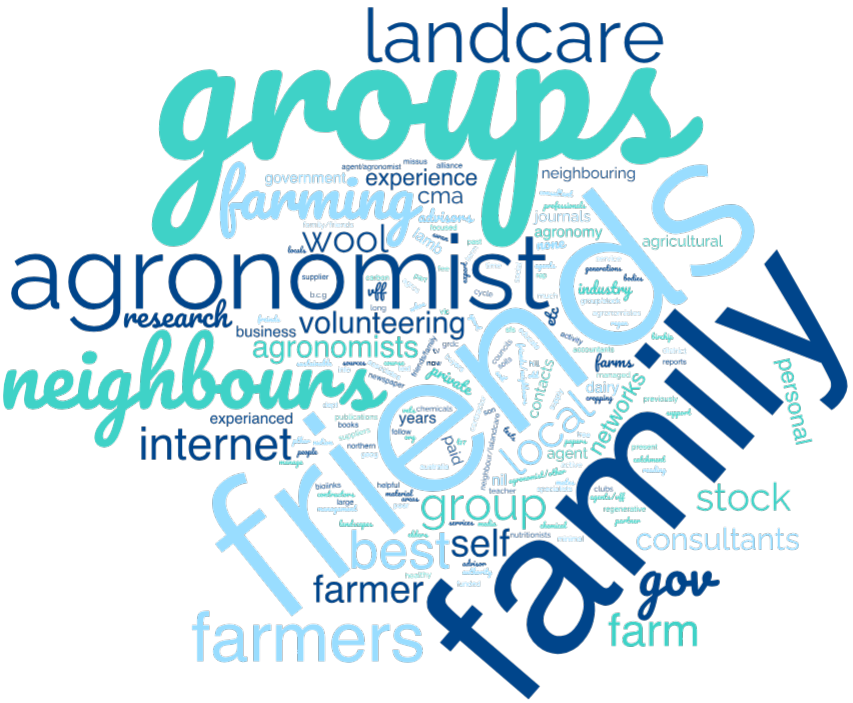

Figure 22. Word cloud representation of landholder responses to the question: 'what is your main source of support for agricultural and/or land management activities?' from the 2024 North Central Victoria Landholder Survey (N=389). Each word is emphasised in relation to the number of responses. Source: wordclouds.com.

5. CHALLENGES ON THE LAND

5.1 REGIONAL ISSUES

Results suggest several key concerns across all landholder types across the region, with water security emerging as the most critical issue (Figure 23.). It is rated highly by full-time (77%), part-time (81%), hobby farmers (78%), and non-farmers (66%), reflecting widespread concern over access to reliable water sources. Declining soil health is another major issue, with 66% of full-time farmers, 63% of part-time farmers, 70% of hobby farmers, and 51% of non-farmers identifying it as important. Additionally, changing weather patterns rank among the top concerns, with between 61% and 67% of respondents across all groups emphasising its impact.

Environmental and biodiversity concerns also feature prominently. The impact of pest plants and animals on native species is a key issue for 61%–75% of respondents, particularly hobby farmers (74%) and non-farmers (75%). Risks to life and property from wildfires were especially important for hobby farmers (71%) and non-farmers (74%), while water quality in farm dams during drought is a significant concern for part-time (70%) and hobby farmers (67%). The findings underscore a strong focus on water security, soil health, and climate variability, alongside biodiversity conservation and natural disaster risks, across all landholder groups.

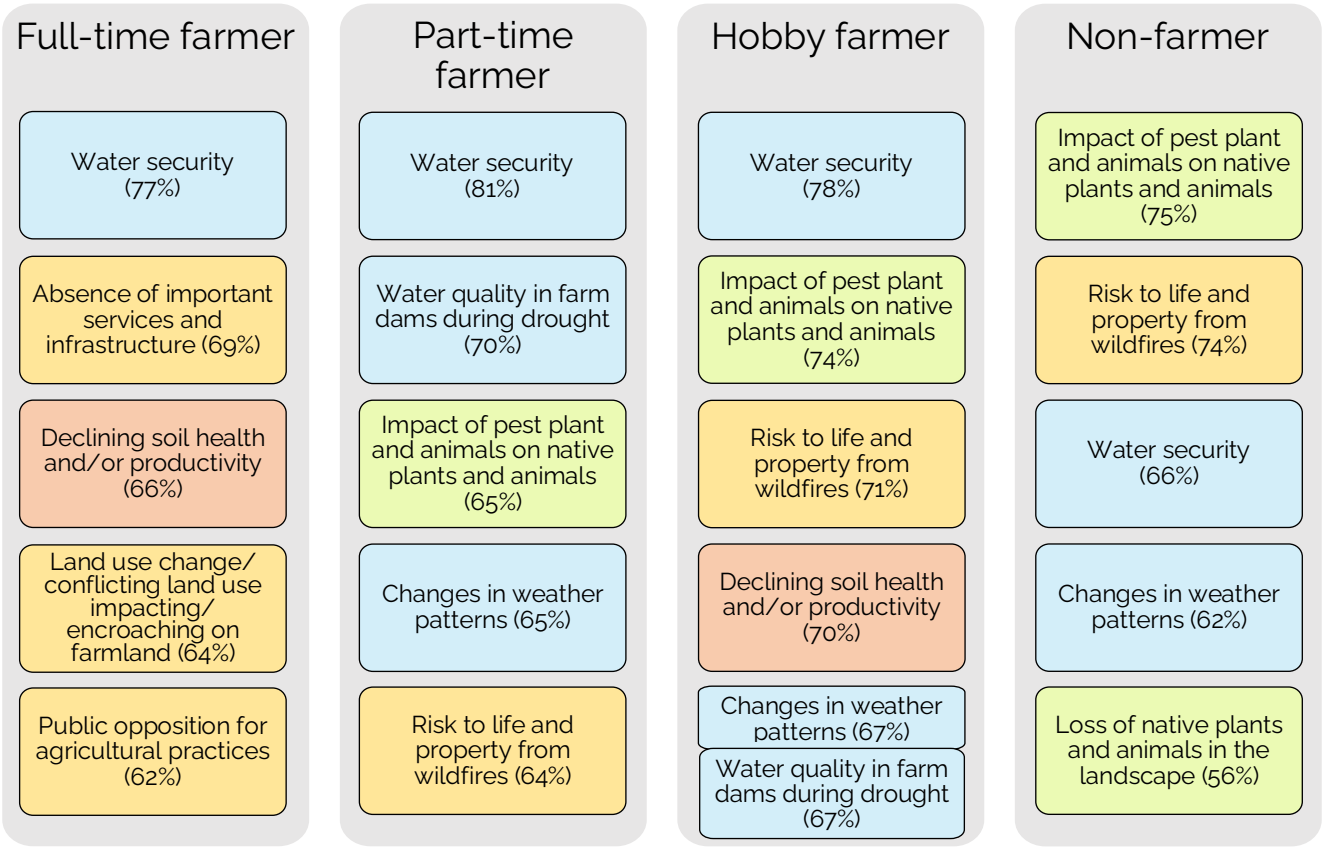

Figure 23. Top five most important district scale issues by landholder type identified in the 2024 North Central Victoria Landholder Survey (n=346-365). Issues related to climate change in blue, soil issues in red, social issues in orange and environmental impact in green.

5.2 PROPERTY SCALE ISSUES

Across the property-level issues identified by respondents, rising input costs, uncertain returns, and the impact of weeds or pest animals dominate the concerns of full-time and part-time farmers (Figure 24.). Specifically, full-time farmers rate rising input costs highest at 92% (mean 4.6), followed by uncertain returns (71%, mean 4.1) and weeds or pest animals (66%, mean 3.9), while part-time farmers similarly ranked rising input costs at 76% (mean 4.2), weeds or pest animals at 70% (mean 3.9), and uncertain returns at 67% (mean 3.9). These findings suggest that economic sustainability and productivity challenges are paramount for those most engaged in farming.

Hobby farmers and non-farmers exhibit a somewhat different set of priorities. Hobby farmers placed the greatest emphasis on the impact of weeds or pest animals (67%, mean 3.9), followed by rising input costs (56%, mean 3.7) and the influence of temperature extremes or changing rainfall patterns (56%, mean 3.5). In contrast, non-farmers are most concerned with weeds or pest animals (44%, mean 3.5), then with temperature extremes (38%, mean 3.3), and finally with weed/pest resistance to chemical controls (32%, mean 3.1). Overall, the data highlight a consistent focus on biotic challenges across all groups, while also revealing distinct economic and environmental concerns that vary with the level of farming engagement.

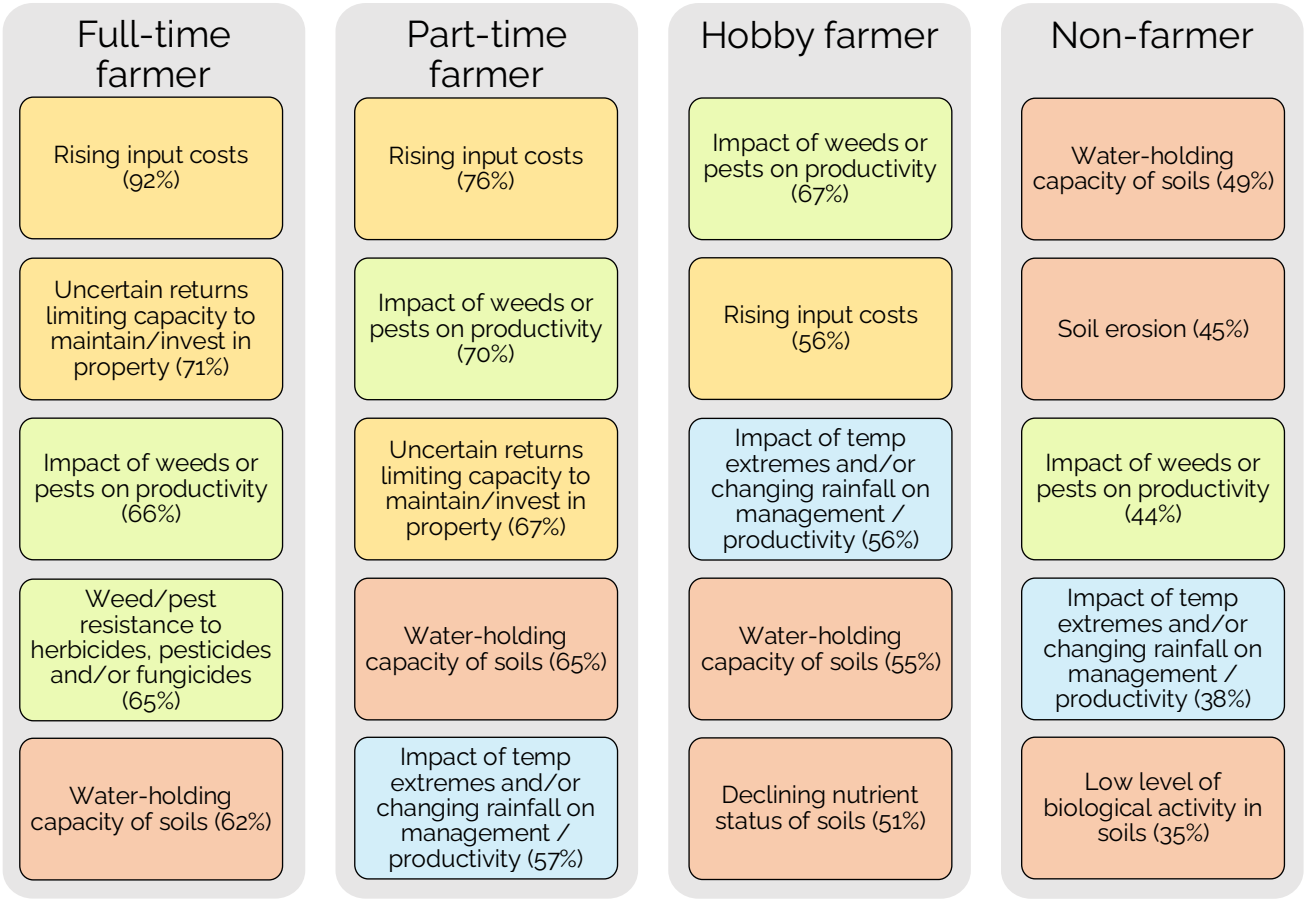

Figure 24. Top five most important property-level issues by landholder type identified in the 2024 North Central Victoria Landholder Survey (n=351-366). Issues related to climate change in blue, soil issues in red, social issues in orange and environmental impact in green.

In considering the future challenges and opportunities for full and part-time farmers over the next decade, several key themes emerge from their responses (Figure 25.). One predominant challenge is the uncertainty and limitations around water rights, exacerbated by climate change and unpredictable weather patterns. Farmers express concerns over maintaining adequate water access for irrigation amidst increasing variability in rainfall and prolonged droughts. This challenge is closely tied to the broader issue of managing costs and achieving sustainable pricing for agricultural produce, essential for economic viability and environmental stewardship.

Additionally, farmers highlight regulatory pressures and government interference as significant challenges. They perceive a growing demand for their produce but also feel constrained by bureaucratic decisions that often overlook their practical farming knowledge. This tension is compounded by concerns over rising input costs, including machinery, labour, and utilities, which threaten profitability. Despite these challenges, opportunities lie in regenerative agriculture and soil health initiatives, which offer paths to improve resilience against climate impacts and enhance long-term sustainability. Farmers see potential in adapting their practices to mitigate climate change effects while optimising land use efficiency and diversifying income streams.

Figure 25. Word cloud representation of landholder responses to the question: 'In the next 10 years, what would you see as likely being your biggest challenge and/or opportunity?' from the 2024 North Central Victoria Landholder Survey (N=389). Each word is emphasised in relation to the number of responses. Source: wordclouds.com.

5.2.1 Importance of soil-related issues on the property

The 2024 North Central Victoria Landholder Survey highlighted the importance of various soil-related issues, with notable differences observed across landholder types (Table 12.). Overall, the most important soil-related issues were water-holding capacity (59%), declining nutrient status (47%), and low biological activity in soils (47%). Full-time farmers expressed higher concern regarding soil-related issues compared to part-time and hobby farmers, particularly emphasising water-holding capacity and soil erosion. Full-time farmers also placed greater importance on low permeability of subsoil (52%) and low organic carbon levels (48%).

Part-time farmers ranked the low level of biological activity in soils higher (54%), and soil erosion was a significant issue for both full-time (44%) and part-time (43%) farmers. Hobby farmers and non-farmers showed relatively lower concern about these issues. Non-farmers, in particular, indicated lower levels of concern regarding many soil-related problems, with issues such as soil sodicity (22%) and soil acidity (18%) being of lesser importance to them.

Soil erosion and its impact were broadly acknowledged, particularly in 2019 and 2024 surveys, but the importance of issues like salinity and soil sodicity seemed to decline over the years. This data underscores the ongoing relevance of soil health challenges, especially for full-time farmers, with a particular focus on improving soil water retention and addressing erosion risks.

Table 12. Importance of soil-related issues by landholder type for the 2024 North Central Victoria Landholder Survey (n=351-366) and overall for the 2014 (n=739-746), 2019 (n=593-640) and 2024 survey years. Means (out of 5) are given in brackets and orange shading highlights the top three issues by percentage, with the darkest shade reflecting the most important issue.

Soil-related issue	% Important / very important						
	Overall (2014)	Overall (2019)	Overall (2024)	Full-time (2024)	Part-time (2024)	Hobby Farmer (2024)	Non-Farmer (2024)
[1] Water-holding capacity of soils	NA	NA	59% (3.6)	62% (3.7)	65% (3.6)	55% (3.6)	49% (3.5)
Declining nutrient status of soils	51% (3.5)	65% (3.9) #	47% (3.4)	53% (3.5)	50% (3.4)	51% (3.5)	30% (3.1)
[1] Low level of biological activity in soils	NA	64% (4.0) #	47% (3.4) #	54% (3.5)	42% (3.3)	46% (3.3)	35% (3.3)
Low permeability of sub soil	42% (3.3)	60% (3.8) #	47% (3.3)	52% (3.4)	46% (3.2)	50% (3.4)	32% (3.1)
[1] Low level of organic carbon in soils	NA	61% (3.9) #	43% (3.3)	48% (3.4)	43% (3.3)	43% (3.3)	30% (3.0)
Soil erosion (e.g. due to wind or water)	43% (3.2)	72% (4.1)	42% (3.2) ^#	44% (3.2)	43% (3.1)	35% (3.1)	45% (3.4)
[1] Soil-borne diseases	NA	NA	38% (3.1)	47% (3.4)	35% (2.9)	39% (3.0)	26% (2.9)
[1] Effects of pesticide use on soil biota	NA	NA	36% (3.2)	41% (3.4)	32% (3.0)	41% (3.2)	26% (2.9)
[1] Soil sodicity	NA	48% (3.6) #*	36% (3.1) #	45% (3.4)	34% (2.8)	35% (3.2)	22% (2.8)
Soil acidity (lower pH) undermining productive capacity of soils	46% (3.4)	57% (3.8) #	35% (3.0)	40% (3.1)	40% (3.0)	37% (3.2)	18% (2.6)
[1] Salinity undermining long-term productive capacity	NA	NA	26% (2.8)	30% (2.8)	28% (2.7)	28% (2.9)	18% (2.7)

Significant difference by landholder type (2019) or farmer vs not-farmer (2024)

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

Note: significant differences were determined using a Kruskal-Wallis rank sum test with $p<0.05$. 2024 data were tested for significant differences by LGA, generation and landholder type. 2019 data were tested for significant differences by landholder type and LGA. No significant differences were calculated in 2014.

5.2.2 Land lost to productivity

A notable proportion of farmers reported facing productivity challenges due to soil-related issues. Approximately 18% of both full and part-time farmers reported that a

portion of their land was lost to production as a result of soil problems. On average, these farmers have lost about 20 hectares of productive land.

The responses indicate that soil degradation is a significant concern for many farmers, manifesting in various forms. Erosion, both general and specific types such as gully erosion and creek erosion, is frequently cited, suggesting widespread issues with soil stability and runoff management. Salinity and sodic soils are also common problems, reducing land productivity and complicating crop growth. Additionally, issues like waterlogging, acidity, and contamination from floods further contribute to land being lost to production. The presence of non-arable, rocky, and heavy clay soils highlights natural limitations, while invasive weeds and tree overgrowth exacerbate soil degradation. Collectively, these issues reflect the complex challenges farmers face in maintaining soil health and productivity.

The data highlights the trend in the perceived importance of uncertain returns limiting investment capacity over time. In 2014, the mean score was 3.8, indicating a relatively high concern. By 2019, the mean had slightly decreased to 3.5, with a notable portion (18%) considering it not important, and 47% deeming it important. The remaining 35% saw it as somewhat important or had no opinion. In 2024, the mean slightly rebounded to 3.6, suggesting that while the issue remains significant, there has been a slight shift in how it's perceived over the years.

5.3 MODELLING LANDHOLDER ATTRIBUTES AND CHALLENGES

The potentially logical pairwise relationships were tested to create a regression model showing the most likely associations for a range of factors. In regard to soil issues, a strong model showed that being **highly concerned about declining soil health** and productivity was closely aligned with having saline soils with declining nutrient status, and being highly concerned about water security, as well as the loss of native plants and animals in the landscape (Adjusted R squared = 0.61).

Interestingly, **uncertainty of returns** was negatively correlated when modelled with landholder wellbeing. Landholder wellbeing, a feeling that they were coping with the associated stressors of farm management was closely related with feeling supported and that they were leaving their farm in a better condition than they had found it. They felt confident managing their farm in the face of uncertainty, had high confidence in regenerative agriculture and were unconcerned about uncertainty of returns limiting capacity to reinvest (adjusted R squared = 0.403).

Feeling supported in farming and land management strongly correlated with feeling that there was adequate financial compensation available for supporting good farm and land management, valuing soil health groups, having confidence in regenerative agriculture, coping well with farm management, and also, a confidence that landholders in the region can adapt to changes in weather patterns (adjusted R squared=0.29).

Feeling **confident dealing with uncertainty** was closely related to feeling confident making farm decisions based on farm data, coping well with farm management

stressors, and feeling generally satisfied with farm productivity (adjusted R squared=0.48).

Wanting to be a part of **positive change in farming** was closely related to knowledge of how to allocate land according to land class, feeling a personal responsibility to be part of a soil health group, feeling confident making farming decisions based on farm data, having good systems in place to manage that data, and on balance, being satisfied with farm productivity over time (adjusted R squared=0.36).

The factors driving **successful succession** were modelled, given that the survey data showed a gap between farmers wishing to keep their farm in the family and having a successor. This strong model identified that having offspring working on the property and a succession plan in place also linked closely with awareness of North Central CMA, decreasing their use of synthetic inputs per hectare, and wanting to be a part of positive change in farming (R squared = 0.51).

Agreeing that **climate change is due to human activity** closely linked with the view that climate change was a risk to the region, that it was not too late to take action to mitigate climate, and that landholders should manage their properties in expectation of a highly variable climate. Within this strong model, these factors also linked with the intention of landholders to set aside land for conservation (adjusted R squared=0.64).

5.4 RELATIONSHIPS BETWEEN ISSUES AND PRACTICE

The survey identified the top ten land management issues and the best-practice interventions implemented by landholders over the past five years to mitigate these challenges (Table 13.). Soil health concerns, such as acidic soils, low organic carbon, and low biological activity, were addressed through the application of lime, soil testing, and the preparation of nutrient budgets, alongside the adoption of regenerative agricultural practices like planting legumes, multi-species pastures, and using biological soil supplements. Similarly, concerns related to pesticide impacts on soil biota were mitigated by integrating native vegetation, no-till practices, and organic farming methods to enhance biodiversity and soil resilience.

Erosion, soil permeability, nutrient decline, salinity, and sodicity were managed through tree planting, perennial pastures, controlled grazing, and fencing off native bushland to regulate stock access. Additionally, precision farming techniques were applied to address soil-borne diseases, while whole-farm planning was used to integrate these interventions into broader land management strategies. The survey results highlight a shift towards sustainable and regenerative practices, reinforcing the importance of soil health, biodiversity, and adaptive management in addressing land degradation challenges in North Central Victoria.

Table 13. Relationships between top 10 issues and best-practices implemented as mitigation interventions in the past five years by landholders in the 2024 North Central Victoria Landholder Survey.

Important issue	Management practice applied in past 5 years
Acidic soils	*At least one lime application to arable land*
	Testing of soils to understand soil condition
	Preparation of a nutrient budget for all/most of the property
	Planting legumes or pulses
	Multi-species pastures
Low organic carbon	*Planting of trees and shrubs (incl. direct seeding)*
	Fencing of native bush/grasslands to manage stock access
	Sowing perennial pastures
	Application of biological soil supplements (e.g. compost tea, effluent)
	At least one lime application to arable land
	Testing of soils to understand soil condition
	Preparation of a nutrient budget for all/most of the property
	Planting legumes or pulses
	Multi-species pastures
	Regenerative practice/s
Low biological activity	*Planting of trees and shrubs (incl. direct seeding)*
	Fencing of native bush/grasslands to manage stock access
	Sowing perennial pastures
	Application of biological soil supplements (e.g. compost tea, effluent)
	At least one lime application to arable land
	Testing of soils to understand soil condition
	Planting legumes or pulses
	Organics
	Multi-species pastures
	Whole farm plan
Effects of pesticide use on soil biota	*Planting of trees and shrubs (incl. direct seeding)*
	Fencing of native bush/grasslands to manage stock access
	Sowing perennial pastures
	Use of no-tillage techniques to establish crops or pastures
	Testing of soils to understand soil condition
	Preparation of a nutrient budget for all/most of the property
	Planting legumes or pulses
	Organics
	Multi-species pastures
	Regenerative practice/s

Soil-borne diseases	*Sowing perennial pastures* *Use of precision farming techniques* *Testing of soils to understand soil condition* *Preparation of a nutrient budget for all/most of the property* *Planting legumes or pulses* *Multi-species pastures*
Erosion	*Planting area of trees*
Low permeability of sub-soil	*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* *Application of biological soil supplements (e.g. compost tea, effluent)* *Planting legumes or pulses* *Organics* *Multi-species pastures* *Regenerative practice/s*
Declining nutrient status of soil	*Planting of trees and shrubs (incl. direct seeding)* *Fencing of native bush/grasslands to manage stock access* *Use of time controlled, cell or rotational grazing* *Sowing perennial pastures* *At least one lime application to arable land* *Testing of soils to understand soil condition* *Planting legumes or pulses* *Multi-species pastures*
Salinity	*Removal of an area of trees and shrubs* *Sowing perennial pastures*
Sodicity	*Encouraging native grasses/grains to grow at scale* *Planting of trees and shrubs (incl. direct seeding)* *Fencing of native bush/grasslands to manage stock access* *Use of time controlled, cell or rotational grazing* *Planting legumes or pulses* *Organics* *Multi-species pastures* *Regenerative practice/s* *Whole farm plan*

5.5 CLIMATE CHANGE

The survey identified several climate change-related issues of varying importance across different landholder types. Water security emerged as the most critical issue,

with 76% of all respondents considering it important, particularly for full-time (77%) and part-time farmers (81%) with Figure 26 highlighting average temperature and rainfall across survey years. Changes in weather patterns and declining soil health/productivity were also significant, with 63% of respondents overall acknowledging their importance (Table 14.). Full-time farmers, in particular, emphasised the need to address these issues, with 66% indicating concern about the impact on their operations.

Farmers expressed high concern about the risks to life and property from wildfires, particularly in non-farming groups (74%) and hobby farmers (71%). While full-time farmers were somewhat less concerned (45%), they were more focused on the economic challenges of uncertain returns, with 71% identifying it as a limiting factor compared to only 33% of hobby farmers. Flooding risks were deemed less important overall but still received notable concern from full-time farmers (45%) and part-time farmers (54%).

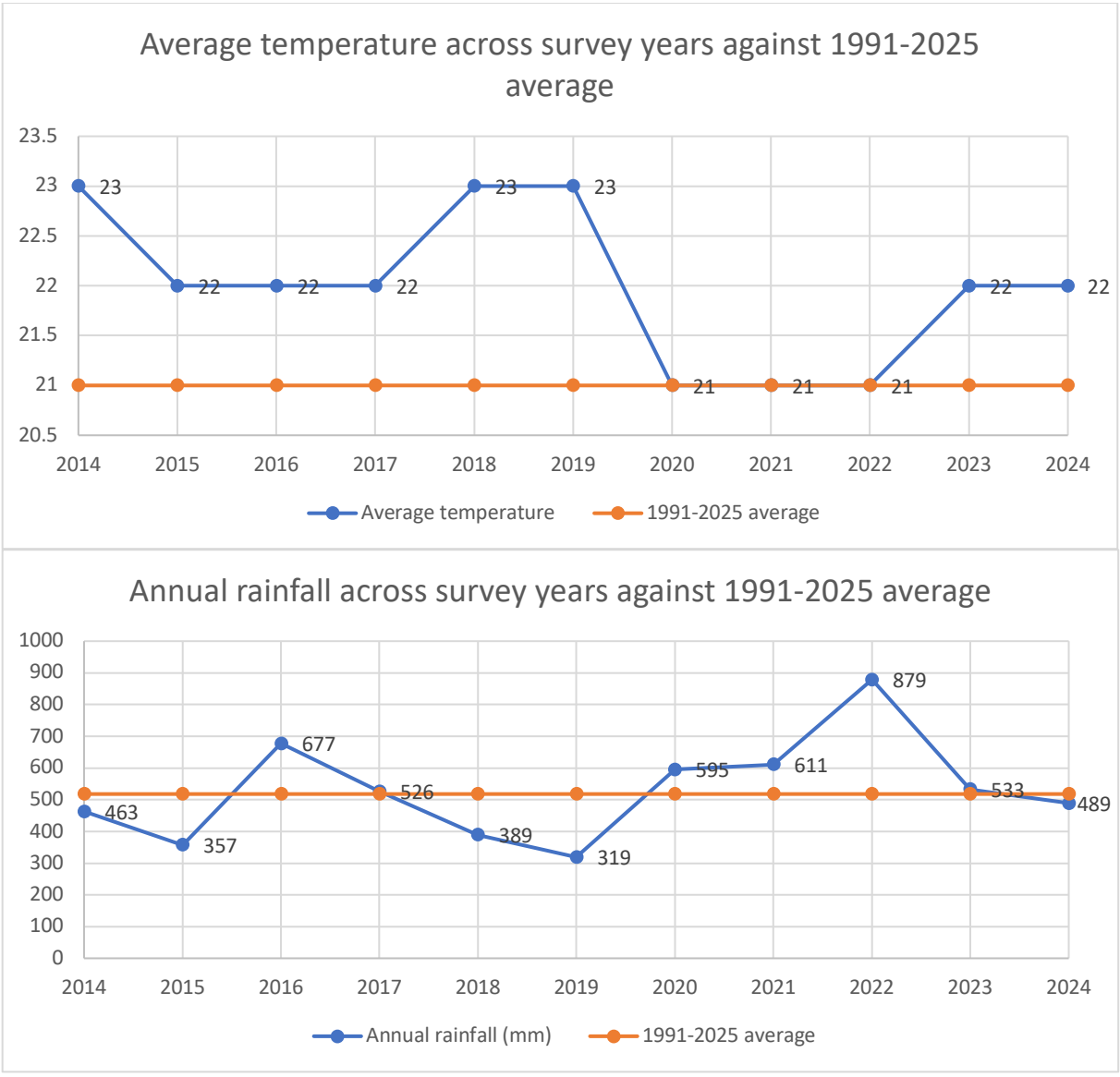

Figure 26. Average temperature (°C) and annual rainfall (mm) against 1991-2025 averages for North Central Victoria.

Table 14. Importance of climate change related issues affecting local district farmers by landholder type and overall, for the 2024 North Central Victoria Landholder Survey. Means (out of 5) are given in brackets and orange shading highlights the top three issues by percentage, with the darkest shade reflecting the most important issue.

Climate change related issue	% Important / very important				
	Overall (2024)	Full-time	Part-time	Hobby Farmer	Non-Farmer
Water security	76% (4.2) *	77% (4.2)	81% (4.3)	78% (4.1)	66% (4.0)
Changes in weather patterns	63% (3.8)	61% (3.8)	65% (3.8)	67% (3.9)	62% (3.9)
Declining soil health and/or productivity	63% (3.9)	66% (3.9)	63% (3.8)	70% (4.0)	51% (3.6)
Risk to life and property from wildfires	61% (3.8) #*	45% (3.5)	64% (3.8)	71% (4.0)	74% (4.2)
~Temperature extremes and/or changing rainfall patterns on management or productivity	54% (3.7)	59% (3.8)	57% (3.7)	56% (3.5)	38% (3.3)
~Uncertain returns limiting capacity to maintain / invest in my property	50% (3.6) #	71% (4.1)	67% (3.9)	33% (3.1)	16% (2.5)
Risk to life and property from flooding	41% (3.2)	45% (3.3)	54% (3.5)	38% (3.0)	29% (3.0)

Significant difference by farmer vs not-farmer

* Significant difference by LGA

~ Issues at the property scale

Note: 2024 data were tested for significant differences by LGA, generation and landholder type using a Kruskal-Wallis rank sum test where $p<0.05$.

There is a notable gap between knowledge of how to prepare for extreme weather events and actual disaster preparedness, particularly among farmers (Table 15.). While 73% of farmers (full-time and part-time) reported knowing how to prepare for events such as fire or flood, only 45% indicated having a formal disaster response plan in place. In contrast, non-farmers (including hobby farmers and those not farming) showed lower levels of knowledge (53%) but higher rates of preparedness, with 62% having a disaster plan. This suggests that while farmers are more informed about preparation strategies, they may be less likely to formalise these into actionable plans.

Table 15. Disaster preparedness and knowledge of how to prepare for extreme weather for the 2024 North Central Victoria Landholder Survey.

Question	All	Full-time	Part-time	Hobby Farmer	Non-farmer	Farmer (FT, PT)	Not Farmer (HF, NF)
How to prepare for an extreme weather event e.g. fire or flood	64	76	69	60	45	73	53
Do you have a disaster response plan prepared? (e.g. a flood or bushfire plan)	53	48	41	64	59	45	62

5.5.1 Changes to make farming systems more resilient

Just over half of full- and part-time farmers believe that significant changes are needed to strengthen the resilience of farming systems in the region. Their concerns centre on three key areas: government regulation, market fairness, and sustainable agricultural practices. Many farmers feel burdened by excessive regulations and advocate for fewer bureaucratic barriers, allowing them more flexibility to adapt to market conditions. There is also a strong concern about the declining viability of family farms, with calls for policies that ensure fair competition and prevent large corporations from dominating the agricultural sector.

The most frequently suggested changes include reducing regulatory burdens, improving soil and water management, and creating fairer market conditions for farmers. Many respondents expressed frustration with government policies, urging for less red tape, better financial support, and long-term investment in sustainable farming. Soil health and water security were major priorities, with farmers calling for increased soil carbon, reduced chemical use, and improved water retention on farms. Additionally, concerns over corporate control—particularly supermarket duopolies—were raised, with farmers emphasising the need for fair pricing structures to ensure the profitability of agricultural businesses.

Farmers also voiced strong dissatisfaction with environmental policies, particularly those they perceive as restrictive or disconnected from agricultural realities. While there is support for sustainable practices, many believe policies should reward rather than penalise farmers for adopting environmentally responsible methods. There is a clear call for better access to information on carbon credits and financial incentives that could make regenerative and innovative farming methods more competitive. Providing farmers with the necessary knowledge and resources is seen as crucial for building long-term resilience and ensuring the sustainability of the agricultural industry.

5.5.2 Beliefs about climate change

The results suggest a changing view on climate change and human responsibility over time. The belief that human activities are influencing climate change has steadily increased from 53% in 2014 to 62% in 2024, indicating a growing acknowledgment of human impact. However, the belief that it is not too late to take action to address

climate change has decreased from 62% in 2019 to 51% in 2024, suggesting a shift toward more pessimistic views on the effectiveness of future action (Figure 27.).

The perception that climate change will have dire consequences if no action is taken has remained relatively stable, rising from 45% in 2014 to 51% in 2024, with a notable increase in agreement from 45% to 55% in 2019. These findings reflect a growing recognition of climate change's severity but also a sense of urgency and a decline in optimism about mitigating its impacts through action.

The data also reveals substantial variation in climate change beliefs across Local Government Areas (LGAs), with clear contrasts between those with the highest and lowest levels of agreement. When asked if climate change poses a risk to the region, Central Goldfields reported the highest agreement at 100%, followed by Mitchell (67%) and Macedon Ranges (62%). In contrast, Ballarat had the lowest level of agreement at 17%, with Buloke following at 43%. A similar pattern emerges in response to the statement "Human activities are influencing changes in climate", where Central Goldfields again showed the highest agreement (100%), alongside Mount Alexander (84%) and Swan Hill (76%). The lowest levels of agreement were found in Buloke (35%) and Ballarat (50%).

These variations may be influenced by differences in demographic composition, land use patterns, or levels of exposure to climate initiatives and education. However, caution is warranted in interpreting these results, as the sample sizes in some LGAs are very small, making them sensitive to the views of a few individuals. For instance, the 100% agreement in Central Goldfields reflects a very limited number of respondents (n=2). These disparities point to the importance of tailoring climate communication and engagement strategies to specific regional contexts, ensuring that outreach is responsive to local beliefs, concerns, and levels of awareness.

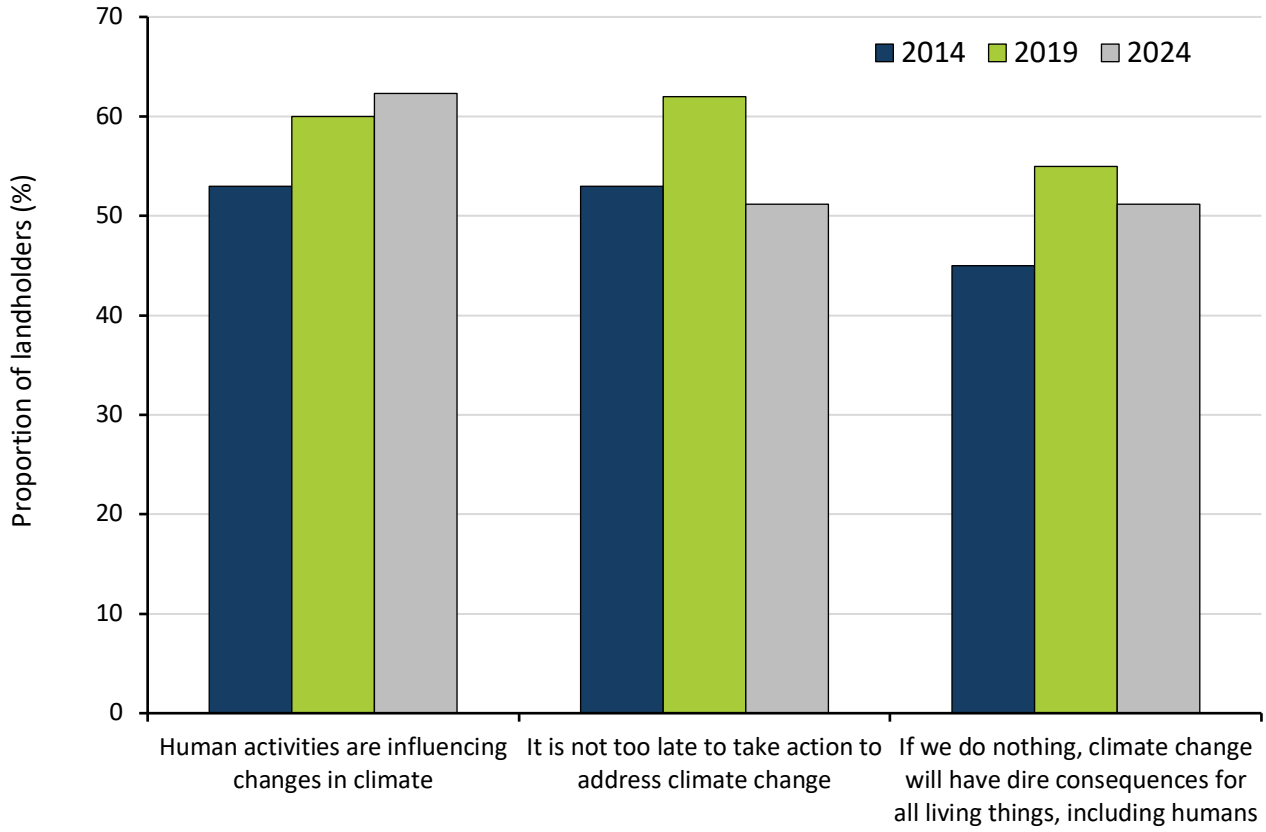

Figure 27. Beliefs about climate change overall for the 2014 (n=746-751), 2019 (n=638-644) and 2024 (n=348-353) North Central Victoria Landholder Survey years. Percentages reflect the proportion of landholders who agree or strongly agree with each statement.

While the above highlights the changes over time, and at an LGA level, here we delve into the current data and explore the results by landholder type. Full-time farmers tended to have lower levels of agreement on climate change-related issues compared to non-farmers and hobby farmers (Figure 28.). For example, 66% of full-time farmers agreed that landholders should manage properties for a highly variable climate, but the figures were higher for part-time farmers (78%), hobby farmers (76%), and non-farmers (81%).

The belief that human activities are influencing climate change shows a similar trend, with 53% of full-time farmers agreeing, while agreement increases for part-time (59%), hobby farmers (67%), and non-farmers (78%). Regarding the perception of climate change as a regional risk, 40% of full-time farmers agree, compared to 47% of part-time farmers, 55% of hobby farmers, and 69% of non-farmers.

Almost two thirds of full-time farmers were confident about their capacity to adapt to changes in rainfall patterns, with 65% agreeing that they think we can, compared to 45% of part-time farmers, 42% of hobby farmers, and only 32% of non-farmers. There is also less agreement among full-time farmers (35%) about the expectation that primary producers should reduce carbon emissions, when compared to non-farmers (61%). Overall, the results indicate that non-farmers generally show a higher level of concern

about climate change and its consequences, while full-time farmers are more cautious in their assessments and actions related to climate change adaptation and mitigation.

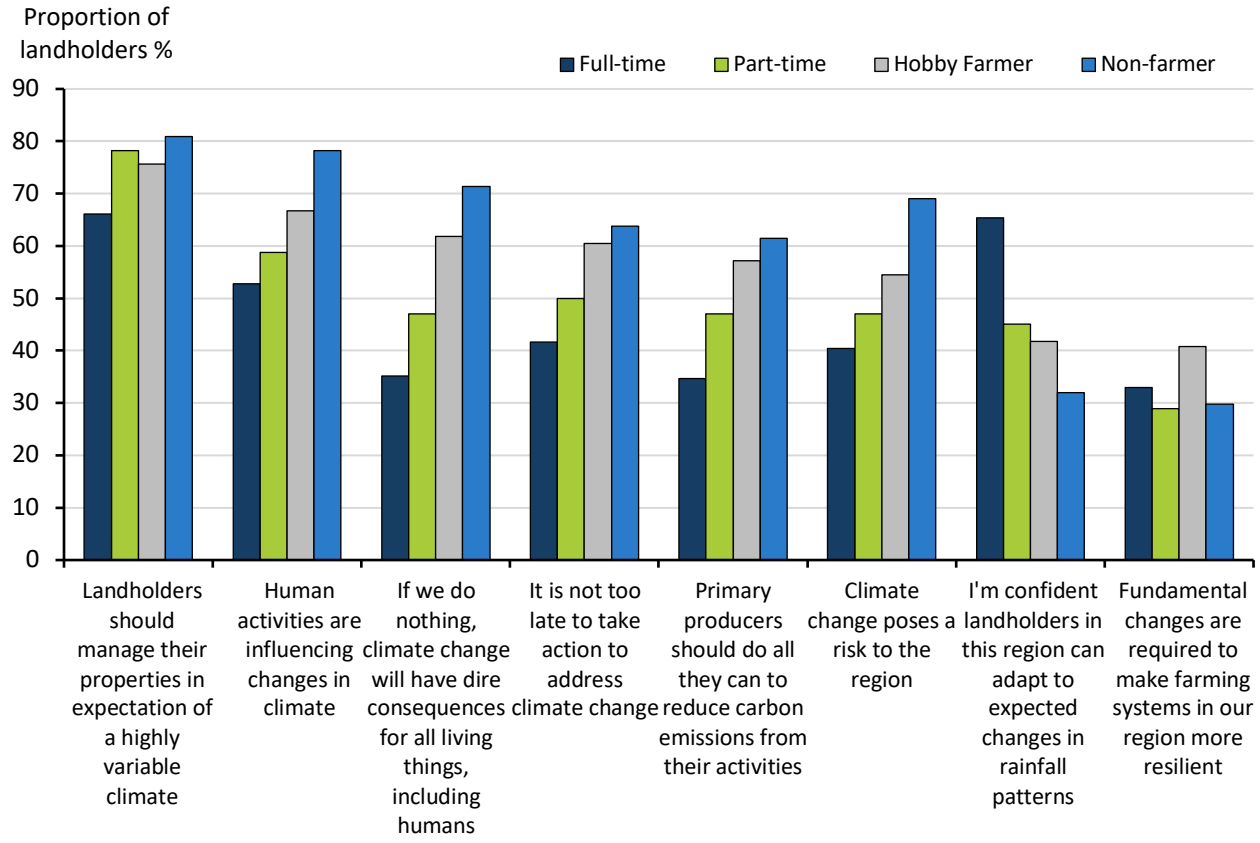

Figure 28. Beliefs about climate change by landholder type for the 2024 North Central Victoria Landholder Survey (n=225-362). Percentages reflect the proportion of landholders who agree or strongly agree with each statement.

5.5.3 Responding to climate change

The results suggest that full-time farmers are the most proactive in adapting to climate change, yet figures remain low overall. Overall, 23% of landholders have adjusted their financial or on-property operations due to seasonal weather changes, with full-time farmers leading at 32%. Similarly, 31% of all respondents have taken steps to increase soil carbon, rising to 40% among full-time farmers. In the past five years, 23% of landholders have implemented changes to reduce carbon emissions, with full-time farmers again showing strong engagement at 24%. These findings suggest that while climate-responsive practices are gaining traction, full-time farmers are at the forefront of adaptation efforts.

5.5.4 Carbon management

Farmers reported a wide range of practice changes aimed at increasing soil carbon, with a strong emphasis on reducing soil disturbance. Techniques such as direct drilling, zero tillage, and minimum tillage were frequently cited as key methods for preserving soil structure and enhancing organic matter content. Many also reported stubble retention and crop rotation, including the use of legumes and perennial pastures, as

central to improving soil carbon. These methods collectively reduce erosion, improve soil cover, and increase biological activity in the soil. Additionally, the use of organic amendments such as compost, biochar, and bio stimulants was mentioned as a way to stimulate microbial activity and increase organic carbon inputs to soil systems.

Despite this widespread adoption of soil carbon-enhancing practices, the data reveals a noteworthy disconnect between practical action and awareness of market-based incentives. As shown in Table 16, while only 7% of respondents reported having good knowledge of market mechanisms that support carbon farming, 31% indicated that they have changed their operations in the past five years to increase soil carbon. These changes included revegetation, exclusion fencing, rotational grazing, and targeted nutrient additions such as lime and trace elements. This suggests that farmers are engaging in soil carbon improvement primarily for agronomic or ecological benefits rather than in response to carbon market opportunities. The findings highlight the potential for greater alignment between practice adoption and policy support if awareness and accessibility of carbon market mechanisms can be improved.

Table 16. Practice change in response to climate change by landholder type and overall, for the 2024 North Central Victoria Landholder Surveys (n=338-349).

Current practice	% Indicating 'yes'				
	Overall	Full-time	Part-time	Hobby Farmer	Non-Farmer
In the past 5 years, have you changed your financial or on-property operations as a result of seasonal changes in weather patterns?	23% #^	32%	23%	16%	10%
In the past 5 years, have you changed your operations to increase soil carbon (e.g. by revegetation, soil management)?	31% #	40%	23%	32%	14%
In the past 5 years, have you changed your on-property operations as a result of considering opportunities to reduce carbon emissions e.g. generating solar, wind power, improved grazing practices)?	23%	24%	27%	21%	15%

Significant difference by farmer vs not-farmer

* Significant difference by LGA

^ Significant difference by generation

Note: 2024 data were tested for significant differences by LGA, generation and landholder type using a Pearson's Chi-squared test where $p<0.05$.

6. THE FUTURE OF FARMING IN NORTH CENTRAL VICTORIA

6.1 DIFFERENCES BY GENERATION

6.1.1 Knowledge

The results indicate generational differences in knowledge across a range of farming and environmental topics, with notable trends in business planning, regenerative agriculture, and ecological management. Despite the small sample size for Generation Y- (n=25), this group reported the highest familiarity (60%) with preparing a farm or property plan according to land and soil conditions, compared to 49% of Generation X and 40% of Baby Boomer+ (Figure 29.). Similarly, Generation Y- exhibited greater knowledge of how to (re)introduce legumes and pulses into their enterprise mix (52%), a figure significantly higher than Generation X (37%) and Baby Boomer+ (30%). However, when it came to understanding market mechanisms that provide financial support for building carbon and biodiversity, all generations demonstrated low awareness, with Generation Y- reporting the least familiarity (4%) compared to Generation X (9%) and Baby Boomer+ (7%).

Across other knowledge areas, younger generations tended to show greater awareness of biodiversity's role in farming systems. For example, 44% of Generation Y- recognised the role of on-farm biodiversity in supporting soil and landscape health, compared to 33% of Generation X and 31% of Baby Boomer+. Similarly, knowledge of riverbank vegetation's role in flood mitigation was relatively high among Generation Y- (44%) and Generation X (45%), slightly higher than Baby Boomer+ (37%). Conversely, older generations demonstrated greater awareness in historical and cultural land-use topics, with Baby Boomer+ and Generation X reporting higher familiarity with how land was managed before European settlement (14-15%) compared to Generation Y- (4%). These trends suggest that while younger landholders may be more engaged with contemporary and future-focused agricultural knowledge, traditional and historical land-use knowledge remains stronger among older generations.

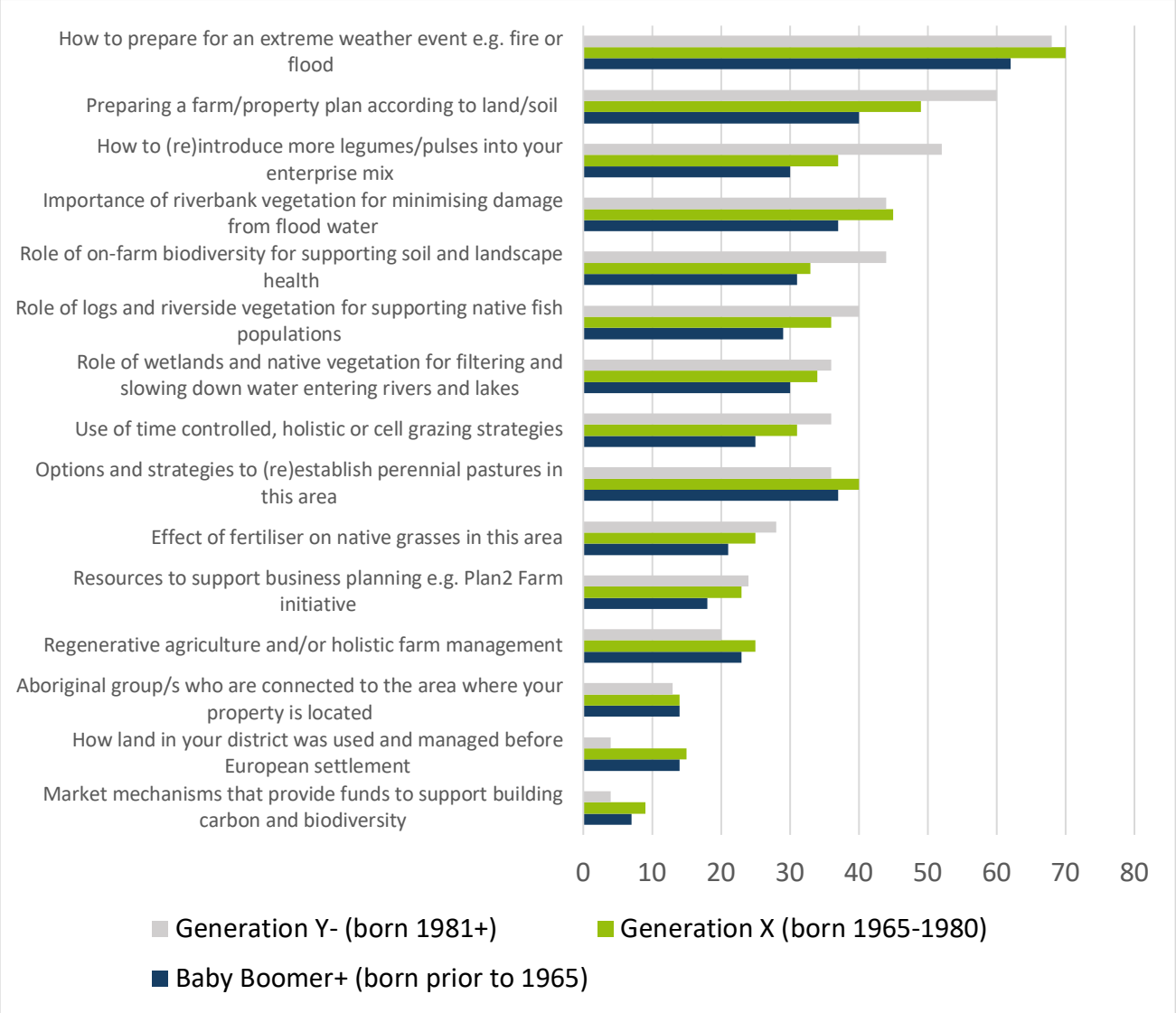

Figure 29. Levels of self-assessed knowledge between generations for full-time and part-time farmers combined, 2024 North Central Victoria Landholder Survey (n=357).

When assessing soil knowledge, the survey results highlight generational differences with Generation Y- (n=25) demonstrating a relatively strong understanding of soil health and management strategies despite their smaller sample size (Figure. 30). This group reported the highest awareness of how to build soil organic matter or soil carbon (56%) and the benefits of applying biological soil supplements (68%), compared to Generation X (43% for both) and Baby Boomer+ (39% and 42%, respectively). Additionally, Generation Y- exhibited the greatest knowledge of strategies to maintain groundcover and minimise erosion (72%), exceeding Generation X (58%) and Baby Boomer+ (56%). These findings suggest that younger landholders may be more engaged with sustainable soil management practices, potentially reflecting a growing emphasis on regenerative agriculture.

Across other aspects of soil knowledge, Generation Y- also demonstrated strong awareness of processes leading to soil degradation (48%) and how to use soil testing to inform productivity planning (48%). While Generation X exhibited slightly lower levels of knowledge in these areas (37% and 42%, respectively), Baby Boomer+ reported the

lowest familiarity (29% and 34%). However, knowledge of soil carbon and microbiology's role in soil health was consistent across generations, with Generation Y- and Generation X both reporting 40% awareness, slightly higher than Baby Boomer+ at 34%. These results indicate that while older generations may have more practical farming experience, younger landholders appear to be prioritising scientific and regenerative approaches to soil management.

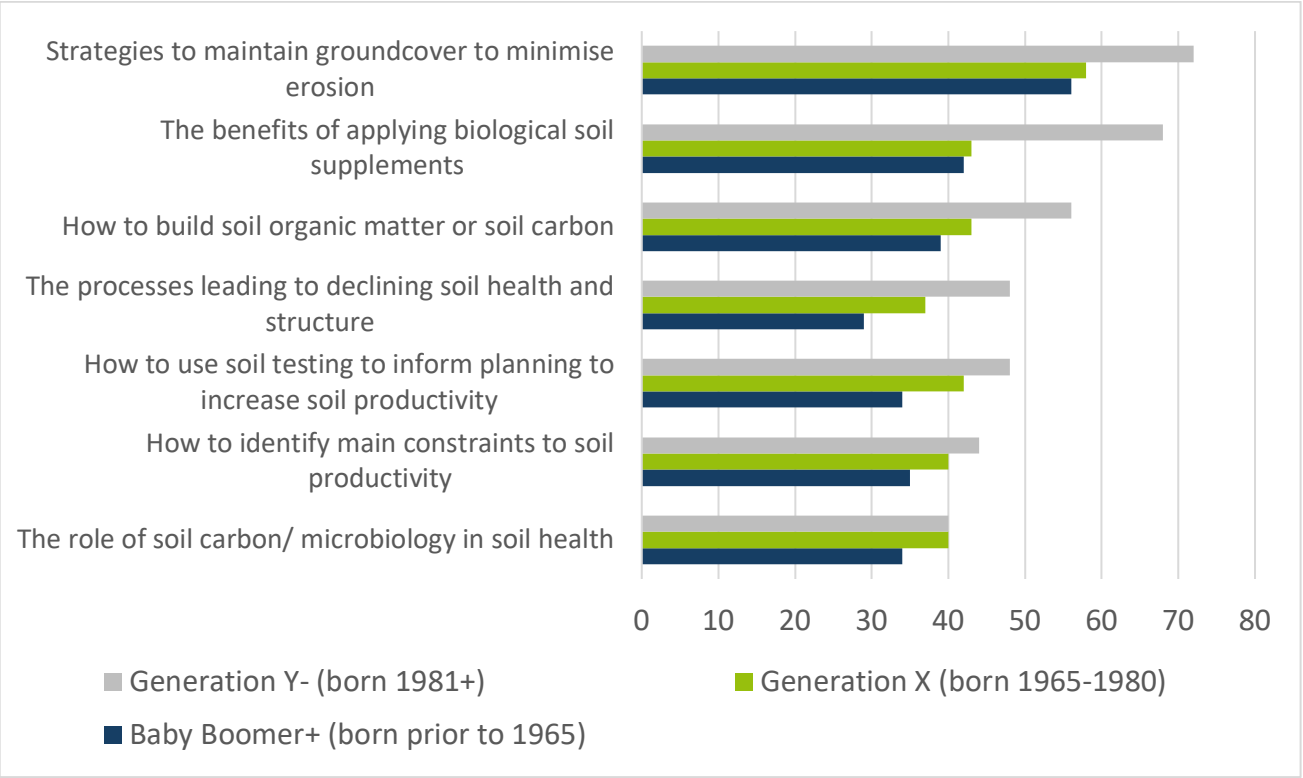

Figure 30. Levels of self-assessed soil knowledge between generations for full-time and part-time farmers combined, 2024 North Central Victoria Landholder Survey (n=357).

6.1.2 Practices

The Generation Y- sample size in this survey was relatively small (n=25), which should be considered when interpreting the results. The survey highlights generational differences in the adoption of land management practices over the past five years (Figure 31.). Across all generations, there is a strong commitment to environmental stewardship, with practices such as planting trees and shrubs for environmental purposes remaining prevalent. Generation X exhibited the highest engagement in this activity (58%), followed by Generation Y- (52%) and Baby Boomer+ (49%). Similarly, maintaining at least 70% groundcover was a consistently high priority across all groups, with both Generation X and Generation Y- reporting 56% participation, slightly higher than Baby Boomer+ (48%). These trends suggest a shared recognition of the importance of soil conservation and ecosystem management.

However, differences emerge in the adoption of more intensive or innovative farming techniques. The younger Generation Y- reported the highest use of no-tillage or minimum tillage techniques (60%) compared to Generation X (50%) and Baby Boomer+ (37%). Likewise, precision-farming techniques were increasingly adopted by younger

generations, with 40% of Generation Y- implementing these practices, compared to 32% of Generation X and just 16% of Baby Boomer+. Soil testing was also notably higher among younger participants, with 64% of Generation Y- engaging in this practice, compared to 44% of Generation X and 31% of Baby Boomer+. These figures indicate a trend where younger landholders are more inclined toward data-driven and technology-based agricultural methods.

When considering regenerative and organic farming practices, younger generations again showed higher levels of participation. Multi-species pasture cropping was reported by 36% of Generation Y-, compared to 27% of Generation X and just 12% of Baby Boomer+. Similarly, integrated pest management was far more common among younger farmers, with 48% of Generation Y- adopting this approach, compared to 31% of Generation X and 21% of Baby Boomer+. Cover cropping also followed this trend, with younger farmers (28%) engaging in the practice more than Baby Boomer+ (12%) and Generation X (18%). These results suggest that younger landholders are more likely to implement diversified and sustainable management strategies.

Despite these trends, certain practices saw relatively low uptake across all groups. Carbon farming, for example, was rarely implemented, with only 4% of Baby Boomer+ and Generation X engaging in this approach and none from Generation Y-. Similarly, organic farming remained a niche practice, with adoption rates below 15% across all generations. These findings suggest that while there is a growing shift toward sustainable farming, some approaches remain underutilised due to economic, practical, or knowledge-related barriers. Given the small sample size for Generation Y-, further research may be necessary to confirm these generational trends and explore the factors influencing adoption rates.

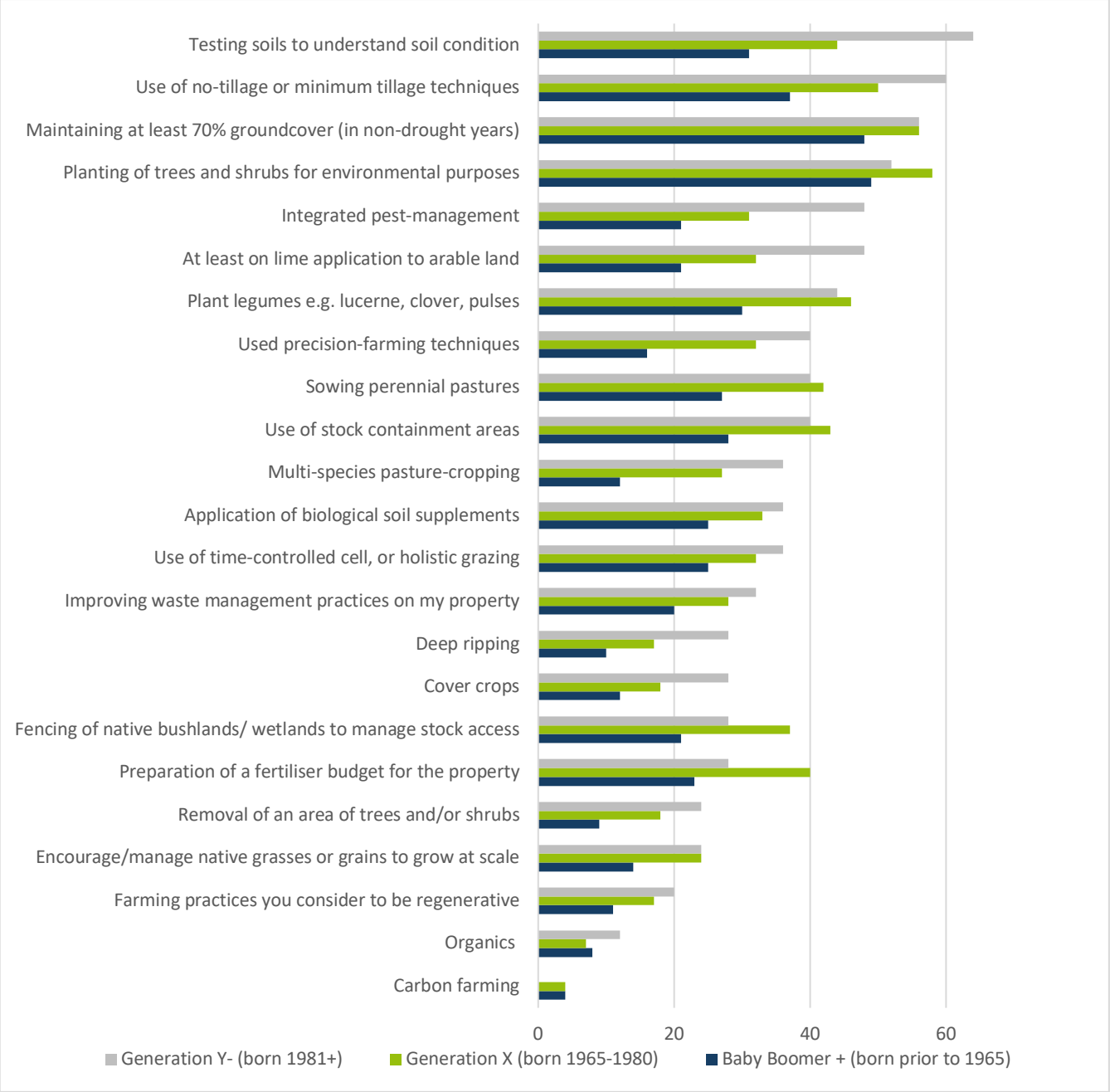

Figure 31. Management practices implemented in the past 5 years that are significantly different between generations for full-time and part-time farmers combined, 2024 North Central Victoria Landholder Survey (n=357).

6.2 LONG-TERM PLANS

Results show that succession planning remains a challenge, with 41% of landholders yet to begin the process, an increase from 36% in 2019 (Figure 32.). While more landholders are in the early stages (35%, up from 27%), fewer have a well-advanced plan (10%, down from 12%), and only 7% have completed or maintain an ongoing plan, a notable decline from 15% in 2019. These trends suggest that while more landholders are initiating succession planning, fewer are successfully completing it, highlighting the need for greater support and guidance in this area.

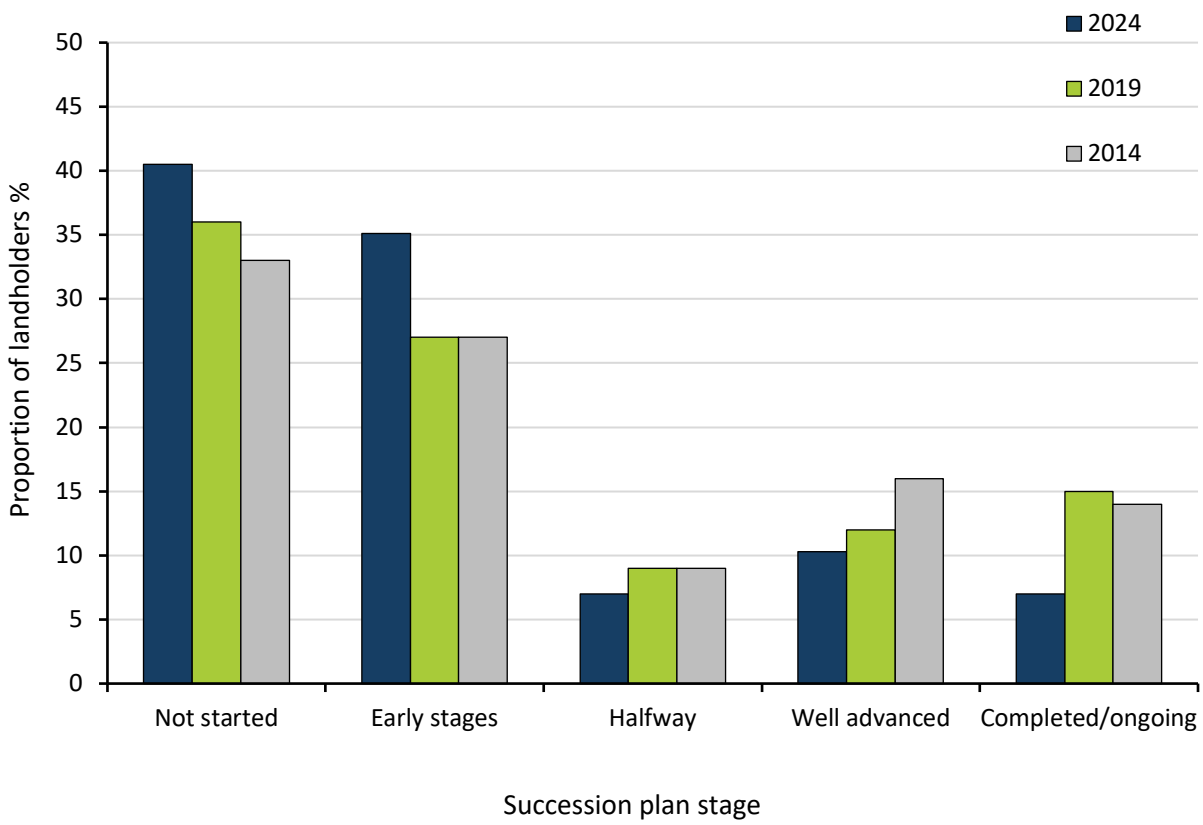

Figure 32. Progress of succession planning for all landholder types across the 2014 (n=395), 2019 (n=304) and 2024 (n=185) North Central Victoria Landholder Survey years.

When the data is broken down by farmer and non-farmer groups, farmers tend to be more engaged in the process, with 40% indicating their succession plans are in the early stages, compared to 35% of non-farmers (Figure 33.). However, fewer farmers (18%) report having a well-advanced plan compared to 17% of non-farmers. Despite farmers' higher engagement, both groups show a lack of significant progress in finalising these plans. The data reveals that 45% of farmers have family members interested in taking over the property, yet a significant 75% believe ownership will stay within the family. In comparison, only 36% of non-farmers have family members interested in taking on the property, but 68% still expect ownership to remain within the family. These findings further emphasise the ongoing challenges in ensuring smooth succession and the need for more targeted assistance for both farmers and non-farmers.

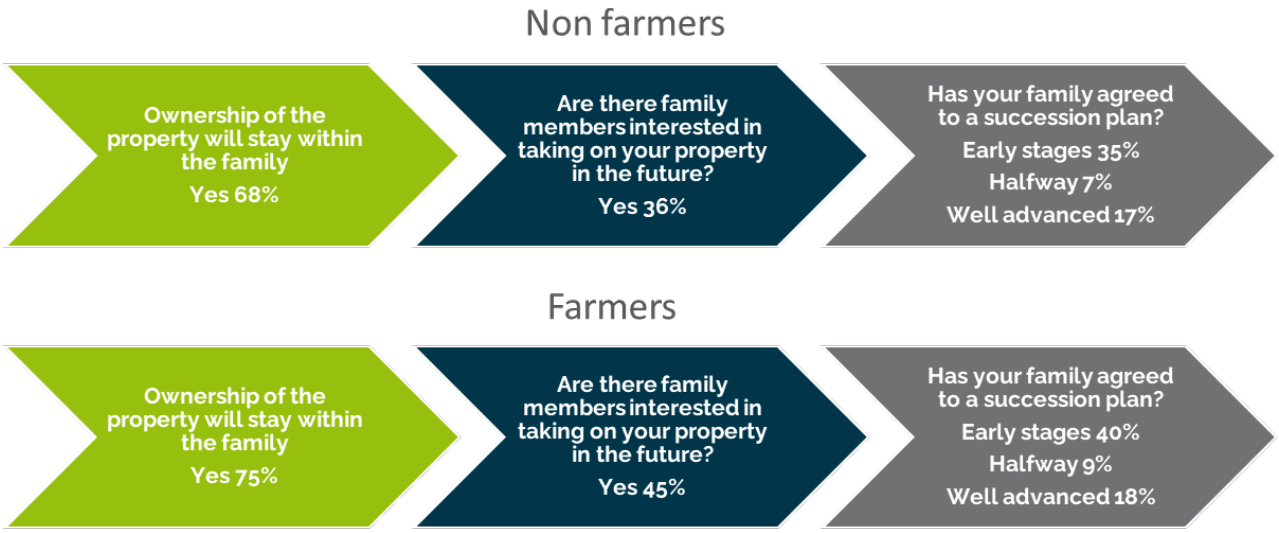

Figure 33. Progress of succession planning for both farmers and no farmers in 2024 (n=185).

Full-time farmers have the highest level of family involvement in daily or weekly on-property work (Figure 34.). Spouses or partners are the most engaged (55%), followed by children (38%), highlighting the role of immediate family in farm operations. Parents contribute to 13% of full-time farms, while involvement from siblings (2%) and others (3%) is minimal. Compared to part-time and hobby farmers, full-time farmers rely more on family support, particularly from spouses and children, underscoring the importance of intergenerational involvement in farm management.

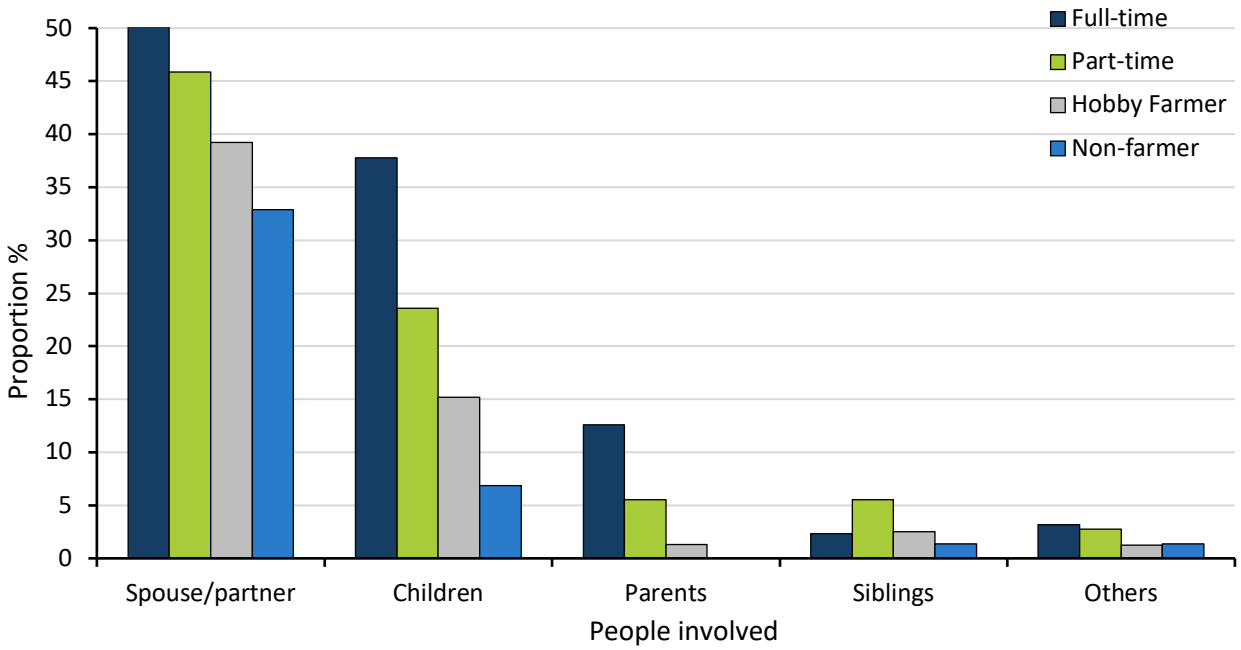

Figure 34. Proportion of landholders who have family members working on property on a daily or weekly basis at the time of the 2024 North Central Victoria Landholder Survey (n=365-367).

7. CONCLUSION

The 2024 North Central Victoria Landholder Survey provides a comprehensive overview of the evolving agricultural landscape, highlighting significant shifts in farmer demographics, land management practices, and decision-making processes. The findings demonstrate an ongoing transition in landholder composition, with a decline in full-time farmers and a rise in hobby and non-farmers, resulting in diverse land use priorities and management approaches. While economic sustainability remains a core focus for full-time and part-time farmers, hobby farmers and non-farmers increasingly emphasise environmental stewardship, conservation, and personal fulfillment. These changes underscore the need for adaptive support strategies that cater to the distinct motivations and challenges faced by different landholder groups.

The survey results indicate a strong commitment among farmers (full- and part-time) to sustainable land management practices, particularly those aimed at improving soil health, productivity, and resilience to climate variability. Adoption of regenerative practices such as no-tillage farming, soil testing, and perennial pasture sowing is evident, although financial constraints and risk aversion continue to influence the rate of uptake. While farmers recognise the importance of soil health, a gap persists between awareness and implementation, particularly in areas requiring significant financial investment. Addressing this gap through targeted incentives, financial support, and knowledge-building initiatives will be crucial in facilitating broader adoption of best-practice land management strategies.

Engagement with landholders presents both challenges and opportunities, with survey responses highlighting the importance of accessible knowledge-sharing platforms and tailored support mechanisms. Farmers rely on a combination of peer networks, professional advice, and personal experience to guide decision-making, with increasing use of digital resources among younger generations. The decline in reliance on traditional media underscores the need for modernised engagement strategies, incorporating online learning platforms, peer-to-peer education, and interactive decision-support tools. Additionally, addressing the perception of inadequate support for sustainable practices will be critical in fostering long-term commitment to environmentally responsible farming.

Key challenges identified by landholders include water security, declining soil health, and climate variability, all of which pose significant risks to agricultural sustainability. Economic pressures, rising input costs, and regulatory uncertainty further complicate farm management decisions, necessitating adaptive strategies to enhance resilience. While many farmers recognise regenerative agriculture as a viable pathway to improving land productivity and sustainability, financial and policy barriers hinder widespread adoption. Developing policy frameworks that balance environmental objectives with economic feasibility will be essential in supporting farmers through this transition.

Generational differences in farming knowledge and practice adoption highlight shifting priorities and learning approaches among landholders. Younger farmers demonstrate a

strong interest in innovative land management techniques, including precision agriculture, biological soil supplements, and multi-species pasture cropping. However, gaps in financial literacy regarding carbon and biodiversity market mechanisms remain prevalent across all generations. Enhancing education and financial incentives in these areas will be necessary to bridge the knowledge gap and promote greater participation in emerging environmental markets.

Overall, the survey results emphasise the need for continued research, policy development, and stakeholder collaboration to support the evolving needs of North Central Victoria's landholders. By addressing barriers to practice adoption, fostering knowledge exchange, and providing financial and policy support, stakeholders can facilitate the transition toward more resilient and sustainable farming systems. As landholder demographics continue to shift, engagement strategies must be adapted to ensure all farmers—regardless of farm size, experience, or primary motivation—receive the support needed to achieve their land management goals while contributing to broader environmental and agricultural sustainability objectives.

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APPENDIX 1 – DATA TABLES

Table X1a. Key attributes of landholders in the LGAs of Ballarat, Buloke, Central Goldfields, Gannawarra, Greater Bendigo, Hepburn and Loddon identified in the 2024 North Central Victoria Landholder Survey (N=389). Note: Findings are based on small sample sizes (n numbers), which may limit generalizability. Interpret with caution.

Key attributes	[1] Ballarat n = 7	Buloke n = 30	[1] Central Goldfields n = 2	Gannawarra n = 34	Greater Bendigo n = 82	Hepburn n = 37	Loddon n = 58
RESPONDENT & PROPERTY							
Farmer identity	57% Farmer, 43% Non-farmer	81% Farmer, 19% Non-farmer	100% Farmer	81% Farmer, 19% Non-farmer	36% Farmer, 64% Non-farmer	56% Farmer, 44% Non-farmer	69% Farmer, 31% Non-farmer
Mean area owned in North Central region	110ha	1249ha	424ha	630ha	129ha	366ha	717ha
Mean age of respondent	67yrs	61yrs	40yrs	62yrs	65yrs	65yrs	67yrs
% Female respondents	14%	0%	0%	3%	25%	23%	19%
Mean length of family ownership	39yrs	90yrs	78yrs	65yrs	37yrs	54yrs	65yrs
Mean hours work on-property per week over last 12 months	45hrs	50hrs	43hrs	42hrs	20hrs	26hrs	41hrs
Received net profit from North Central property in 2022/2023 financial year (% Yes)	33%	88%	50%	60%	12%	31%	63%
FARM MANAGEMENT & STRATEGIC DECISION-MAKING							
Enterprise mix – top 3	Beef cattle & sheep for wool or meat & area set aside for living/ recreation (57%)	Cereal (86%), dryland broadacre farming (82%), legumes/ pulses (71%)	Sheep for wool or meat & dryland broadacre farming (100%)	Pasture (47%), irrigated agriculture & beef cattle (41%)	Sheep for wool or meat (44%), area set aside for living/ recreation (36%), pasture (22%)	Pasture & area set aside for living/ recreation (51%), other tree planting (41%)	Pasture & sheep for wool or meat (54%), cereal & dryland broadacre farming (53%)
Top management practice implemented in past 5yrs	Maintaining at least 70% groundcover in non-drought years (86%)	Planting legumes e.g. lucerne, clover, pulses (72%)	Maintaining at least 70% groundcover in non-drought years & testing	Planting of trees and shrubs (including direct seeding) for	Planting of trees and shrubs (including direct seeding) for	Planting of trees and shrubs (including direct seeding) for	Use of no-tillage or minimum tillage techniques & maintaining at least 70%

			soils to understand soil condition (100%)	environmental purposes (58%)	environmental purposes (48%)	environmental purposes (58%)	groundcover in non-drought years (63%)
Key attributes	[1] Ballarat n = 7	Buloke n = 30	[1] Central Goldfields n = 2	Gannawarra n = 34	Greater Bendigo n = 82	Hepburn n = 37	Loddon n = 58
Most important person / people in decision making on the property	Me and my partner (57%)	Me and my partner (46%)	Me and my partner & multi-generations of family (50%)	Me and my partner (45%)	Me and my partner (55%)	Me and my partner (51%)	Me and my partner (43%)
Longest time frame you consider when making strategic decisions on your farm/land	Year to year & and over 100 years (33%)	Up to 5 years (24%)	Up to 5 years & and 6-20 years (50%)	Year to year (28%)	Seasonal & and year to year (26%)	Year to year (31%)	Year to year (33%)
Have prepared/ are preparing a property management or whole farm plan (%Yes)	14%	39%	50%	45%	28%	29%	50%
LANDHOLDER GUIDING PRINCIPLES							
Looking after my family/ loved ones and their needs (% Important / very important)	100%	100%	100%	90%	96%	89%	98%
Preventing pollution and protecting natural resources (% Important / very important)	71%	85%	100%	87%	96%	83%	86%
Respecting the earth and living in harmony with nature (% Important / very important)	86%	70%	50%	74%	76%	80%	71%
LANDHOLDER ATTACHED VALUES							
Ability to pass on a healthier environment for future generations (% Important / very important)	67%	92%	100%	91%	84%	89%	83%
An attractive place/area to live (% Important / very important)	67%	83%	50%	88%	84%	89%	85%
My property is an important part of who I am (% Important / very important)	83%	74%	50%	82%	65%	89%	76%
VIEWS & EXPERIENCES							
I feel a personal responsibility to maintain the productive capacity of my soil (%Agree / strongly agree)	86%	100%	100%	91%	79%	81%	91%

Key attributes	[1] Ballarat n = 7	Buloke n = 30	[1] Central Goldfields n = 2	Gannawarra n = 34	Greater Bendigo n = 82	Hepburn n = 37	Loddon n = 58
I'm confident that my land is in better condition than when I took on management of this farm (%Agree / strongly agree)	100%	92%	50%	85%	74%	83%	79%
Soil testing is an essential step in understanding soil condition (%Agree / strongly agree)	71%	92%	100%	81%	73%	78%	73%
RISK & TRUST							
I am open to new ideas about farming and land management (%Agree / strongly agree)	86%	92%	100%	81%	80%	83%	90%
Most people are trustworthy (%Agree / strongly agree)	43%	60%	0%	67%	56%	60%	57%
Financially, I can afford to take a few risks and experiment with new ideas (%Agree / strongly agree)	43%	56%	100%	32%	33%	54%	52%
LOCAL DISTRICT & PROPERTY SCALE CHALLENGES							
Top issue at the local district scale (% Important / very important)	Risk to life and property from wildfires & risk to life and property from floods (71%)	Land use change / conflicting land use impacting / encroaching on farmland (83%)	-	Water security (94%)	The impact of pest plants and animals on native plants and animals (75%)	Water security (80%)	Water security (84%)
Top issue for property owners (% Important / very important)	Rising input costs (86%)	Rising input costs (93%)	-	Rising input costs (91%)	Rising input costs (57%)	Rising input costs (66%)	Rising input costs (76%)
Top soil-related issue on your property (% Important / very important)	Declining nutrient status of soils (71%)	Water-holding capacity of soils (56%)	-	Low level of organic carbon in soils (61%)	Water-holding capacity of soils (59%)	Water-holding capacity of soils (54%)	Water-holding capacity of soils (64%)
Landholders who have lost land to production due to soil problems (%Yes)	14%	20%	0%	23%	19%	6%	14%
CLIMATE CHANGE VIEWS, RISK & ADAPTATION							
Climate change poses a risk to this region (%Agree / strongly agree)	14%	44%	100%	39%	58%	51%	37%

Key attributes	[1] Ballarat n = 7	Buloke n = 30	[1] Central Goldfields n = 2	Gannawarra n = 34	Greater Bendigo n = 82	Hepburn n = 37	Loddon n = 58
Landholders should manage their properties in expectation of a highly variable climate (%Agree / strongly agree)	86%	60%	100%	58%	75%	74%	71%
Human activities are influencing changes in climate (%Agree / strongly agree)	43%	36%	100%	55%	63%	63%	52%
Landholders who have changed on-property operations to reduce carbon emissions in past 5yrs (%Yes)	29%	16%	0%	13%	21%	35%	19%
Landholders who have a disaster response plan prepared (%Yes)	43%	31%	50%	42%	57%	60%	44%
INFORMATION & LANDHOLDER KNOWLEDGE							
Top source of information (% Yes)	Friends/neighbours/relatives & my own knowledge from my own experiences (86%)	Other farmers (85%)	-	My own knowledge from my own experiences (59%)	Other farmers (54%)	My own knowledge from my own experiences (70%)	Other farmers (63%)
Top mode of information (% Yes)	Field days (57%)	Field days (56%)	YouTube (100%)	Newspapers (47%)	Websites (43%)	Websites (54%)	Field days (52%)
Knowledge of how to prepare for an extreme weather event such as fire or flood (%sound / very sound knowledge)	67%	75%	100%	66%	60%	69%	65%
Knowledge of the strategies to maintain groundcover to minimise erosion in this area (% Sound / very sound knowledge)	50%	83%	100%	59%	50%	54%	70%
Knowledge of the benefits of applying biological soil supplements (% Sound / very sound knowledge)	50%	48%	100%	41%	42%	49%	47%
Completed short course related to property management in past 5 years (myself or partner) (%Yes)	0% me, 0% my partner, 0% both	24% me, 0% my partner, 4% both	100% me, 0% partner, 0% both	27% me, 0% partner, 3% both	10% me, 3% my partner, 3% both	11% me, 0% my partner, 0% both	10% me, 4% my partner, 14% both

Key attributes	[1] Ballarat n = 7	Buloke n = 30	[1] Central Goldfields n = 2	Gannawarra n = 34	Greater Bendigo n = 82	Hepburn n = 37	Loddon n = 58
Attended a field day/ farm walk/ demonstration focused on soil health and productivity in last 12 months (%Yes)	33%	62%	50%	45%	35%	40%	57%
LONG-TERM PLANS							
Ownership of the property will stay in the family (% Likely / highly likely)	83%	85%	100%	69%	62%	65%	69%
Some part of my property will be managed for conservation purposes (% Likely / highly likely)	17%	15%	0%	31%	32%	42%	26%
The property will be sold (% Likely / highly likely)	33%	8%	0%	10%	31%	27%	16%

[1] n for these LGAs was low (n<10). Take caution when interpreting data

Table X1b. Key attributes of landholders in the LGAs of Macedon Ranges, Mitchell, Mount Alexander, Northern Grampians, Pyrenees and Swan Hill identified in the 2024 North Central Victoria Landholder Survey (N=389). Note: Findings are based on small sample sizes (n numbers), which may limit generalizability. Interpret with caution.

Key attributes	Macedon Ranges n = 33	[1] Mitchell n = 6	Mount Alexander n = 31	Northern Grampians n = 20	Pyrenees n = 29	Swan Hill n = 20
RESPONDENT & PROPERTY						
Farmer identity	42% Farmer, 58% Non-farmer	67% Farmer, 33% Non-farmer	30% Farmer, 70% Non-farmer	70% Farmer, 30% Non-farmer	48% Farmer, 52% Non-farmer	70% Farmer, 30% Non-farmer
Mean area owned in North Central region	80ha	245ha	85ha	754ha	278ha	227ha
Mean age of respondent	62yrs	64yrs	67yrs	63yrs	63yrs	71yrs
% Female respondents	24%	17%	21%	0%	28%	26%
Mean length of family ownership	28yrs	56yrs	31yrs	68yrs	44yrs	41yrs
Mean hours work on-property per week over last 12 months	18hrs	36hrs	22hrs	37hrs	40hrs	32hrs
Received net profit from North Central property in 2022/2023 financial year (% Yes)	8%	60%	23%	47%	28%	24%
FARM MANAGEMENT & STRATEGIC DECISION-MAKING						
Enterprise mix – top 3	Area set aside for living / recreation (52%), beef cattle (48%), other tree planting (33%)	Other tree planting (50%), pasture & beef cattle & sheep for wool or meat & area of remnant / regenerated native vegetation (33%)	Other tree planting (48%), area set aside for living / recreation (45%), beef cattle & sheep for wool or meat & area of remnant / regenerated native vegetation (32%)	Sheep for wool or meat (70%), pasture (65%), dryland broadacre farming (45%)	Sheep for wool or meat (48%), area set aside for living / recreation (45%), area of remnant / regenerated native vegetation (41%)	Irrigated agriculture (55%), pasture & other tree planting & area set aside for living / recreation (25%)
Top management practice implemented in past 5yrs	Planting of trees and shrubs (including direct seeding) for environmental purposes (69%)	Maintaining at least 70% groundcover in non-drought years (67%)	Cover crops (100%)	Use of no-tillage or minimum tillage techniques (53%)	Planting of trees and shrubs (including direct seeding) for environmental purposes (68%)	Planting of trees and shrubs (including direct seeding) for environmental purposes (47%)

Key attributes	Macedon Ranges n = 33	[1] Mitchell n = 6	Mount Alexander n = 31	Northern Grampians n = 20	Pyrenees n = 29	Swan Hill n = 20
Most important person / people in decision making on the property	Me and my partner (66%)	Me and my partner (67%)	Me and my partner (53%)	Mostly just me (42%)	Me and my partner (46%)	Me and my partner (44%)
Longest time frame you consider when making strategic decisions on your farm/land	Up to 5 years (33%)	Year to year (50%)	Up to 5 years (31%)	Year to year (28%)	Seasonal (30%)	Year to year (41%)
Have prepared/ are preparing a property management or whole farm plan (%Yes)	33%	33%	30%	53%	48%	42%
LANDHOLDER GUIDING PRINCIPLES						
Looking after my family/ loved ones and their needs (% Important / very important)	97%	100%	94%	100%	93%	78%
Preventing pollution and protecting natural resources (% Important / very important)	83%	100%	94%	95%	93%	82%
Respecting the earth and living in harmony with nature (% Important / very important)	80%	100%	90%	70%	82%	72%
LANDHOLDER ATTACHED VALUES						
Ability to pass on a healthier environment for future generations (% Important / very important)	84%	83%	78%	90%	90%	89%
An attractive place/area to live (% Important / very important)	90%	100%	85%	70%	75%	71%
My property is an important part of who I am (% Important / very important)	48%	83%	85%	80%	86%	83%
VIEWS & EXPERIENCES						
I feel a personal responsibility to maintain the productive capacity of my soil (%Agree / strongly agree)	73%	67%	65%	79%	79%	89%
I'm confident that my land is in better condition than when I took on management of this farm (%Agree / strongly agree)	83%	100%	71%	79%	79%	67%

Key attributes	Macedon Ranges n = 33	[1] Mitchell n = 6	Mount Alexander n = 31	Northern Grampians n = 20	Pyrenees n = 29	Swan Hill n = 20
Soil testing is an essential step in understanding soil condition (%Agree / strongly agree)	77%	67%	74%	100%	89%	89%
RISK & TRUST						
I am open to new ideas about farming and land management (%Agree / strongly agree)	81%	100%	83%	89%	78%	82%
Most people are trustworthy (%Agree / strongly agree)	62%	0%	55%	63%	56%	35%
Financially, I can afford to take a few risks and experiment with new ideas (%Agree / strongly agree)	66%	67%	50%	32%	54%	53%
LOCAL DISTRICT & PROPERTY SCALE CHALLENGES						
Top issue at the local district scale (% Important / very important)	Risk to life and property from wildfires (81%)	The impact of pest plants and animals on native plants and animals (83%)	Changes in weather patterns (74%)	Declining soil health and/or productivity (75%)	Water security (93%)	Water security (95%)
Top issue for property owners (% Important / very important)	Impact of weeds or pests on productivity (70%)	Impact of weeds or pests on productivity (83%)	Impact of weeds or pests on productivity (71%)	Rising input costs (70%)	Rising input costs (67%)	Rising input costs (78%)
Top soil-related issue on your property (% Important / very important)	Water-holding capacity of soils (50%)	Water-holding capacity of soils (83%)	Water-holding capacity of soils (48%)	Soil erosion & water-holding capacity of soils (60%)	Water-holding capacity of soils (78%)	Water-holding capacity of soils (71%)
Landholders who have lost land to production due to soil problems (%Yes)	10%	0%	14%	13%	23%	0%
CLIMATE CHANGE VIEWS, RISK & ADAPTATION						
Climate change poses a risk to this region (%Agree / strongly agree)	62%	67%	74%	53%	50%	50%
Landholders should manage their properties in expectation of a highly variable climate (%Agree / strongly agree)	69%	83%	90%	58%	77%	100%

Key attributes	Macedon Ranges n = 33	[1] Mitchell n = 6	Mount Alexander n = 31	Northern Grampians n = 20	Pyrenees n = 29	Swan Hill n = 20
Human activities are influencing changes in climate (%Agree / strongly agree)	76%	67%	84%	68%	62%	76%
Landholders who have changed on-property operations to reduce carbon emissions in past 5yrs (%Yes)	18%	33%	14%	12%	46%	28%
Landholders who have a disaster response plan prepared (%Yes)	63%	50%	61%	61%	85%	28%
INFORMATION & LANDHOLDER KNOWLEDGE						
Top source of information (% Yes)	Other farmers (66%)	My own knowledge from my own experiences (67%)	Friends & neighbours & relatives (52%)	My own knowledge from my own experiences (65%)	Other farmers (62%)	My own knowledge from my own experiences (70%)
Top mode of information (% Yes)	Newspapers (44%)	Websites (67%)	Television (39%)	Emails (50%)	Newspapers (48%)	Newspapers (35%)
Knowledge of how to prepare for an extreme weather event such as fire or flood (%sound / very sound knowledge)	55%	67%	52%	60%	74%	76%
Knowledge of the strategies to maintain groundcover to minimise erosion in this area (% Sound / very sound knowledge)	48%	50%	52%	70%	52%	61%
Knowledge of the benefits of applying biological soil supplements (% Sound / very sound knowledge)	45%	33%	33%	35%	41%	61%
Completed short course related to property management in past 5 years (myself or partner) (%Yes)	4% me, 17% my partner, 0% both	2% me, 0% my partner, 0% both	4% me, 0% my partner, 0% both	2% me, 0% my partner, 13% both	17% me, 0% my partner, 0% both	2% me, 17% my partner, 13% both
Attended a field day/ farm walk/ demonstration focused on soil health and productivity in last 12 months (%Yes)	46%	50%	28%	28%	44%	26%
LONG-TERM PLANS						
Ownership of the property will stay in the family (% Likely / highly likely)	59%	83%	62%	83%	69%	58%

Key attributes	Macedon Ranges n = 33	[1] Mitchell n = 6	Mount Alexander n = 31	Northern Grampians n = 20	Pyrenees n = 29	Swan Hill n = 20
Some part of my property will be managed for conservation purposes (% Likely / highly likely)	34%	17%	41%	21%	46%	11%
The property will be sold (% Likely / highly likely)	38%	17%	28%	6%	12%	28%

[1] n for these LGAs was low (n<10). Take caution when interpreting data

Table X2. Land use and enterprise mixes for all landholders across the 2014 (n=598-706), 2019 (638-661) and 2024 (n=383-386) North Central Victoria Landholder Survey years. Means (out of 5) are given in brackets and percentages reflect the proportion of landholders engaging with each land use or enterprise at the time of the survey.

Land use / enterprise type	% Yes (2014)	% Yes (2019)	% Yes (2024)
[1] Sheep for wool or meat	62%	56% #*	43% #*^
Pasture	82%	60% #*	38% #*
Area set aside for living/recreation e.g. gardens, pets, vehicles	80%	36% #*	38% #
[1] Area of remnant/regenerated native vegetation e.g. trees, grasslands, wetlands	79%	46% #	29% ^
[1] Other tree planting e.g. shelter, habitat, erosion, recharge control	65%	37%	28%
Beef cattle	41%	25% #*	27% #*
[1] Cereal	NA	NA	26% #*^
[1] Dryland broadacre farming	NA	NA	25% #*
[1] Legumes/ pulses	NA	NA	17% #*^
Cropping	60%	50%	NA
Irrigated agriculture	35%	22% #*	16% #*
[1] Hay/fodder production for sale	NA	28% #*	16% #*
[1] Oil seed	NA	NA	15% #*^
Other commercial livestock enterprises e.g. goats, pigs, deer, horse studs, poultry, alpaca, dogs	13%	8% #	7%
Horticulture	5.3%	8%	NA
[1] Other horticulture	NA	NA	7% *
[1] Permanent protection for conservation e.g. Trust for Nature covenant or Heritage Agreement	10%	5% #	6%
[1] Bee keeping	NA	NA	5% ^
Farm forestry	8%	5.4%	5%

Dairying	8%	4.4% #*	3% #
Viticulture	4%	2.4% #*	3%
Farm-based tourism e.g. farm stays, BNB	3%	4.1% *	3%

Significant difference by landholder type

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

Note: significant differences were determined using a Pearson's Chi-squared test with $p<0.05$. 2024 data were tested for significant differences by LGA, generation and landholder type. 2019 data were tested for significant differences by landholder type and LGA. No significant differences were calculated in 2014.

Table X3. Overall proportion of landholders who agree or strongly agree with views and experiences statements for the 2014 (n=736-747), 2019 (n=635-644) and 2024 (n=357-363) North Central Victoria Landholder Surveys. Means (out of 5) are given in brackets.

View and experience statements	% Agree / strongly agree		
	Overall (2014)	Overall (2019)	Overall (2024)
CONFIDENCE STATEMENT			
Soil testing is an essential step in understanding soil condition	85% (4.2)	88% (4.2)	80% (4.2)
[1] Fencing to manage stock access is an essential element of protecting waterways and native vegetation	68% (3.8)	70% (3.9) #	79% (4.3)
[1] Biological activity is an important indicator of the productive capacity of soils	NA	76% (4.1) #	76% (4.1)
[1] Reduced production in the short-term is justified where there are long term benefits	NA	NA	66% (3.9) #*
Intensive grazing for short periods is usually better for the health of native vegetation along waterways and wetlands than set stocking	52% (3.6)	52% (3.7) #	51% (3.7) #*
The benefits of stubble retention outweigh problems arising from the practice	52% (3.8)	57% (3.8) #	47% (3.8) *^
The costs of establishing perennial pastures are justified by the returns	56% (3.7)	60% (3.8) #*	47% (3.6) ^
The costs of applying lime to balance soil acidity is justified by increased production	53% (3.7)	56% (3.8) #	46% (3.7) ^#
The increased allocation of water for the environment under the Murray-Darling Basin Plan will improve the health of waterways & wetlands	31% (3.1)	35% (3.1) #*	33% (3.0) #*
[1] I am confident that adopting regenerative/holistic farming practices is justified by the returns	NA	NA	32% (3.2) #
[1] The cost of deep-tillage and subsoil modification are justified by increased production	NA	30% (3.2) #	23% (3.2) ^
ATTITUDE STATEMENT			
[1] I'm confident that my land is in a better condition than when I took on the management of this farm	NA	NA	80% (4.3)
[1] I am confident making management decisions based on the data from my farm	NA	NA	66% (3.9) #
[1] Most years I am satisfied with my farm's productivity given the seasonal conditions experienced	NA	NA	65% (3.9) #^
[1] I feel confident managing my farm in the face of increasing change and uncertainty	NA	NA	58% (3.7) #^
[1] I am coping well with the associated stresses and challenges of managing my farm	NA	NA	57% (3.6) #^
[1] I'm confident that landholders in this region can adapt to expected changes in rainfall patterns	NA	58% (3.6) #*	49% (3.5) *

[1] I am interested in learning more about regenerative/holistic farming approaches	NA	NA	46% (3.4) #
[1] I feel adequately supported to conduct farming and land management activities on my property	NA	NA	45% (3.4) #^
[1] I have good systems in place to manage my farm data	NA	NA	40% (3.3) #^
[1] Overall, I am decreasing my use of synthetic fertiliser/pesticide inputs per hectare	NA	NA	33% (3.2) #*^
[1] Internet or mobile phone access is a barrier to finding/using information for my farm management	NA	NA	32% (3.0) #
[1] There is adequate compensation or support provided for good land/soil stewardship	NA	NA	7% (2.5) #^
NORMS			
I feel a personal responsibility to maintain the productive capacity of my soil	86% (4.2)	82% (4.1) #	82% (4.3) #
[1] Decision-making needs to be strongly influenced by scientific evidence	NA	NA	59% (3.7) #*
Aboriginal Peoples should be able to negotiate access with landholders to visit cultural sites	49% (3.2)	49% (3.3) #*	45% (3.1) #
Landholders should have the right to harvest water that falls on their property, even if it impacts others	50% (3.4)	41% (3.2)	38% (3.2)
[1] I feel a personal responsibility to be part of a soil health group/ group working to improve land or NRM	33% (3.1)	30% (3.1) #	33% (3.2)
[1] The public should have the right to access crown land managed by private landholders e.g. unused roads	NA	24% (2.6) #*	21% (2.3) #

Significant difference by landholder type (2019) or farmer vs not-farmer (2024)

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

Note: significant differences were determined using a Kruskal-Wallis rank sum test with $p<0.05$. 2024 data were tested for significant differences by LGA, generation landholder type. 2019 data were tested for significant differences by landholder type and LGA. No significant differences were calculated in 2014

Table X4. Management practices implemented sometime in the past five years by landholder type for the 2024 North Central Victoria Landholder Survey (n=355-357) and overall, for the 2014 (n=619-715), 2019 (n=638) and 2024 surveys. Overall proportions for the 2014 and 2019 survey years also include data from full period of management and the past 12 months.

Management practice	% Implemented sometime in past 5 years						
	Overall (2014)	Overall (2019)	Overall (2024)	Full-time (2024)	Part-time (2024)	Hobby Farmer (2024)	Non-Farmer (2024)
[1] Planting of trees and shrubs (incl. direct seeding) for environmental purposes e.g. shelterbelts, pollination	[2] 72%	[2] 66%	52% *	45%	55%	59%	54%
[1] Maintaining at least 70% groundcover (in non-drought years)	NA	NA	50% #	59%	61%	50%	25%
[1] Use of no-tillage or minimum tillage techniques	54% #	[2] 52%	41% #*^	61%	44%	35%	9%
[1] Testing soils to understand soil condition	56% #	[2] 50%	36% #*^	58%	39%	23%	7%
[1] Plant legumes e.g. lucerne, clover, pulses	NA	[2] 39% lucerne	35% #*^	62%	37%	19%	1%
[1] Use of stock containment areas	NA	NA	32% #^	40%	34%	30%	13%
[1] Sowing perennial pastures	[2] 61%. #	[2] 40% not lucerne	31% #*^	48%	42%	21%	3%
[1] Application of biological soil supplements e.g. compost-tea, organic manure	NA	NA	28% #	21%	38%	39%	18%
[1] Preparation of a fertiliser/nutrient budget for all/most of the property	26% #	[2] 19%	28% #*^	54%	28%	9%	0%
[1] Use of time-controlled, cell or holistic grazing	[3] 46%	[2] 35%	27% #	34%	27%	31%	7%
[1] Fencing of native bush/ grasslands/ wetlands to manage stock access	[2] 44% native bush # [2] 29% wetland #	[2] 43% native bush [2] 34% wetland	26% ^	24%	32%	28%	18%
[1] At least one lime application to arable land	[2] 46% #	[2] 38%	25% #^	36%	31%	19%	4%
[1] Integrated pest-management	NA	NA	25% #^	36%	31%	20%	6%
[1] Improving waste management practices on my property	NA	NA	23%	22%	28%	30%	13%

[1] Used precision-farming techniques	[3] 34% #	[2] 29%	22% #*^	43%	23%	5%	1%
[1] Multi-species pasture-cropping	NA	NA	21% #*^	29%	25%	16%	6%
[1] Encourage/manage native grasses or grains to grow at scale	NA	NA	18%	18%	17%	23%	15%
[1] Cover crops	NA	NA	15% #*	23%	20%	5%	3%
[1] Removal of an area of trees and/or shrubs	NA	NA	13% #^	11%	7%	24%	12%
[1] Deep ripping	NA	[2] 18%	13% #*^	20%	15%	5%	6%
[1] Farming practices you consider to be regenerative	NA	NA	13%	15%	15%	11%	6%
[1] Organics	NA	NA	8%	7%	8%	13%	4%
[1] Carbon farming	NA	NA	4%	5%	1%	5%	3%

Significant difference by landholder type

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

[2] Practice implemented sometime over full period of management

[3] Practice implemented sometime in the past 12 months

Note: 2024 data were tested for significant differences by LGA, generation and landholder type using a Pearson's Chi-squared test with $p<0.05$. 2019 data were tested for significant differences by LGA and landholder types using a Kruskal-Wallis rank sum test with $p<0.05$.

Table X5. Most important issues overall at the local district and property scale identified in the 2014 (n=737-751), 2019 (n=593-642) and 2024 (n=346-366) Landholder Surveys. Means (out of 5) are given in brackets and percentages reflect the proportion of landholders that designate each issue as important or very important.

Important Issues	% Important / very important						
	Overall (2014)	Overall (2019)	Overall (2024)	Full-time	Part-time	Hobby Farmer	Non-Farmer
LOCAL DISTRICT LEVEL							
[1] Water security	NA	NA	76% (4.2) *	77% (4.2)	81% (4.3)	78% (4.1)	66% (4.0)
The impact of pest plants and animals on native plants and animals	63% (3.8)	67% (3.9)	68% (3.9) #^	61% (3.8)	65% (3.8)	74% (4.1)	75% (4.1)
[1] Declining soil health and/or soil productivity	NA	NA	63% (3.9)	66% (3.9)	63% (3.8)	70% (4.0)	51% (3.6)
[1] Changes in weather patterns	NA	71% (4.1)	63% (3.8)	61% (3.8)	65% (3.8)	67% (3.9)	62% (3.9)

[1] Risk to life and property from wildfires	NA	64% (3.9) #*	61% (3.8) #*	45% (3.5)	64% (3.8)	71% (4.0)	74% (4.2)
[1] Absence of important services and sufficient infrastructure e.g. internet, phone, schools, transport	65% (3.9)	60% (3.8) *	56% (3.7) #	69% (4.1)	52% (3.4)	45% (3.4)	49% (3.5)
[1] Quality of water in farm dams during drought	NA	66% (4.0)	56% (3.6)	48% (3.5)	70% (3.9)	67% (3.8)	44% (3.5)
[1] Land use change/conflicting land use (e.g. solar, mining, residential) impacting/ encroaching on farmland	NA	49% (3.6)	52% (3.6)	64% (3.9)	49% (3.5)	51% (3.6)	34% (3.1)
[1] Salinity, nutrient or chemical runoff threatening water quality in rivers/ streams/ wetlands	40% (3.2)	37% (3.2) #*	50% (3.4) #	48% (3.4)	42% (3.2)	59% (3.6)	51% (3.6)
[1] Public opposition for agricultural practices e.g. GMs, animal welfare, pesticide use	NA	57% (3.8) #	46% (3.4) #	62% (3.8)	41% (3.1)	45% (3.2)	27% (3.0)
Loss of native plants and animals in the landscape e.g. due to cropping or draining wetlands	50% (3.5)	52% (3.6) #	43% (3.3) #	35% (3.1)	45% (3.2)	43% (3.3)	56% (3.7)
[1] Risk to life and property from flooding	NA	NA	41% (3.2)	45% (3.3)	54% (3.5)	38% (3.0)	29% (3.0)
Long-term negative impacts of property purchased by absentees	55% (3.6)	52% (3.7)	40% (3.2)	47% (3.5)	39% (3.1)	38% (3.2)	29% (2.9)
[1] The effect of farm dams or water extraction on long-term health of rivers/ streams/ wetlands	22% (2.5)	29% (2.9) #*	37% (3.0) #*	26% (2.8)	36% (3.0)	45% (3.2)	46% (3.4)
[1] Stock damage to native vegetation/ rivers/ streams/ wetlands	33% (2.9)	33% (3.1) #*	34% (3.0)	34% (2.9)	30% (2.9)	32% (3.1)	41% (3.2)
PROPERTY LEVEL							
[1] Rising input costs	NA	NA	67% (4.1) #	92% (4.6)	76% (4.2)	56% (3.7)	27% (3.0)
[1] The impact of weeds or pest animals (including overabundant native species) on productivity	NA	NA	63% (3.8)	66% (3.9)	70% (3.9)	67% (3.9)	44% (3.5)
[1] Impact of temperature extremes and/or changing rainfall patterns on management / productivity	NA	NA	54% (3.7)	59% (3.8)	57% (3.7)	56% (3.5)	38% (3.3)
[1] Uncertain returns limiting capacity to maintain / invest in my property	59% (3.8)	47% (3.5) #	50% (3.6) #	71% (4.1)	67% (3.9)	33% (3.1)	16% (2.5)
[1, 2] Weed/pest resistance to herbicides, pesticides and/or fungicides	63% (3.9)	63% (3.9) #	50% (3.5) *	65% (3.9)	46% (3.4)	47% (3.4)	32% (3.1)
[1] Lack of skilled labour to undertake important on-property work	NA	NA	32% (3.0) #	57% (3.7)	27% (2.8)	16% (2.5)	11% (2.3)
SOIL-RELATED ISSUES AT THE PROPERTY LEVEL							

[1] Water-holding capacity of soils	NA	NA	59% (3.6)	62% (3.7)	65% (3.6)	55% (3.6)	49% (3.5)
Declining nutrient status of soils	51% (3.5)	65% (3.9) #	47% (3.4)	53% (3.5)	50% (3.4)	51% (3.5)	30% (3.1)
[1] Low level of biological activity in soils	NA	64% (4.0) #	47% (3.4) #	54% (3.5)	42% (3.3)	46% (3.3)	35% (3.3)
Low permeability of sub soil	42% (3.3)	60% (3.8) #	47% (3.3)	52% (3.4)	46% (3.2)	50% (3.4)	32% (3.1)
[1] Low level of organic carbon in soils	NA	61% (3.9) #	43% (3.3)	48% (3.4)	43% (3.3)	43% (3.3)	30% (3.0)
Soil erosion (e.g. due to wind or water)	43% (3.2)	72% (4.1)	42% (3.2) #^	44% (3.2)	43% (3.1)	35% (3.1)	45% (3.4)
[1] Soil-borne diseases	NA	NA	38% (3.1)	47% (3.4)	35% (2.9)	39% (3.0)	26% (2.9)
[1] Effects of pesticide use on soil biota	NA	NA	36% (3.2)	41% (3.4)	32% (3.0)	41% (3.2)	26% (2.9)
[1] Soil sodicity	NA	48% (3.6) #*	36% (3.1) #	45% (3.4)	34% (2.8)	35% (3.2)	22% (2.8)
Soil acidity (lower pH) undermining productive capacity of soils	46% (3.4)	57% (3.8) #	35% (3.0)	40% (3.1)	40% (3.0)	37% (3.2)	18% (2.6)
[1] Salinity undermining long-term productive capacity	NA	NA	26% (2.8)	30% (2.8)	28% (2.7)	28% (2.9)	18% (2.7)

Significant difference by landholder type

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

[2] Issue assessed at the district scale for 2014 and 2019 survey years

Note: significant differences were determined using a Kruskal-Wallis rank sum test with $p<0.05$. 2024 data were tested for significant differences by LGA, generation and landholder type. 2019 data were tested for significant differences by landholder type and LGA. No significant differences were calculated in 2014

Table X6. Views about risk and trust for all landholders identified in the 2014 (n=745-750), 2019 (n=593-642) and 2024 (n=342-355) North Central Victoria Landholder Surveys. Means (out of 5) are given in brackets and percentages reflect the proportion of landholders who agree or strongly agree with each statement.

Risk and openness to change	% Agree / strongly agree		
	Overall (2014)	Overall (2019)	Overall (2024)
[1] I am open to new ideas about farming and land management	NA	NA	84% (4.0) #^
[1] Most people are trustworthy	NA	NA	56% (3.3)
[1] Financially, I can afford to take a few risks and experiment with new ideas	NA	NA	47% (3.2) *
People are almost always interested in their own welfare	49% (3.3)	44% (3.3)	44% (3.2)

[1] I have sufficient time available to consider changing my practices	NA	NA	42% (3.2)
I usually view risks as a challenge to embrace	52% (3.5)	47% (3.4) #	41% (3.1)
I prefer to avoid risks	58% (3.5)	48% (3.4)	41% (3.1)
[1] I prefer to see evidence of local success before trying a new practice	NA	NA	37% (3.1) #
[1] I am usually an early adopter of new agricultural practices and technologies	NA	33% (3.3) #	28% (3.0) #
[1] This may not be the best farm around, but I see no reason to change	NA	NA	25% (2.7) ^

Significant difference by landholder type

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

Note: significant differences were determined using a Kruskal-Wallis rank sum test with $p<0.05$. 2024 data were tested for significant differences by LGA, generation and landholder type. 2019 data were tested for significant differences by landholder type and LGA. No significant differences were calculated in 2014

Table X7. Views and beliefs about climate change and associated actions taken by landholders identified in the 2014 (n=746-751), 2019 (n=638-644) and 2024 (n=225-362) North Central Victoria Landholder Surveys. Means (out of 5) are given in brackets.

Statement	% Landholders		
	Overall (2014)	Overall (2019)	Overall (2024)
VIEWS (% Agree / strongly agree)			
[1] I am confident that landholders in the region can adapt to expected changes in rainfall patterns	NA	58% (3.6) #*	49% (3.5) *
[1] Primary producers should do all they can to reduce carbon emissions from their activities	NA	68% (3.8) #*	48% (3.3) #*
[1] Landholders should manage their properties in expectation of a highly variable climate	NA	NA	73% (3.8) #*
[1] Fundamental changes are required to make farming systems in our region more resilient	NA	NA	33% (3.3)
BELIEFS (% Agree / strongly agree)			
[1] Climate change poses a risk to the region	NA	NA	51% (3.4) #*
Human activities are influencing changes in climate	53% (3.5)	60% (3.7) #*	62% (3.6) #*
It is not too late to take action to address climate change	53% (3.6)	62% (3.7) #	51% (3.4) #
If we do nothing, climate change will have dire consequences for all living things, including humans	45% (3.3)	55% (3.6) #*	51% (3.4) #*
ACTIONS			
[1] Have you changed your financial or on-property operations as a result of seasonal changes in weather patterns?	NA	NA	23% in the last 5 years #^
[1] Have you changed your operations to increase soil carbon (e.g. by revegetation, soil management)?	NA	13% in the last 12 months	31% in the last 5 years #
[1] Have you changed your on-property operations as a result of considering opportunities to reduce carbon emissions e.g. generating solar, wind power, improved grazing practices)?	NA	17% in the last 12 months	23% in the last 5 years

Significant difference by landholder type (2019)

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

Note: 2024 data were tested for significant differences by LGA, generation and landholder type using a Kruskal-Wallis rank sum test ('VIEWS' and 'BELIEFS' sections) and a Pearson's Chi-squared test ('ACTIONS' section) with $p<0.05$. 2019 data were tested for significant differences by LGA and landholder types using a Kruskal-Wallis rank sum test with $p<0.05$. No statistical tests were performed on 2014 data.

Table X8. Long-term plans of landholders identified in the 2014 (n=744-767), 2019 (n=640-649) and 2024 (n=325-359) North Central Victoria Surveys. Percentages reflect the proportion of landholders who designate each scenario as likely or highly likely in the next 10 years.

Long-term plans	% Likely / highly likely		
	Overall (2014)	Overall (2019)	Overall (2024)
Ownership of the property will stay within the family	73% (4.0)	66% (4.0) #	68% (3.9) #^
[1] Some part of my property will be managed for conservation purposes	12% (2.0)	11% (2.0) #	30% (2.6) #^
The property will be sold	18% (2.1)	18% (2.3) #	22% (2.3) #^
[1] I will move off the property around/soon after reaching retirement age	13% (2.2)	15% (2.3) #	17% (2.2)
Additional land will be purchased	31% (2.5)	26% (2.5) #*	16% (2.0) #*^
[1] Me or my partner will seek additional off-property work	23% (2.3)	21% (2.3) #	15% (2.0) ^
The enterprise mix will be changed to diversify income sources	24% (2.5)	23% (2.7) #*	13% (2.1) #*^
All or most of the property will be leased or share farmed	19% (2.2)	18% (2.2) #	10% (1.8) #*
The enterprise mix will be changed to more intensive enterprises	15% (2.3)	14% (2.4) #	9% (2.0) #*^
[1] Additional land will be leased, share farmed or managed for a corporate	20% (2.2)	17% (2.2) #*	7% (1.6) #*^
The property will be subdivided and a large part of the property sold	9% (1.7)	7% (1.7)	7% (1.6) #
[1] Buying property outside of my current area to mitigate increased seasonal variability.	NA	NA	6% (1.6) #*^

Significant difference by landholder type

* Significant difference by LGA

^ Significant difference by generation

[1] Slight difference in wording or not included in some surveys - see appendix

Note: significant differences were determined using a Kruskal-Wallis rank sum test with $p<0.05$. 2024 data were tested for significant differences by LGA, generation and landholder type. 2019 data were tested for significant differences by landholder type and LGA. No significant differences were calculated in 2014

Table X9. Summary characteristics and data trends for all landholder types across the 2014 (N=794), 2019 (N=663) and 2024 (N=389) North Central Victoria Landholder Survey years.

Characteristic	Overall (2014)	Overall (2019)	Overall (2024)
PROPERTY AND FARM MANAGEMENT			
[1] Median property area	253ha -	228ha (638ha Mean)	60ha (402ha Mean)
Median age	59 years -	62 years (61 Mean)	64 years (65 years Mean)
[1] % Female respondent	17% Female	22% Female	18% Female
Mean on-property hours work/week	40 hours	32 hours	25 hours
[1] Proportion earning a net on-farm profit	57%	24% >$50K	38%
[1] Top 3 land uses (% Yes)	Pasture (82%), area for living/recreation (80%), area of remnant native vegetation (79%)	Pasture (60%), sheep for wool or meat (56%), cropping (50%)	Sheep for wool or meat (43%), Pasture (38%), area for living or recreation (38%)
VALUES AND PRINCIPLES			
[1] Top 3 landholder attached values (% important/very important)	Ability to pass on a healthier environment for future generations (82%), an attractive place/area to live (78%), the productive value of the soil on my property (77%)	Ability to pass on a healthier environment for future generations (85%), an attractive place/area to live (83%), the productive value of the soil on my property (75%).	Ability to pass on a healthier environment (86%), an attractive place/area to live (83%), my property is an important part of who I am (75%)
[1] Top 3 landholder principles (% important/very important)	Looking after my family and their needs (92%), preventing pollution and protecting natural resources (74%), protecting the environment and preserving nature (68%)	Looking after my family and their needs (95%), preventing pollution and protecting natural resources (83%), protecting the environment and preserving nature (81%).	Looking after my family/loved ones and their needs (95%), preventing pollution and protecting natural resources (89%), respecting the earth and living in harmony with nature (77%)
CHALLENGES AND RISKS			
[1,2] Top 3 property issues (% important/very important)	Uncertain/low returns limiting capacity to invest in my property (59%), declining nutrient status of soils (51%), soil acidity undermining productive capacity of soil (46%)	Soil erosion (72%), declining nutrient status of soils (65%), low biological activity of soils (64%)	Rising input costs (67%), the impact of weeds or pest animals on productivity (63%), water-holding capacity of soils (59%)
[1,2] Top 3 district issues (% important/very important)	Absence of important services and infrastructure (65%), crop weed resistance to herbicide (63%), the	Changes in weather patterns (71%), the impact of pest plants and animals on native plants and animals (67%), quality	Water security (76%), the impact of pest plants and animals on native plants and animals (68%), declining soil health

	impact of pest plants and animals on native plants and animals (63%)	of water in farm dams during drought (66%)	and/or soil productivity (63%)
[1] Top view/belief of climate change (% agree/strongly agree)	It is not too late to take action to address climate change (53%)	Primary producers should do all they can to reduce carbon emissions from their activities (68%)	Landholders should manage their properties in expectation of a highly variable climate (73%)
INFORMATION AND KNOWLEDGE			
[1] Top 3 modes of information (% Yes)	Newspapers (76%), books/magazines/journals (70%), mailed brochures/leaflets/community newsletters (65%)	Newspapers (58%), television (47%), websites/internet (45%)	Websites (38%), newspapers (36%), field days (36%)
[1] Top 3 sources of information (% Yes)	Friends/neighbors/ relatives (71%), North Central CMA (52%), Bureau of Meteorology (52%)	Bureau of Meteorology (64%), friends/neighbors/ relatives (55%), ag consultants, agronomists or stock agents (45%)	Other farmers (58%), my own knowledge from my own experiences (53%), friends/neighbors/relatives (42%)
[1] Top 3 self-assessed knowledge topics (% sound/very sound)	How to establish introduced perennial pastures (57%), Strategies to maintain ground cover to minimise erosion (56%), frequency and rate of fertiliser application to maintain productivity across the main soil types on the property (50%)	Strategies to maintain ground cover to minimise erosion (62%), how to establish introduced perennial pastures (53%), how to identify the main constraints to soil productivity on your property (49%).	How to prepare for an extreme weather event such as fire or flood (64%), strategies to maintain groundcover to minimise erosion in this area (59%), the benefits of applying biological soil supplements (44%)
[1] Top practice implemented over full period of management (% yes)	Area of trees and shrubs planted (including direct seeding) (72%)	Each year worked to control non-crop weeds (79%)	Planting of trees or shrubs (including direct seeding) for environmental purposes (56%)
FUTURE PLANS			
Ownership will stay in the family (% likely/highly likely)	73%	66%	68%
[1] Some part of the property will be managed for conservation purposes (% likely/highly likely)	12%	11%	30%
Additional land will be purchased (% likely/highly likely)	31%	26%	16%
The property will be sold (% likely/highly likely)	18%	18%	22%

[1] slight difference in wording or statements not included in some surveys - see appendix

[2] issues assessed at either property or district scales may differ between survey years – see appendix

Table X10a. Modes of information used by landholder types and overall from the 2024 North Central Victoria Landholder Survey (n=381-382). Percentages reflect the proportion of landholders that used each mode in the last 12 months.

Mode of information	% Indicating 'yes'				
	Overall	Full-time	Part-time	Hobby Farmer	Non-Farmer
Websites	38% #	42%	38%	49%	22%
Newspapers	36% #	50%	37%	31%	22%
Field days	36% #*	57%	37%	30%	9%
Brochures / leaflets / newsletters	29% ^	33%	37%	27%	20%
Emails	28% #	48%	22%	22%	8%
Television	26%	23%	22%	30%	29%
Radio	23%	30%	21%	21%	15%
Magazines	20% #*	30%	19%	20%	8%
Books	17%	17%	18%	20%	15%
Academic journals/ research papers	11%	15%	11%	10%	8%
YouTube	10% *	9%	12%	12%	6%
Facebook	10% ^	13%	7%	12%	5%
Short courses	9%	11%	12%	11%	3%
Podcasts	6%	8%	8%	5%	0%
Extension officers	6% #*	11%	7%	1%	1%
Twitter	2% #	5%	0%	0%	1%
Instagram	2%	1%	3%	2%	3%
WhatsApp or Messenger groups	2%	5%	1%	1%	1%

Significant difference by landholder type

* Significant difference by LGA

^ Significant difference by generation

Note: 2024 data were tested for significant differences by LGA, generation and landholder type using a Pearson's Chi-squared test with $p<0.05$.

Table X10b. Modes of information used by the Baby Boomer+, Generation X and Generation Y- respondents from the 2024 North Central Victoria Landholder Survey (n=345). Percentages reflect the proportion of landholders in the three generations that used each mode in the last 12 months.

Mode of information	% Indicating 'yes'		
	Baby Boomer+ (n=221)	Generation X (n=99)	Generation Y- (n=25)
Newspapers	40%	38%	32%
Field days	37%	41%	40%
Websites	35%	45%	48%
Television	29%	26%	20%
Brochures / leaflets / newsletters	28%	32%	52%
Emails	25%	32%	44%
Magazines	24%	16%	20%
Radio	24%	28%	20%
Books	18%	20%	8%
Academic journals/ research papers	11%	10%	12%
YouTube	9%	8%	20%
Short courses	8%	11%	12%
Facebook	6%	17%	24%
Extension officers	5%	9%	4%
Podcasts	4%	9%	8%
WhatsApp or Messenger groups	2%	3%	8%
Twitter	1%	3%	8%
Instagram	1%	4%	4%

Table X11a. Sources of information used by landholder types and overall, from the 2024 North Central Victoria Landholder Survey (n=379-382). Percentages reflect the proportion of landholders that used each source in the last 12 months.

Source of information	% Indicating 'yes'				
	Overall	Full-time	Part-time	Hobby Farmer	Non-Farmer
Other farmers	58% #*	73%	70%	62%	27%
My own experience	53% #*	69%	53%	53%	32%
Friends / neighbours / relatives	42% *	40%	44%	53%	34%
Bureau of Meteorology	34%	42%	34%	32%	24%
Independent agricultural consultants, agronomists or stock agents	23% #*	45%	23%	11%	3%
Commercial agricultural consultants, agronomists or stock agents	23% #*	43%	29%	9%	1%
Landcare group/ network / coordinator	20%	22%	12%	26%	22%
Ag Vic	12% #	22%	8%	9%	1%
Rural R&D corporations e.g. GRDC, MLA	11% #*^	23%	8%	5%	0%
North Central CMA	8% #	14%	4%	4%	6%
Local council	8% *	7%	4%	12%	11%
Victorian Farmers / National Farmers Federation	8% #	16%	5%	1%	1%
Environmental organisations e.g. Greening Australia	6%	4%	5%	7%	9%
Commodity groups e.g. AWL	6% #	12%	5%	2%	0%
Other	6%	4%	4%	6%	8%
Universities / CSIRO	4%	5%	3%	5%	3%
Banks	3%	4%	4%	2%	0%
Soil CRC	1%	2%	1%	0%	0%

Significant difference by landholder type

* Significant difference by LGA

^ Significant difference by generation

Note: 2024 data were tested for significant differences by LGA, generation and landholder type using a Pearson's Chi-squared test with $p<0.05$.

Table X11b. Sources of information used by the Baby Boomer+, Generation X and Generation Y- respondents from the 2024 North Central Victoria Landholder Survey (n=345). Percentages reflect the proportion of landholders within each of the three generations that used each source in the last 12 months.

Source of information	% Indicating 'yes'		
	Baby Boomer+ (n=221)	Generation X (n=99)	Generation Y- (n=25)
Other farmers	59%	67%	64%
My own experience	56%	55%	56%
Friends / neighbours / relatives	42%	41%	60%
Bureau of Meteorology	36%	37%	36%
Independent agricultural consultants, agronomists or stock agents	21%	27%	28%
Commercial agricultural consultants, agronomists or stock agents	21%	29%	36%
Landcare group/ network / coordinator	19%	21%	28%
Ag Vic	11%	16%	8%
Local council	9%	5%	20%
Victorian Farmers / National Farmers Federation	9%	9%	0%
Rural R&D corporations e.g. GRDC, MLA	8%	17%	16%
North Central CMA	6%	12%	8%
Other	6%	6%	4%
Environmental organisations e.g. Greening Australia	5%	7%	4%
Commodity groups e.g. AWL	5%	7%	12%
Universities / CSIRO	4%	4%	4%
Banks	2%	5%	0%
Soil CRC	0%	2%	4%

APPENDIX 2 – SURVEY

SURVEY NO.

SUPPORTING LANDHOLDERS IN THE NORTH CENTRAL VICTORIA REGION

RURAL LANDHOLDER SURVEY 2024

SUPPORTING LANDHOLDERS IN THE NORTH CENTRAL VICTORIA REGION

This comprehensive survey is a vital part of efforts to understand the important social and economic factors shaping landholder decision making in the North Central region. **Your contribution will guide the Board and staff who develop and implement the programs and activities for the North Central Catchment Management Authority (North Central CMA)** and the Australian Cooperative Research Centre for high performance soils (Soil CRC), who are co-funders of this survey.

Surveys are being sent to a random sample of landholders with properties in the North Central region, identified via ratepayer lists. Each survey has a serial number that links to the property, enabling us to spatially reference our survey results with soil and weather data. **No property or person will ever be identifiable in our reporting.**

Similar surveys were undertaken in 2014 and 2019. There is no other way to obtain this property-level information.

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, so more than one person may choose to fill this in together. If you are not involved in the management of the property, please forward the survey to the property manager or return the survey in the postage-paid return envelope. We ask that you only provide information for your property/s within the North Central region.

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 and you can stop anytime.
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 raw 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. LANDHOLDER IDENTITY

Please **circle** the descriptor/term that best describes your landholder identity in relation to your property:

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

Who participates in decision making for your property? *(Please circle the most important)*

Mostly just me Me and my partner Multi-generations of my family Property manager Property manager and me Agronomist Farm Business Advisor

2. ENTERPRISE / LAND USE MIX

This topic is seeking **information about your current land use/enterprise mix.**
(Place a tick besides any correct response in the **'Situation Now'** column). Please answer with the land you own and manage in the North Central region in mind.

ENTERPRISES / LAND USE ON YOUR PROPERTY IN 2024	SITUATION NOW	ENTERPRISES / LAND USE ON YOUR PROPERTY IN 2024	SITUATION NOW
Cereal	○	Irrigated agriculture	○
Legumes/pulses	○	Dryland broadacre farming	○
Oil seed	○	Farm forestry	○
Pasture	○	Other tree planting (e.g. shelter, habitat, erosion or recharge control)	○
Dairy	○	Farm-based tourism (e.g. farm stays, B&B)	○
Beef cattle	○	Area of remnant/regenerated native vegetation (e.g.. trees, grasslands, wetlands)	○
Sheep for wool or meat	○	Area set aside for living/recreation (e.g. gardens, pets, vehicles)	○
Bee keeping	○	Hay/fodder production for sale	○
Other commercial livestock enterprises (e.g. goats, pigs, deer, horse studs, poultry, alpaca, dogs)	○	Permanent protection for conservation, eg. Trust for Nature covenant or Heritage Agreement	○
Viticulture	○	Other **(please specify)**:	○
Other horticulture	○	.....	

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 property and your local district.** *Examine each statement in the table, 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. internet, phone, schools, transport). **If important, please provide an example:**	
Land use change/conflicting land use (e.g. solar, mining, residential) impacting/encroaching on farmland. **If important to you, please provide an example:**	
Long-term negative impacts of property purchased by absentees	
Public opposition for agricultural practices (e.g. GMs, animal welfare, pesticide use)	
Loss of native plants and animals in the landscape (e.g. due to cropping or draining wetlands)	
Declining soil health and/or soil productivity	
Water security	
Changes in weather patterns	
Risk to life and property from wildfires	
Risk to life and property from flooding	
The impact of pest plants and animals on native plants and animals	
Stock damage to native vegetation/ rivers/ streams/ wetlands	
Salinity, nutrient or chemical runoff threatening water quality in rivers/ streams/ wetlands	
The effect of farm dams or water extraction on long-term health of rivers/ streams/ wetlands	
Quality of water in farm dams during drought	

IMPORTANCE OF ISSUES ON YOUR PROPERTY	YOUR VIEW
Uncertain returns limiting capacity to maintain/invest in my property	
Rising input costs	
Impact of temperature extremes and/or changing rainfall patterns on management/productivity	
The impact of weeds or pest animals (including overabundant native species) on productivity	
Weed/pest resistance to herbicides, pesticides and/or fungicides	
Lack of skilled labour to undertake important on-property work	

IMPORTANCE OF SOIL - RELATED ISSUES ON YOUR PROPERTY	YOUR VIEW
Soil erosion (e.g. due to wind or water)	
Declining nutrient status of soils	
Salinity undermining long-term productive capacity	
Soil acidity (lower pH) undermining productive capacity of soils	
Low level of organic carbon in soils	
Low level of biological activity in soils	
Effects of pesticide use on soil biota	
Soil-borne diseases	
Water holding capacity of soils	
Low permeability of sub soil	
Soil Sodicity	

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 vulnerable people 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	
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	
Working on the property is a welcome break from my normal occupation	
A sense of accomplishment from being a part of positive change in farming	

Can 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	
Resources to support business planning, such as Plan2 Farm initiative	
Market mechanisms that provide funds to support the building of carbon and biodiversity	
How to use soil testing to inform planning to increase soil productivity such as a nutrient budget	
The processes leading to declining soil health or structure in this area	
How to identify the main constraints to soil productivity on your property	
The role of soil carbon/ microbiology (e.g. bacteria & fungi) in soil health	
How to build soil organic matter/soil carbon	
The benefits of applying biological soil supplements (e.g. compost, manure, microbial inoculants)	
Strategies to maintain groundcover to minimise erosion in this area	
The Aboriginal group/s who are connected to the area where your property is located	
How land in your district was used and managed before European settlement	
The effect of fertiliser application on the persistence of native grasses in this area	
The role of on-farm biodiversity for supporting soil and landscape health	
How to (re)introduce more legumes/pulses into your enterprise mix	
Options and strategies to (re)establish perennial pastures (e.g. lucerne/native grasses) in this area	
The use of time controlled, holistic or cell grazing strategies	
Regenerative agriculture and/or holistic farm management	
The role of wetlands and native vegetation for filtering and slowing down water entering rivers & lakes	
The role of logs and riverside vegetation for supporting native fish populations	
The importance of riverbank vegetation for minimising damage from flood waters	
How to prepare for an extreme weather event such as fire or flood	

7. YOUR VIEWS & EXPERIENCE

We would like to know **how closely the statements presented below reflect your views.** 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	
The cost of deep-tillage and subsoil modification are justified by increased production	
Soil testing is an essential step in understanding soil condition	
The costs of applying lime to balance soil acidity is justified by increased production	
The costs of establishing perennial pastures are justified by the returns	
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	
Intensive grazing for short periods is usually better for the health of native vegetation along waterways and wetlands than set stocking	
I feel a personal responsibility to maintain the productive capacity of my soil	
I feel a personal responsibility to be part of a soil health group /group working to improve land/NRM	
There is adequate compensation or support provided for good land/soil stewardship	
I feel confident managing my farm in the face of increasing change and uncertainty	
I am confident making management decisions based on the data from my farm	
Decision-making needs to be strongly influenced by data/scientific evidence	
I have good systems in place to manage my farm data	
Internet or mobile phone access is a barrier to finding/using information for my farm management	
Overall, I am decreasing my use of synthetic fertiliser/pesticide inputs per hectare	
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	
I feel adequately supported to conduct farming and land management activities on my property	
I'm confident that adopting regenerative/holistic farming practices is justified by the returns	
I am interested in learning more about regenerative/holistic farming approaches	
I'm confident that my land is in a better condition than when I took on the management of this farm	
I'm confident that landholders in this region can adapt to expected changes in rainfall patterns	

STATEMENTS	YOUR VIEW
Reduced production in the short-term is justified where there are long term benefits	
Landholders should have the right to harvest water that falls on their property, even if it impacts others	
The public should have the right to access crown land managed by private landholders (e.g. unused roads)	
Aboriginal people should be able to negotiate access with landholders to visit cultural sites	
The increased allocation of water for the environment under the Murray-Darling Basin Plan will improve the health of waterways & wetlands	

OPEN QUESTIONS

What is your main source of support for your agricultural and/or land management activities (e.g. gov, groups, friends)?

What is the most important influence on your soil health?

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

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

NORTH CENTRAL CATCHMENT MANAGEMENT AUTHORITY (CMA)

Are you aware of the existence of the North Central CMA? ◯ No ◯ Yes

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)	YOUR VIEW
The North Central CMA provides valuable information about soil, land, water and natural resource management (NRM).	
The North Central CMA can be relied on to keep landholders' interests in mind when making decisions about land, water and NRM.	
I can rely on the North Central CMA to provide appropriate support for land, water and NRM.	

What sort of North Central CMA support do you most value? **In regards to supporting:**

◯ Community ag / soils groups ◯ Funding for the environment ◯ Flood advice ◯ Schools ◯ Salinity monitoring
◯ Other (please describe)

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 North Central Victori?** *Please place a tick besides your key sources in the table below.*

MODE OF INFORMATION		ORGANISATION/PERSONS	
Television	○	Other farmers	○
Books	○	North Central CMA	○
Magazines	○	Banks	○
Newspapers	○	Landcare group/ network / coordinator	○
Radio	○	Local Council	○
Field days	○	Ag Vic	○
Brochures/leaflets/newsletters	○	Soil CRC	○
Academic journals/research papers	○	Rural R&D corporations (e.g. GRDC, MLA)	○
Emails	○	Environmental organisations (e.g. Greening Australia)	○
Websites	○	Commodity groups (e.g. AWL)	○
Twitter	○	Friends/neighbours/relatives	○
Instagram	○	Universities/CSIRO	○
YouTube	○	Bureau of Meteorology	○
Podcasts	○	**Independent** agricultural consultants, agronomists or stock agents	○
Facebook	○	**Commercial** agricultural consultants, agronomists or stock agents	○
Whatsapp or Messenger groups	○	Victorian Farmers / National Farmers Federation	○
Extension officers	○	My own knowledge from my own experiences	○
Short courses	○	Other	○

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
Most people are trustworthy	
People are almost always interested only in their own welfare	
I am usually an early adopter of new agricultural practices and technologies	
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 usually view risks as a challenge to embrace	
I am open to new ideas about farming and land management	
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 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	
Primary producers should do all they can to reduce carbon emissions from their activities	
Landholders should manage their properties in expectation of a highly variable climate	
Fundamental changes are required to make farming systems in our region more resilient **What sort of changes do you suggest?**	

10. MANAGEMENT PRACTICES ON YOUR PROPERTY

This section asks about **practices undertaken** on your main or 'home' property in North Central Victoria 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 CARRIED OUT ON YOUR MAIN OR "HOME" PROPERTY IN NORTH CENTRAL VICTORIA	AT SOME POINT PRIOR TO 2019	PAST 5 YEARS (2019-present)	INTEND TO IMPLEMENT/ CONTINUE IN NEXT 5 YEARS
Planting of trees and shrubs (incl. direct seeding) for environmental purposes (e.g. shelterbelts, pollination)	○	○	○
Removal of an area of trees and/or shrubs	○	○	○
Fencing of native bush/grasslands/wetlands to manage stock access	○	○	○
Use of time-controlled, cell, or holistic grazing	○	○	○
Sowing perennial pastures	○	○	○
Use of no-tillage or minimum tillage techniques	○	○	○
Used precision-farming techniques	○	○	○
At least one lime application to arable land	○	○	○
Application of biological soil supplements (eg. compost-tea, organic manure)	○	○	○
Maintaining at least 70% groundcover (in non-drought years)	○	○	○
Testing of soils to understand soil condition	○	○	○
Preparation of a fertiliser/nutrient budget for all/most of the property	○	○	○
Plant legumes (e.g. lucerne, clover, pulses)	○	○	○
Carbon farming	○	○	○
Cover crops	○	○	○
Organics	○	○	○
Multi-species pasture-cropping	○	○	○
Integrated pest management	○	○	○
Encourage/manage native grasses/grains to grow at scale	○	○	○
Use of stock containment areas	○	○	○
Improving waste management practices on my property	○	○	○
Deep ripping	○	○	○
Farming practices you consider to be regenerative **If important, provide an example:**	○	○	○

11. YOUR PROPERTY AND YOU

BACKGROUND INFORMATION	PLEASE TICK OR FILL IN YOUR RESPONSE
What is the total area of land you own in the North Central region? (excluding land you manage but do not own)	..... total Ha owned
Is this North Central property your principal place of residence?	◯ No ◯ Yes
What area of additional land do you manage (lease/sharefarm/agist from others) in the North Central region (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** the North Central region?	..... 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 all relevant 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:** ◯ Spouse/partner ◯ Children ◯ Parents ◯ Siblings ◯ Others	◯ 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? **Please specify the issue:**	◯ No ◯ Yes ..... Ha

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

.....

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 5 years have you changed your financial or on-property operations as a result of seasonal changes in weather patterns?	◯ No ◯ Yes
In the past 5 years have you changed your operations to increase the soil carbon on your property (e.g. by revegetation, soil management) Please note what these changes are:	◯ No ◯ Yes
In the past 5 years 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 North Central property during 2022/2023 financial year?	◯ No ◯ Yes
Did you earn/draw a wage from your North Central property during 2022/2023?	◯ No ◯ Yes
Did your North Central property return a net profit during the 2022/2023 financial year? (i.e. income exceeded all expenses before tax)	◯ No ◯ Yes
Did you or your spouse receive a net off-property income (after expenses and before tax) in the financial year (2022/2023)	◯ No ◯ Yes, me ◯ Yes, my partner
Does your family rely on off-farm income and investments?	◯ No ◯ Yes
In the 2022/2023 financial year, what percentage of you (and your spouse's) income was earned off farm? (e.g. from shares, rental income, employment, other business)	..... %
Estimate the number of **days** you were doing **paid off-property** work in the **past 12 months**	..... days per year
Has your North Central property returned a net profit over the last **5 years?** (i.e. **income exceeded all expenses before tax,** on balance, over the 5 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, whole farm planning)	◯ No ◯ Yes, me ◯ Yes, my partner
In the last 12 months, did you attend field days, webinars, farm walks and other activities focused on soil health and productivity?	◯ No ◯ Yes

On average, what is the longest time-frame you consider when making strategic decisions on your farm/land?
◯ Opportunistic ◯ Seasonal ◯ Year to year ◯ Up to 5 years ◯ 6-20 years ◯ Over 20 years ◯ Over 100 years

Do you have a **disaster response plan prepared?** (e.g. a flood or bushfire plan) ◯ No ◯ Yes

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

.....

Over the last **5 years,** what **management decision** was the most important influence on your **profitability?**

.....

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, share farmed or managed for a corporate	
The enterprise mix will be changed to diversify income sources	
The enterprise mix will be changed to more intensive enterprises	
Me or my partner will seek additional off-property work	
Some part of my property will be managed 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

What proportion of your property contains an area of remnant, restored or planted native vegetation or wetland?

◯ 0% ◯ 1-25% ◯ 26-50% ◯ 51-75% ◯ 76-100%

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 the North Central Region? 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 that is addressed to Dr. Luke.**

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: