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SOCIAL BENCHMARKING FOR NATURAL RESOURCE MANAGEMENT: 2019 CORANGAMITE REGION

REPORT TO THE CORANGAMITE CATCHMENT MANAGEMENT AUTHORITY




ALLAN CURTIS WITH
SIMON MCDONALD, EMILY MENDHAM
AND SIMON CURTIS ©2020

CORANGAMITE CMA

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Disclaimer
The views expressed in this report are solely the author's, and do not necessarily reflect the views of the Corangamite Catchment Management Authority or the people consulted during the research project.

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Local governments also provided valuable support in preparing the property data sets used to develop the survey mailing list or undertaking the mailout process. This report includes a summary of data for the seven Local Government Areas (LGAs) in the Corangamite region.

Thanks also to the rural property owners who took the time to complete the survey. Respondents will be advised that the report has been completed and how they can access the document.

The Corangamite CMA acknowledges the Traditional Custodians of the land and waters where we work and pay our respects to their elders past, present and emerging.

List of acronyms

ABS – Australian Bureau of Statistics
CMA – Catchment Management Authority
GIS – Geographic Information System
LGA – Local Government Area, including local councils and regional cities
CCMA –Corangamite Catchment Management Authority
NRM – Natural Resource Management
RCS – Regional Catchment Strategy
VFF – Victorian Farmers' Federation

List of key terms

Values: guiding principles/what is important to people
Beliefs: what we think is true
Norms: how we/others think we ought to behave. These can be personal norms or social norms
Attitudes: what we think should happen in relation to a specific social issue
Knowledge: grasp of facts, understanding of process
Skills: ability to implement or perform a task
Trust: willingness of those who are vulnerable to rely on others
Social capital: networks, relationships based on trust and reciprocity, social norms and rules
District: area where residents know each other, are in regular contact and there are "ties that bind".

EXECUTIVE SUMMARY

THE CONTEXT

Information was gathered through a survey of rural property owners in 2019. Survey data are expected to inform the CCMA Board and staff as they develop, implement and evaluate the 2021-2027 Corangamite Regional Catchment Strategy (RCS).

CCMA staff worked with Allan Curtis to review and revise the 2006 CCMA social benchmarking survey. A draft 2019 survey was then pre-tested, including with two groups of rural property owners. Surveys were posted to a random sample of 1900 property owners selected from the seven Local Government Areas (LGAs). Only properties of 10 hectares and above were included.

The research team either undertook the mailout process or liaised with Council/City staff to implement that process. There was an initial mailout (including a cover letter, survey booklet and return envelope) followed by three reminder/thankyou cards; then a second mailout package to non-respondents followed by two reminder/thankyou cards.

After removing return-to-sender, duplicate ownerships, properties that had been sold, owners who were ill or overseas and other acceptable reasons for a non-response, there are 1802 possible respondents. With 644 returned and completed surveys, the response rate for 2019 is 36%. This response rate is lower than expected (e.g. 50% in 2006). However, the response rate is consistent with the recent experience with social benchmarking surveys.

There is a trend to lower response rates for surveys in Australia and overseas. This trend may reflect "survey fatigue" and concerns about privacy heightened by the exposure of "data mining" by Facebook and Google. Contemporary trends in property ownership, including more absentee owners and more owners identifying as non-farmers by occupation also appear to be influencing response rates.

Experience with social benchmarking surveys in Victoria suggests that non-respondents are not a homogenous group and with a 36% response rate, given there are more than 600 surveys completed, data are likely to be representative. That confidence is based on a number of assessments. For example, comparisons of respondents and non-respondents, including using available data for property size; and the extent results are consistent with contemporary social theory and social trends (e.g. fewer respondents with strong farmer identity). In every case, results from the 2019 CCMA social benchmarking survey are consistent with those expectations.

CCMA social benchmarking surveys in 2006 and 2019 (this survey) covered similar topics and employed some of the same items. Both surveys drew on random samples of rural property owners. In 2013 the CCMA contracted RMCG consulting to prepare a rural community and land use profile. RMCG identified a sample of rural property owners using telephone lists (i.e. White Pages) and a list of Australian farmers. It appears that those who are not full-time farmers and resident owners are under-represented

in the RMCG sample. Trends over time are therefore based on comparisons of 2006 and 2019 survey data only.

The objectives of the 2019 CCMA social benchmarking survey were to:

1. Better inform staff engagement with rural property owners.
2. Describe the social and farming structure for the region and for each LGA.
3. Gather data to support assessment of progress in the achievement of RCS and NRM programs.
4. Inform understanding of implementation of best-practice NRM by rural property owners.

A DESCRIPTION OF THE SOCIAL AND FARMING STRUCTURE

In many ways, Table A provides a useful introduction by describing key elements of the social and farming structure in the Corangamite region and identifying important trends over time. Most rural properties are relatively small, most property owners are not full-time farmers by occupation and to the extent property owners are engaged in agriculture, most are undertaking less intensive enterprises and few property owners earn substantial incomes from agriculture. **Trends over time in survey data highlight the extent the Corangamite region is a multi-functional social landscape. That is, a mix of productivist (i.e. agriculture), environmental and amenity/recreation values shape decisions about land use and management in the region** [refer to Figure A].

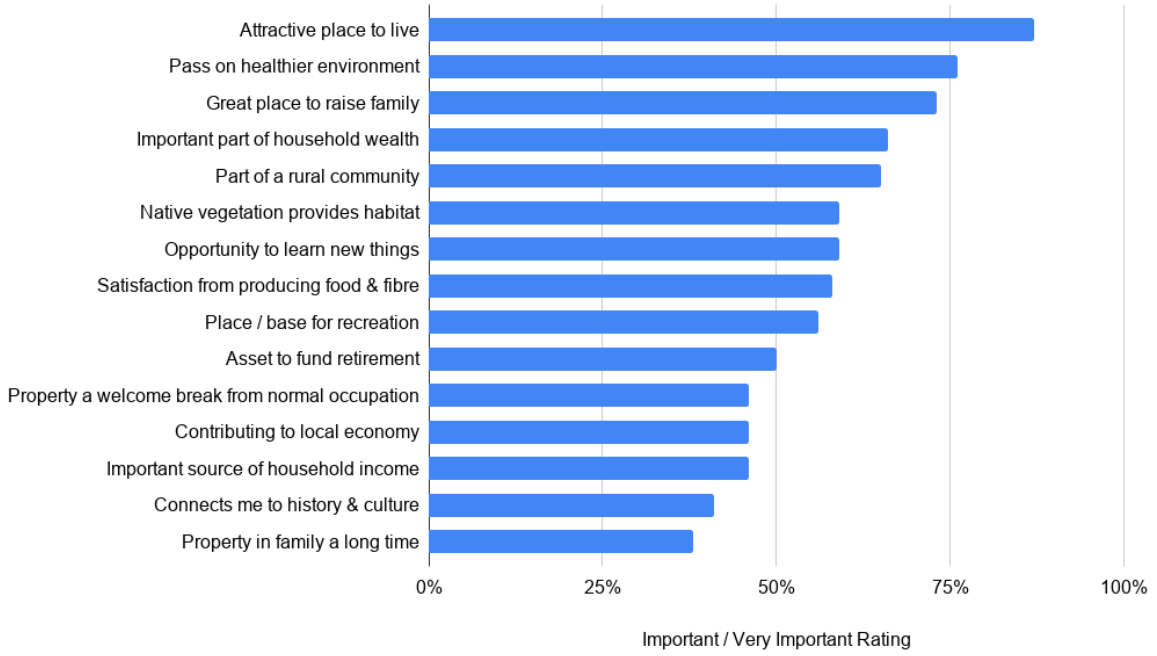


FIGURE A. ATTACHED VALUES, 2019 (N=644)

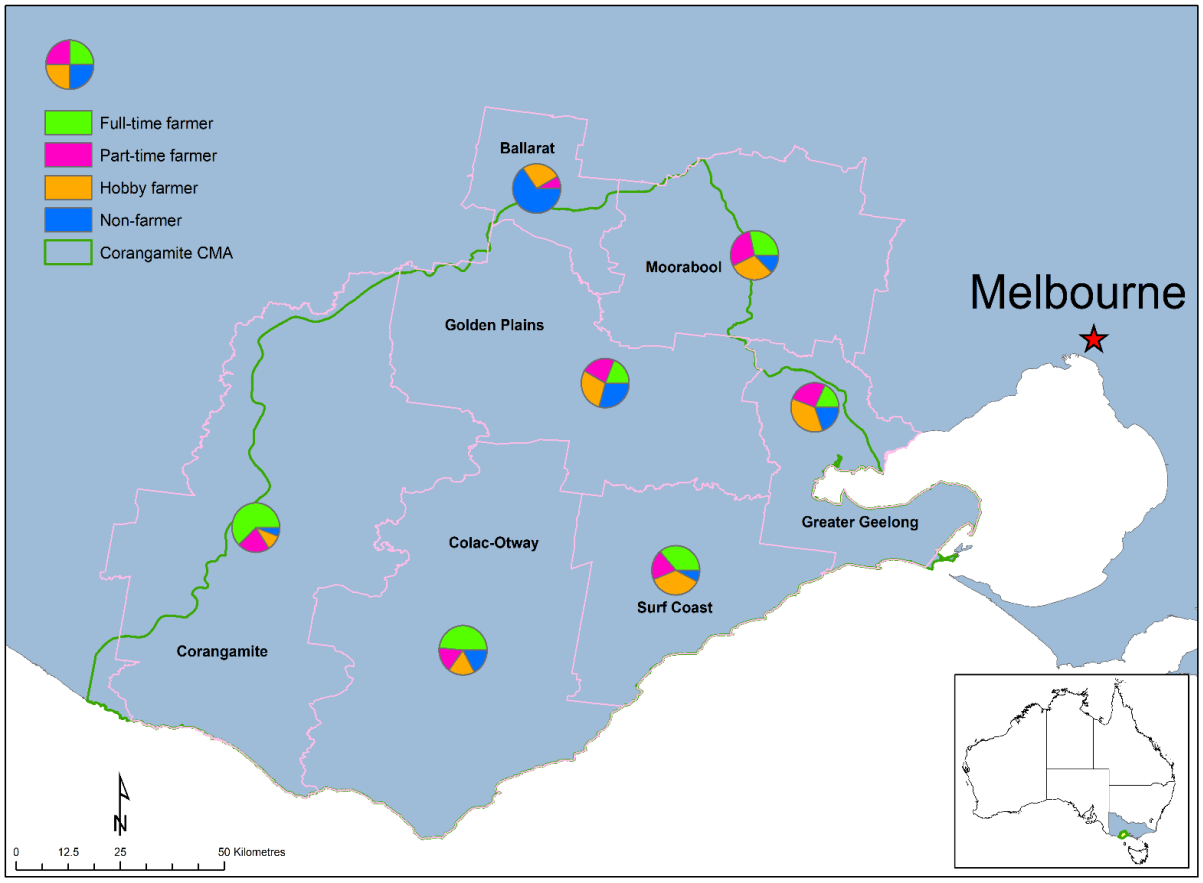
TABLE A. CORANGAMITE REGION PROFILE OF PROPERTY AND PERSONAL ATTRIBUTES, 2019 (N=644) AND 2006

Key attributes	2019	2006
% who are full-time farmers	33%	53%
Property size	50 ha	130 ha
Beef cattle	44%	53%
Area set aside for living/recreation (gardens, pets, dams, vehicles)	39%	NA
Broadacre cropping	13%	26%
Sheep for meat or wool	32%	43%
Dairying	12%	21%
Age	61 years	55 years
Respondents who are women	29%	18%
Absentee owners	25%	23%
Time lived in local district	36 years	34 years
Paid off-property work last year and days	65%/91 days	49%/83 days
Hours worked on-property per week past year	20 hours	NA
% of all survey respondents with net profit from agriculture 2018/19	31%	61%
% all survey respondents with net profit from agriculture >$50K	14%	34%
Landcare member/participant	30%	35%
Local commodity group participant	10%	18%
Work funded by Government programs past 5 years	16%	26%
Completed short course past 5 years	14%	37%
Prepared/preparing property management plan/whole farm plan	43%	41%
Have a business plan	17%	NA
Attend field day/farm walk/demonstration on native plants & animals last 12 months	30%	NA
Attend field day/farm walk/demonstration on soil health last 12 months	20%	NA
Employed a consultant last 12 month	18%	23%
Employed a contractor last 12 months	49%	NA

IMPORTANCE OF FARMER IDENTITY

The regional profile in Table A masks significant differences by geography (i.e. LGA) and extent of farmer identity. A profile for each LGA is included in the report and these should provide helpful insights for local government staff and NRM practitioners setting out to engage rural property owners. Differences across the four-farmer identity cohorts are even more important and to a large extent, explain differences in the character of the seven LGAs [Map A].

MAP A. DISTRIBUTION OF FARMER IDENTITY COHORTS BY LGA, 2019 (N=644)



Those identifying as Full-time farmers, Part-time farmers, Hobby farmers and Non-farmers are significantly different [Table B]. **Those differences matter: both for those setting out to engage property owners and in the implementation of best-practice NRM. In many ways the key difference is that Full-time and Part-time farmers have a strong business orientation and are focused on producing food and fibre** [Table C]. Not surprisingly, these two cohorts are more likely to implement all of the sustainable farming practices included in the survey.

By comparison, Hobby farmers and Non-farmers typically have more focus on amenity and environmental values [Table C] and these values are expressed through their land use and management decisions. Nevertheless, Full-time and Part-time farmers are as likely to implement most environmental best-practices included in the survey. That outcome may seem counterintuitive, but is consistent with results from other social benchmarking surveys. Full-time and Part-time farmers are more connected to

local NRM organisations, spend more time on their properties and are more likely to be engaged through government NRM agency programs.

TABLE B. PERSONAL AND PROPERTY ATTRIBUTES BY FARMER IDENTITY, 2019 (N=644)

Key attributes	Full-time (33%)	Part-time (20%)	Hobby (26%)	Non-farmer (21%)
Property size	250 ha	65 ha	22 ha	21 ha
% land respondents own in CCMA region	76%	14%	4%	6%
Property includes waterways & wetlands	69%	72%	55%	53%
Property leased, share farmed, agisted from others	53% Yes 166 ha	46% 40 ha	34% 30 ha	36% 3 ha
Age	61 years	60 years	60 years	61 years
% respondents who are men	76%	81%	59%	60%
Resident on property	88%	75%	75%	58%
Years lived on property	40 years	20 years	18 years	14 years
Family members working full-time on property	44%	7%	7%	8%
Paid off-property work last year	67% 17 days	75% 129 days	75% 109 days	74% 149 days
Hours work on-property per week past year	50 hours	20 hours	12 hours	5 hours
Income from agriculture 2018/19	95%	85%	33%	7%
% all survey respondents with net profit from agriculture >$50K	39%	8%	Nil	3%
Landcare member/participant	40%	26%	26%	18%
Local commodity group participant	21%	8%	2%	2%
Work funded by Government past 5 years	24%	17%	10%	13%
Completed short course past 5 years	23%	13%	9%	9%
Property management plan/whole farm plan	56% Yes	49%	32%	27%
Have a business plan	28%	20%	10%	4%
Attend field day/farm walk/demonstration on native plants & animals last 12 months	45%	22%	28%	17%
Attend field day/farm walk/demonstration on soil health last 12 months	42%	18%	13%	2%
Employed a consultant last 12 month	31%	14%	12%	9%
Employed a contractor last 12 months	68%	60%	36%	23%

TABLE C. DIFFERENCES IN IMPORTANCE OF VALUES ATTACHED TO PROPERTY BY FARMER IDENTITY, 2019 (N=644)

Values attached to the property	Full-time farmer	Part-time farmer	Hobby farmer	Non-farmer
Provides an important source of household income	89%	44%	20%	10%
An asset that is an important part of family wealth	87%	66%	57%	47%
Natural setting makes this an attractive place to live	84%	87%	93%	87%
Satisfaction from producing food and fibre for others	80%	70%	50%	18%
Being part of a rural community	76%	73%	60%	46%
Contributing to the local economy by providing work and supporting local businesses	75%	56%	31%	16%
Native vegetation provides habitat for native animals	45%	65%	64%	71%
A place or base for recreation	39%	48%	77%	71%
Working on the property is a welcome break from my normal occupation	15%	60%	72%	55%

There are many reasons why NRM organisations engage rural property owners in NRM. These objectives extend beyond implementation of best-practice NRM and include: gathering local knowledge to inform priority setting and program implementation; building the capacity of rural property owners to respond to future threats to environmental assets; establishing a constituency to support investment in NRM; and establishing relationships that demonstrate trustworthiness and build trust in the organization.

It seems the CCMA is faced with a dilemma: respond to the needs of most rural property owners or focus engagement on those who manage almost all of the land in the Corangamite region. Survey information suggests the focus at this time is on Full-time farmers who are far more likely to be engaged in NRM platforms and processes [Table B]. And the notes provided in the Other Comments section of the survey suggest there is considerable unmet demand for information, advice and financial support amongst Non-farmers.

To the extent NRM engagement is focused on Full-time farmers, there may be missed opportunities given the close alignment of the values of Hobby farmers and Non-farmers with contemporary NRM policies and practices. It is also worth remembering that the trend is away from Full-time farming. Indeed, no respondent in the Ballarat LGA and less than 20% of respondents in the Greater Geelong and Golden Plains LGAs self-identified as Full-time farmers.

ISSUES OF CONCERN OR THREATS TO VALUES

For most respondents there is a long list of important issues and these include a mix of social, economic and environmental concerns [Figure B]. Differences exist across the four farmer identity cohorts and these are as expected. For example, those with a stronger farmer identity are more likely to give a higher rating to *The condition or health of soils* and *Low profitability of farm enterprises*; whereas those with a weaker farmer identity are more likely to give a higher rating to *The impact of pest plants and animals on native plants and animals* and *Nutrient and chemical runoff reducing water quality*.

The key finding is that most respondents across all farmer identity cohorts share concern for most of the top ten rated issues. So, there is much common ground in terms of the issues that might threaten important values, including those shared values. This information should provide a sound basis for effective engagement of rural property owners in NRM.

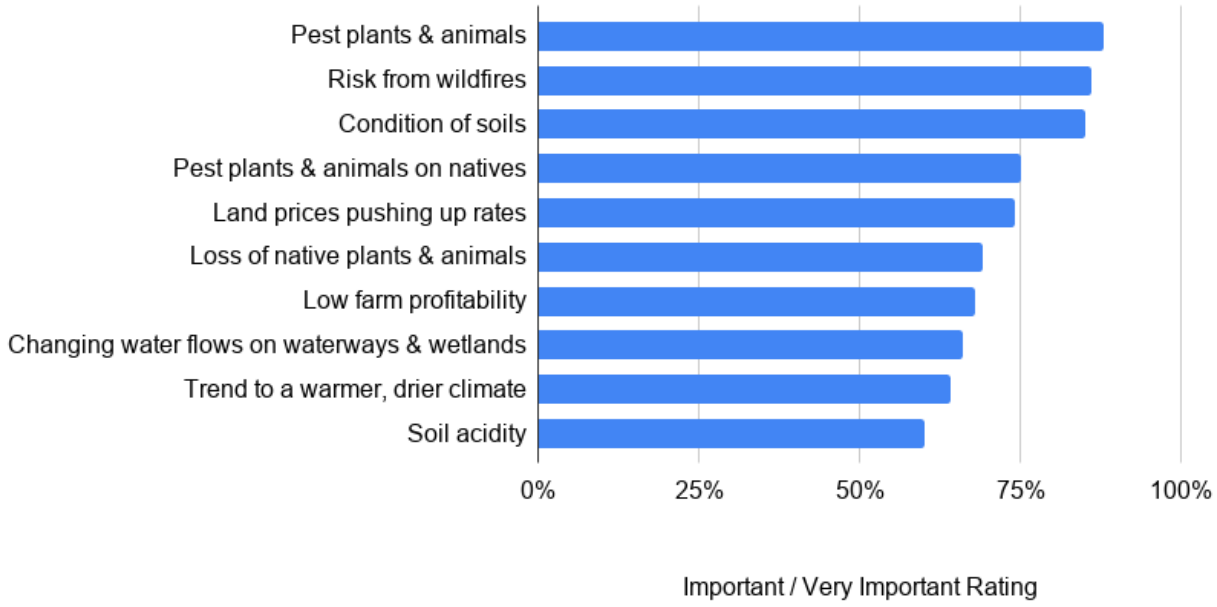


FIGURE B. TOP 10 ISSUES (I.E. THREATS TO VALUES), 2019 (N=644)

UTILITY OF THE CONCEPTUAL FRAMEWORK

The results of analyses exploring relationships between implementation of best-practice NRM and variables expected to influence implementation appear to validate the conceptual framework underpinning the choice of survey topics and items [Figure C]. For example, there is a consistent pattern of significant positive relationships between best-practice implementation and attached values; issues (i.e. concern about threats to values); long-term plans; engagement in NRM platforms and processes; knowledge of NRM; and confidence in best-practices. There is also abundant evidence of significant positive relationships between engagement in NRM platforms and processes and knowledge and confidence in best-practices.

A key assumption underpinning this research is that there are attributes of property owners (i.e. their values and beliefs) which are relatively constant but critical for engagement; and other attributes that are more amenable to intervention (e.g. knowledge, management skills, confidence in best-practice). Best-practice NRM is established for some topics (e.g. managing riparian areas) but less certain for others (e.g. maintaining the productive capacity of soils). For the more problematic topics, it is important to engage property owners in "dialogue, learning and action" through platforms (e.g. group-based extension) and processes (e.g. Field days/Farm walks/Demonstrations, short courses, property planning).

In this study, farmer identity encapsulates and shapes important differences in values and beliefs, and in turn, influences engagement in NRM platforms and processes and the implementation of best-practices. The four farmer identity cohorts should provide a useful base for those setting out to engage rural property owners in the Corangamite region.

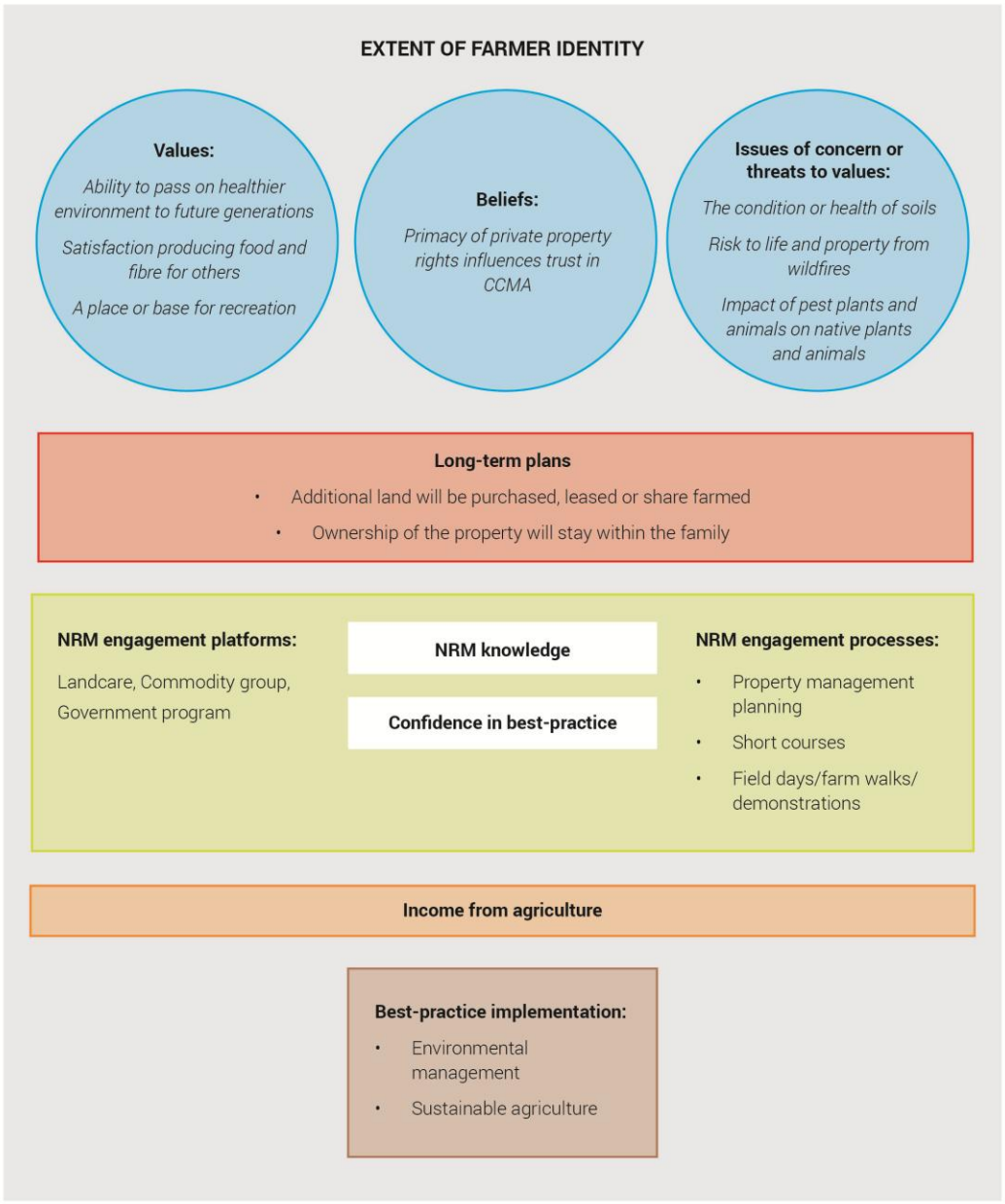
Amongst the 60% of respondents who were aware of the CCMA before receiving the survey, those willing to rely on the CCMA outnumber those who don't trust the CCMA by four to one. However, a majority of survey respondents are not-predisposed to trust others and a majority of respondents continue to believe their rights as private property owners trump their responsibilities to the wider community or public. These attributes are associated with less trust in the CCMA and may represent an important barrier to engagement in NRM. Having said that, in this study there are no significant relationships between trust in the CCMA or predisposition to trust and implementation of best-practices.

Trust may not be a key to engagement in best-practice implementation but there are many reasons to focus on trust building, especially by demonstrating trustworthiness (i.e. ability, benevolence and integrity). Where trust exists, intentions are less likely to be misinterpreted, any errors or unforeseen outcomes of actions are more readily forgiven, local knowledge is more likely to be offered, and it is easier/less costly to engage property owners in projects (Sharp and Curtis 2014).

An additional challenge for those setting out to engage rural property owners in the Corangamite region is that there is now a more diversified set of information sources about property management. The reach of legacy media (e.g. newspapers, television, radio) is declining over time and Hobby Farmers and Non-farmers are far less likely to seek information about property management from almost all sources.

However, the legacy media (e.g. newspapers, television, radio) is still relevant and in the 2019 survey has far greater reach than social media (i.e. Twitter, Facebook, Instagram). For example, from about a third to half or more respondents selected each of the three legacy media as sources of information about property management compared to less than one in five for any social media platform.

FIGURE C: APPLYING THE CONCEPTUAL FRAMEWORK USING 2019 SURVEY DATA



1 INTRODUCTION

This research employed a survey of rural property to inform the Corangamite Catchment Management Authority (CCMA) Board and staff as they develop, implement and evaluate the 2021-2027 Corangamite Regional Catchment Strategy (RCS). In broad terms, each of Victoria's 10 NRM regions will develop an RCS that identifies regional priorities and describes strategies to achieve those objectives. The Corangamite region is located in the area to the west of Melbourne and includes the land between Geelong and Ballarat and extends westward along the coast towards Port Campbell [Map 1].

CMA typically have limited ability (agency) to accomplish their goals without the support of other stakeholders (e.g. Australian and state governments, Non-Government Organisations or NGO), and especially rural property owners who own most rural land in Victoria and directly influence the condition of soil, waterways, wetlands and native vegetation. In turn, the condition of those environmental assets influences their livelihoods, well-being and wealth (including property values).

The 2019 survey draws on a widely accepted approach to social benchmarking for regional NRM developed by Allan Curtis (see Curtis, Byron, & MacKay, 2005). This survey-based methodology has been applied across Australia, including as part of the Australian Government's National Action Plan for Salinity and Water Quality, with case studies in Victoria, New South Wales and Queensland. The most recent social benchmarking surveys have been completed in the North Central (Curtis & Luke 2020) and Wimmera (Curtis & Mendham 2017) regions of Victoria.

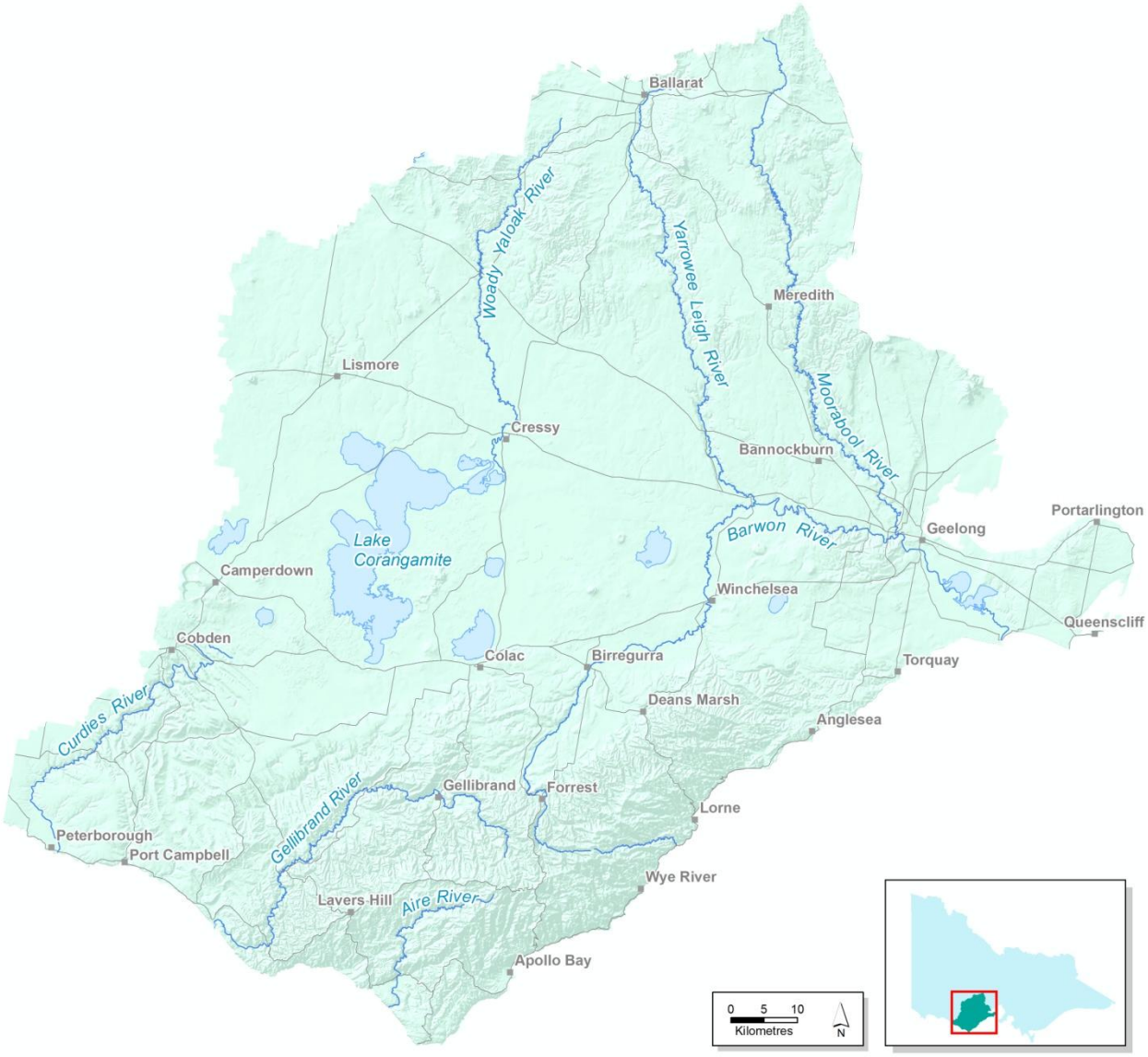
The objectives of the 2019 CCMA social benchmarking survey were to:

1. Better inform staff engagement with rural property owners.
2. Describe the social and farming structure for the region and for each LGA.
3. Gather data to support assessment of progress in the achievement of RCS and NRM programs.
4. Inform understanding of implementation of best-practice NRM by rural property owners.

Allan Curtis led a social benchmarking for NRM survey in the Corangamite region in 2006 (Curtis et al. 2006). There are some items common to those surveys (e.g. attached values, issues of concern, long-term plans). Where social benchmarking surveys have been repeated over time, survey data can provide important additional insights for NRM practitioners, including trends in social structure (i.e. property size, occupational identity, length of residence, extent of absentee ownership, enterprise mix). Longitudinal data are also useful for researchers (e.g. assessing the extent of stability and change in values, beliefs and attitudes) (Toman, Curtis & Mendham 2019).

CCMA staff worked with Allan Curtis to review and revise the 2006 survey. A draft 2019 survey was subsequently pre-tested, including with two groups of rural property owners. A copy of the final 16 page survey booklet is included as Appendix 1.

MAP 1. LOCATION AND EXTENT OF THE CORANGAMITE CMA REGION (MAP PREPARED BY CCMA)



The CCMA sought and obtained support for the social benchmarking survey from local governments in the region. Council/City staff identified a random sample of rural property owners on holdings greater than 10 hectares, with the number in each LGA sample reflecting that LGA's proportion of the total land area in the region [Map 2, Table 1]. The Victoria's Valuer General has identified 10 ha as the property size distinguishing rural and urban land. The intention was to survey approximately 2000 rural property owners.

The research team either undertook the mailout process or liaised with Council/City staff to implement the process. There was an initial mailout (including a cover letter, survey booklet and return envelope) followed by three reminder/thankyou cards; then a second mailout package to non-respondents followed by two reminder/thankyou cards.

Surveys were initially posted to 1900 property owners. After removing return-to-sender, duplicate ownerships, properties that had been sold, owners who were ill or overseas and other acceptable reasons for a non-response, there were 1802 possible respondents. With 644 returned and completed surveys, the response rate for 2019 is 36% [Table 1]. The response rate in 2006 was 50% (482 useable surveys returned from 972 posted).

TABLE 1. CORANGAMITE SURVEY RESPONSE RATE BY LGA, (N=1802, n=644) 2019

LOCAL GOVERNMENT AREA	POSTED	REMOVED	RETURNED	RESPONSE RATE
Ballarat	150	5	57	39%
City of Greater Geelong	200	4	68	35%
Colac Otway	450	59	159	41%
Corangamite	250	4	80	33%
Golden Plains	400	10	142	36%
Moorabool	200	3	59	30%
Surf Coast	250	13	76	32%
Unknown	Nil		3	
Total	**1900**	**98**	**644**	**36%**

The 2019 survey response rate is lower than expected based on the 2006 social benchmarking survey in Corangamite (50%) and past surveys in the Wimmera (e.g. 2017) and North Central regions (e.g. 2014). However, the response rate is consistent with the more recent experience with social benchmarking surveys, including the North Central region (2019). Why the lower than expected response rate and what are the implications for reliability of the data?

There is a trend to lower response rates for surveys of rural property owners in Australia and overseas (e.g. Stedman 2016), particularly for surveys that are not directed to a specific audience (e.g. horse

owners; cattle producers). This trend may reflect “survey fatigue” across societies, concerns about privacy heightened by recent exposure of “data mining” by Facebook and Google, and lessening of ties with and trust in universities and governments. Contemporary trends of increased absentee ownership of rural properties, including by “land bankers” close to Melbourne, and more rural property owners identifying as non-farmers by occupation, appear to be contributing to lower survey response rates in Victoria.

Notes provided by respondents in the Other Comments section suggests that even amongst those who returned surveys, smaller property owners, particularly those with no agricultural enterprises, struggled to see the relevance of the survey. Then there is the reality that many property owners in the Corangamite region are not aware of the CCMA or connected to local NRM groups. Even amongst 2019 survey respondents, four out of 10 said they were not aware of the CCMA before receiving the survey.

Non-respondents may be different to respondents and social researchers are often asked about the impact of non-responses on the reliability of survey data (i.e. ability to generalise from the respondents to the larger population). Experience with social benchmarking surveys suggests that non-respondents are not a homogenous group (i.e. there are many reasons for non-responses) and that a 40% response rate, given more than 500 surveys completed, is likely to provide reliable data (e.g. the recent North Central social 2019). That confidence is based on a number of tests. For example, comparisons of respondents and non-respondents, including using available data for property size (based on LGA lists for both cohorts); and age of farmers (using ABS data for the non-respondent cohort and survey data for respondents).

When reflecting on the reliability of survey data, social researchers can also draw upon established theory. For example, are results consistent with contemporary social theory about the stability of values, or the differences between cohorts based on farmer identity; and explore the extent results are consistent with those of previous studies (e.g. 2006 CCMA survey, 2019 North Central region survey). Those assessments suggest the 2019 Corangamite survey data are reliable. For example, 10 of the 2006 survey topics exploring attached values are repeated in the 2019 survey. As expected, there is a remarkable degree of consistency in the results (i.e. rank order of items and proportion selecting Important/Very important). For example, the top 4 rated items are the same in each survey. In the 2019 survey there are also significant differences across nine of the 15 items based on the four farmer identity cohorts. In each case, these differences are as expected.

A final point is that comparisons of 2006 and 2019 CCMA survey data reveals a number of important trends. For example, in median property size, the proportion those self-identifying as Full-time farmers and the extent of off-property work. Those trends are consistent with a transition to multi-functional social landscapes and with recent social benchmarking survey data for the North Central and Wimmera regions.

In 2013 the CCMA contracted the RMCG consulting group to provide a rural community and land use profile (RMCG 2013). RMCG used telephone interviews to gather data from two cohorts of rural property owners:

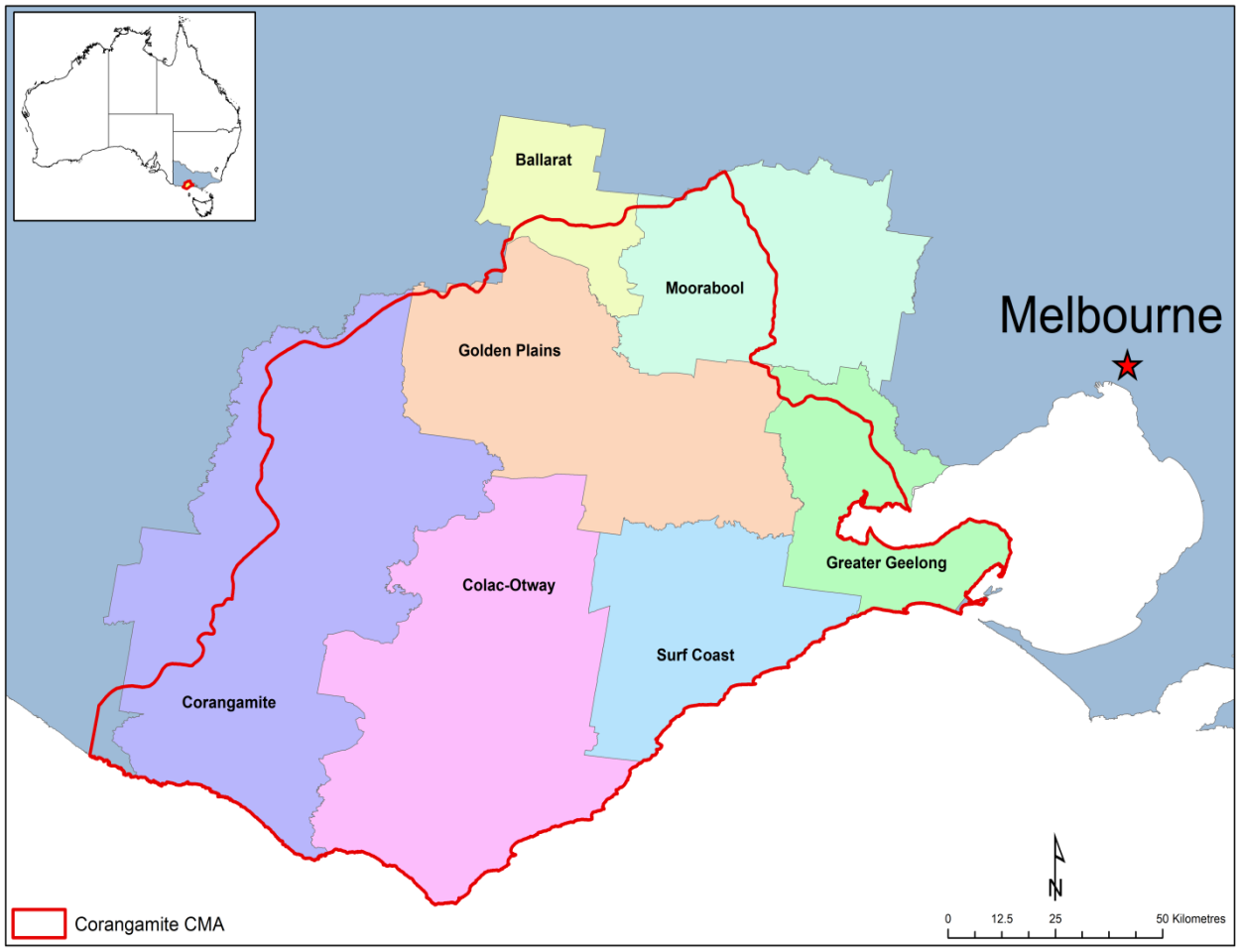
1. 100 property owners identified through white pages telephone lists; and
2. 500 farmers in the region from a list supplied by another consultant.

The RMCG approach, including the items employed, is sound but is likely to produce a sample that under-represented non-farmer and absentee rural property owners. Indeed, a comparison of data in their report with results from the 2006 and 2019 social benchmarking surveys suggests that is what transpired. Assessments of trends over time are therefore based on comparisons of 2006 and 2019 social benchmarking survey data.

The remaining sections of this report (i.e. outside the Executive Summary and Introduction) provide:

1. A summary (tables/figures plus notes) of data for each survey topic that includes a comparison with 2006 data where that is possible.
2. A discussion of relationships between implementation of best-practice NRM and factors expected to influence implementation.
3. Profiles for the seven LGAs.
4. A summary of the additional comments provided by respondents.
5. An explanation of the conceptual framework underpinning the survey [Appendix 1].
6. A brief explanation of how survey data were analysed [Appendix 2].
7. A copy of the 2019 survey [Appendix 3].

MAP 2. LOCAL GOVERNMENT BOUNDARIES FOR THE CORANGAMITE CMA REGION



2 IMPORTANCE OF ISSUES AFFECTING THE DISTRICT

2.1 Introduction

- There is considerable common ground amongst respondents:
  - Most are concerned about a range of NRM issues
  - Similar level of concern across the four farmer identity cohorts for half the issues
  - Where there is a significant difference across farmer identity cohorts, at least 50% of each cohort rates the issue as Important/Very important.
- Those with a stronger farmer identity are more likely to give a higher rating to issues focused on agriculture and those with a weaker farmer identity are more likely to give a higher rating to issues focused on the environment.
- Concern about the risks posed by a threat appear to influence implementation of some best-practices.

Information about the relative importance of contemporary NRM issues will inform RCS development and implementation. There are 19 items in the 2019 survey exploring the importance of issues at the district scale. Five items were also in the 2006 survey [Table 2]. Some issues items (e.g. concern about *Soil acidity*) relate directly to implementation of a best practice (e.g. *applying lime*). Measure of concern about an issue can be considered a measure of concern about a threat to an attached value (e.g. the threat of *Soil acidity* for the attached value of *Property provides an important source of household income*). Appendix 1 provides a detailed explanation of the Conceptual Framework that underpins the survey.

The survey asks respondents to indicate the importance of different issues for their district or property. Those geographies are preferred to LGAs because respondents are expected to be more confident in the knowledge of those more constrained geographies. A district is the area where residents know each other, are in regular contact and there are "ties that bind". Respondents may delineate their local district in different ways but a district will typically be focused around the area serviced by a central place, a school, a sporting club or community group. Prior to the amalgamation of local governments by the Victorian Government from 1994, LGAs were often based on areas where there were strong social connections. That is no longer the case and LGAs often include a number of districts.

In Table 2 there are variations in the proportion of respondents selecting Don't know/Not Applicable (i.e. from Nil to 13%). These variations are as expected (e.g. higher for items related to *windfarms, plantations* and *intensive industries*; and lower for items related to *wildfires* and *pest plants and animals*).

Notations in Table 2 indicate where there is a statistically significant difference across geography (i.e. LGA) and with farmer occupational identity (a proxy for a range of social and farming attributes). Shading is used to indicate items exploring related topics.

The 15 items include some issues where concern is expected to influence implementation of best-practice NRM. For example, concern about *The expected trend to a warmer, drier climate* might underpin a decision to *Upgrade water infrastructure to more effectively use existing water supplies.* There is also evidence that concern about *the Risk to life and property from wildfire* can constrain willingness to *Fence waterways and wetlands to exclude stock access*. Pairwise comparisons have been used to test for these expected relationships and those results are discussed.

FIGURE 1. TOP TEN ISSUES (I.E. THREATS TO VALUES), 2019 (N=644, N=626-635)

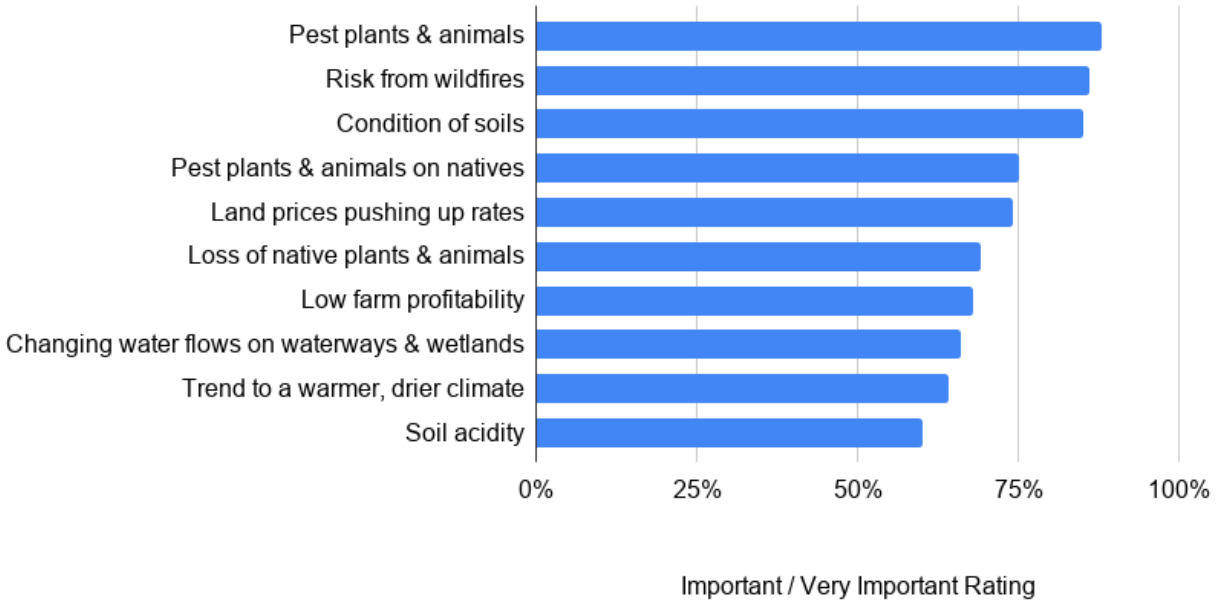


TABLE 2. ASSESSMENT OF ISSUES AT THE DISTRICT SCALE, 2019 (N=644, N=626-635) AND 2006

Issues (i.e. threats to values)	Mean score	Important	Some importance	Not important	NA/ Don't know
Risk to life and property from wildfires ***	4.5	86%	9%	4%	Nil
The condition or health of soils *** ###	4.4 (NA)	85% (27%)	10% (20%)	4% (41%)	1% (12%)
Increasing land prices pushing up Council rates ###	4.2	74%	16%	8%	2%
Management of pest plants and animals	4.1	88%	9%	3%	1%
The impact of pest plants and animals on native plants and animals ###	4.1	75%	16%	7%	2%
Low profitability of farm enterprises *** ###	4.0	68%	16%	10%	6%
The impact of changes in river/stream flows on the health of waterways & wetlands ###	4.0	66%	20%	10%	6%
Loss of native plants and animals ###	3.9	69%	19%	11%	1%
The expected trend to a warmer, drier climate *** ###	3.9	64%	19%	16%	2%
Soil acidity undermining productive capacity of farmland	3.8 (NA)	60% (25%)	23% (22%)	11% (38%)	6% (15%)
Nutrient and chemical runoff reducing water quality *** ###	3.8 (NA)	60% (29%)	22% (18%)	13% (39%)	5% (15%)
Poorly managed areas next to waterways & wetlands that have been fenced to exclude stock	3.6	49%	25%	16%	10%
Ability to engage contractors (e.g. weed spraying, fencing, sowing pastures)	3.5	53%	24%	17%	5%
Impact of large scale forestry enterprises on community viability ***	3.4	42%	23%	22%	13%
Large scale solar farms on productive farming land	3.2	40%	18%	33%	10%
The impact of intensive industries such as piggeries and poultry ***	3.2 (NA)	37% (17%)	23% (13%)	27% (48%)	13% (21%)
The impact of increased number of small properties	3.1	35%	30%	31%	3%
Impact of windfarms on landscape quality/amenity ###	2.8 (NA)	30% (18%	19% (11%)	43% (58%)	9% (14%)
Dams on rural properties reducing runoff to waterways & wetlands ###	2.6	21%	28%	46%	4%

*** Significant difference across LGAs, Kruskal-Wallis rank sum tests, chi-square, p<0.05
Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum tests, chi-square, p<0.05
Green shading for environmental issues. Tan shading for farm business issues; Orange shading for policy related issues. No shading for unclassified issues
() Data for 2006

TABLE 3. SIGNIFICANT DIFFERENCES IN IMPORTANCE OF DISTRICT SCALE ISSUES BY FARMER IDENTITY, 2019 (N=644, N=630-635)

Issues (i.e. threats to values)	Full-time farmer	Part-time farmer	Hobby farmer	Non-farmer
The condition or health of soils	4.5 92%	4.4 85%	4.3 83%	4.1 76%
Increasing land prices pushing up Council rates	4.5 87%	4.1 73%	4.1 71%	3.8 58%
Low profitability of farm enterprises	4.4 86%	4.1 71%	3.9 62%	3.4 45%
The impact of pest plants and animals on native plants and animals	3.9 70%	4.0 77%	4.2 78%	4.3 80%
The impact of changes in river/stream flows on the health of waterways & wetlands	3.7 52%	4.0 68%	4.3 72%	4.1 76%
Loss of native plants and animals	3.6 59%	3.9 69%	4.1 73%	4.3 80%
Nutrient and chemical runoff reducing water quality	3.6 51%	3.7 57%	4.0 66%	4.1 68%
The expected trend to a warmer, drier climate	3.5 53%	4.0 66%	4.0 68%	4.2 75%
Impact of windfarms on landscape quality/amenity	2.9 31%	2.9 32%	2.7 29%	2.4 18%
Dams on rural properties reducing runoff to waterways & wetlands	2.5 16%	2.7 24%	2.8 24%	2.8 26%

Mean scores calculated after removing N/A responses. So mean out of 5
All tests were Kruskal-Wallis rank sum tests with chi-square p values <0.05
Tan shading: items where there is a positive relationship with farmer identity. Green shading: negative relationship with farmer identity

2.2 Key findings

The first observation is that a range of NRM issues are important to most respondents. For example, issues where at least 60% of respondents selected the Important/Very important ratings (11 items), span a mix of social, economic and environmental concerns [Table 2, Figure 1].

Five items from the 2006 survey are included in the 2019 survey [identified in Table 2]. In each case, there is a large increase in the proportion of respondents rating each issue as Important/Very important. For three of these issues (*Soil health*; *Soil acidity*; *Nutrient and chemical runoff*) a majority of respondents now rate these as Important/Very important issues [Table 2].

There are important differences in the issues ratings (by mean scores) across geography (i.e. LGA) and the four farmer identity cohorts. These differences are explained below, but in most instances the difference is across the four farmer identity cohorts (10 out of 15 items).

There are three issues where there is a difference across the LGAs but not by farmer identity: *Risk to life and property from wildfires*; *Impact of large scale forestry*; *Impact of intensive industries*. These differences are as expected. For example, a smaller proportion of respondents in Greater Geelong gave an Important/Very important rating to the threat of wildfires.

For almost all items with a significant difference on mean scores across the four farmer identity cohorts, the difference is linear. For four items shaded light brown in Table 3 the trend is for those with stronger farmer identity to be more likely to rate an issue as Important/Very important. The reverse holds for the six items shaded light green. For example, those with a stronger farmer identity are more likely to give a higher rating to *The condition or health of soils* and *Low profitability of farm enterprises*; whereas those with a weaker farmer identity are more likely to give a higher rating to *The impact of pest plants and animals on native plants and animals* and *Nutrient and chemical runoff reducing water quality*. These differences are largely as expected.

For nine items there is no significant difference across the four farmer identity cohorts [Table 2]; and for seven of the ten items where there is a significant difference, at least 50% of each cohort rates the issue as Important/Very important [Table 3]. These findings suggest there is considerable shared or common ground across the four farmer identity cohorts.

There are 13 items where it is seems reasonable to expect concern about the issue to be reflected in implementation of the NRM best-practices included in the survey, at least over the period of management. It was not expected that concern about windfarms, small properties, solar farms, large scale forestry, intensive industries or dams on rural properties would directly influence implementation.

The results of pairwise comparisons suggest that concern about the risks posed by a threat does influence some management decisions. For example, there is a significant positive relationship between:

- *The condition or health of soil* and five best practices, including *Used minimum tillage*, *Used time controlled or rotational grazing, Used precision farming techniques for cropping, Applied lime to substantial areas, Tested soils for nutrient status*.
- *Risk to life and property from wildfires* (but not for *The expected trend to a warmer, drier climate*) and *Upgraded infrastructure to more effectively use existing water supplies*;
- *Management of pest plants and animals* and *Each year worked to control pest plants outside cropped areas;*
- *The impact of pest plants & animals on native plants & animals* and *Fenced native bush/grasslands to exclude stock access;*
- *Loss of native plants & animals* and *Fenced native bush/grasslands to exclude stock access*;
- *Soil acidity undermining the productive capacity of farmland* and the best-practices, *Used minimum tillage, Used time controlled or rotational grazing* and *Used precision farming techniques for cropping*. But no relationship with *Applied lime to substantial areas*.
- *Poorly managed areas next to waterways & wetlands fenced to exclude stock* and the best-practices, *Planted locally indigenous trees & shrubs along waterways & wetlands, Fenced waterways & wetlands to exclude stock access*.

3 LONG-TERM PLANS FOR YOUR PROPERTY

3.1 Introduction

The 14 items in this topic explore the long-term plans of property owners [Table 4]. Long-term is defined as the next 10 years. Ten items were included in the 2006 survey. Two additional items explore family succession plans and these items were also included in the 2006 survey [Tables 5&6].

- There is considerable diversity in the long-term plans of survey respondents.
- There is a remarkable degree of consistency in the long-term plans between the 2006 and 2019 surveys and across the four farmer identity cohorts.
- Most respondents say *I will continue to live on the property* and the median age of rural property owners has increased from 55 years in 2006 to 61 years in 2019. NRM practitioners will need to consider how they support an ageing cohort of owners.
- Most respondents say *Ownership of the property to stay within the family* but there is low and declining expectation of family succession. NRM practitioners will need to consider the support they offer a substantial number of new owners who will typically purchase smaller properties and not be farmers by occupation.
- There is evidence that long-term plans, including the intention for family succession, expand land owned/managed and to sell, influence implementation of best-practice NRM.

3.2 Key findings

About two-thirds of all respondents indicate their long-term plans include *I will continue to live on the property* and only 16% of respondents indicate they intend to *Move off the property around/soon after reaching age 65 years* [Table 4, Figure 2]. Consistent with this intention, the median age of rural property owners has increased from 55 years in 2006 to 61 years in 2019. **It seems that NRM practitioners in the region will need to consider how they support an ageing cohort who will typically be less able to actively manage difficult terrain.**

While most respondents expect *Ownership of the property to stay within the family*, the low and declining level of expectations of family succession [Table 5] suggests this is unlikely. **It seems that NRM practitioners in the region will also need to consider the support they offer a substantial number of new owners who will typically purchase smaller properties and not be farmers by occupation.**

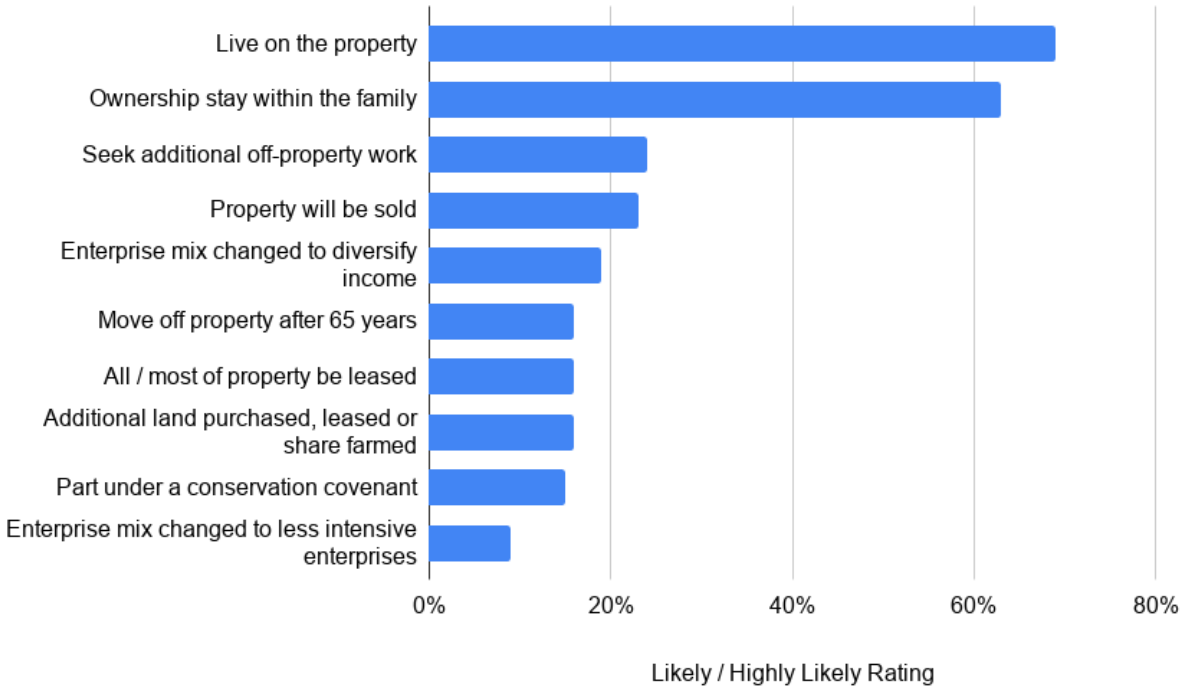


FIGURE 2. TOP TEN LONG-TERM PLANS, 2019 (N=644)

Only two long-term options are selected as Likely/Highly likely by >25% of respondents [Table 4]. This observation suggests **there is a diversity of long-term plans amongst rural property owners.** For example, about 10% of respondents intend to change to a more intensive enterprise mix and 10% intend to change to a less intensive mix; 16% of respondents intend to increase the area of land they manage whereas another 16% say some part of their property will be leased to others [Table 4].

Compared to results in other social benchmarking surveys there is **remarkably little variation in long-term plans across the four farmer identity cohorts or by LGA** [Table 4]. For example, in the recent North Central region social benchmarking survey there is a significant difference across the four farmer identity cohorts for 11 of 12 items in this topic (i.e. no difference only for *The property will be subdivided and a large part of the property sold*).

TABLE 4. LONG-TERM PLANS, 2019 (N=644, N=628 TO 615) AND 2006

Long term plans	Mean	Likely	Unsure	Unlikely	NA
I will live on the property ***	4.0 (NA)	69% (66%)	12% (8%)	16% (22%)	3% (4%)
Ownership of the property will stay within the family	3.9 (NA)	63% (63%)	18% (13%)	17% (20%)	1% (4%)
I will seek additional off-property work *** ###	2.4 (NA)	24% (19%)	11% (8%)	49% (53%)	17% (21%)
The property will be sold	2.4 (NA)	23% (22%)	17% (13%)	58% (61%)	2% 3%)
The enterprise mix will be changed to diversify income sources	2.4	19%	22%	50%	9%
I will move off property around/soon after reaching age 65 years	2.3	16%	16%	52%	15%
All or most of the property will be leased ***	2.1 (NA)	16% (12%)	13% (14%)	64% (66%)	6% (7%)
Some part of the property will be placed under a conservation covenant ###	2.1 (NA)	15% (11%)	15% (13%)	65% (62%)	4% (14%)
The enterprise mix will be changed to less intensive enterprises	2.1	9%	22%	58%	10%
Additional land will be purchased, leased or share farmed ###	2.0 (NA)	16% (23%)	13% (16%)	65% (54%)	6% (8%)
The enterprise mix will be changed to more intensive enterprises	2.0	11%	18%	62%	9%
All or most of the property will be share farmed	1.8 (NA)	10% (8%)	11% (11%)	72% (72%)	8% (10%)
The property will be subdivided and a large part of the property sold	1.8 (NA)	9% (9%)	11% (7%)	73% (73%)	7% (12%)

Mean scores calculated after removing NA responses. So mean out of 5

*** Significant difference across LGAs, Kruskal-Wallis rank sum tests, chi-square, $p<0.05$

Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum tests, chi-square, $p<0.05$

Blue shading: intention to move away from full-time farming by moving off property, sell, lease, adopt less intensive approaches, take more off-property work.

() Data for 2006

TABLE 5. FAMILY ENGAGEMENT IN PROPERTY SUCCESSION, 2019 (N=644, N=603) AND 2006

Do you have family members interested in taking on your property in the future?	Yes	Unsure/Too early to know	No
All respondents	36% (49%)	33%	31%

() 2006 data

TABLE 6. STAGE IN PLANNING PROPERTY SUCCESSION BY FARMER IDENTITY, 2019 (N=286) AND 2006

Farmer identity cohort	Not started	Early stages	About halfway	Well advanced	Completed/ ongoing
Full-time farmers	27%	25%	12%	20%	17%
Part-time farmers	48%	26%	4%	6%	6%
Hobby farmers	54%	21%	7%	6%	11%
Non-farmers	56%	18%	4%	7%	16%
All respondents	45% (46%)	21% (29%)	8% (8%)	13% (10%)	13% (8%)

() 2006 data

The most obvious finding from a comparison of 2019 and 2006 data is the degree of stability in the intentions of respondents. For example, the rank order of the 10 items in 2006 is almost identical to the rank order of those items in 2019. And for most items the proportion selecting the Likely/Highly Likely option is very similar. The exception is *Additional land will be purchased, leased or share farmed* and in 2019 a much smaller proportion of respondents said it was Likely/Highly Likely they would do this.

The main exception is *Additional land will be purchased, leased or share farmed.* This item was ranked three out of the 10 items in 2006 and in 2019 is ranked seven of 10 items. As indicated in Table 4, there is a significant difference in intentions on this item with the extent of farmer identity (e.g. Full-time farmer 27% Likely/Highly likely, Part-time farmer 23%, Hobby farmer 7%, Non-farmer 6%). With fewer Full-time farmers in 2019 (i.e. 53% in 2006 and 33% in 2019) it is not surprising that the proportion of respondents selecting this option has declined (i.e. 23% to 16% in 2019) [Table 4].

The other item where there is notable change across the two survey periods is for *I will seek additional off-property work* [Table 4]. Again, there is a significant difference in intentions with the extent of farmer identity (Full-time farmer 11% Likely/Highly likely, Part-time farmer 35%, Hobby farmer 33%, Non-farmer 24%).

There is a significant negative relationship between farmer identity and intention to *Place some part of the property under a conservation covenant* (i.e. Full-time farmer 10% Likely/Highly likely, Part-time farmer 17%, Hobby farmer 14%, Non-farmer 22%).

There are three items where there is a significant difference across the LGAs [Table 4]. While statistically significant, the proportion selecting Likely/Highly likely for *I will seek additional off-property work* only varies from 20% to 25% across the seven LGAs. The difference for the item *All or most of the property will be leased* is between Surf Coast and Ballarat (~10% Likely/Highly likely) and the other LGAs (from 15% to 20% Likely/Highly likely). For the item I will live on the property the difference is between Ballarat, Surf Coast and Moorabool (75% to 80% Likely/Highly likely) and Colac Otway, Corangamite, Greater Geelong and Golden Plains (60% to 70% Likely/Highly Likely).

Only 36% of respondents say they have *Family members interested in taking on your property in the future.* This proportion is substantially lower than in 2006 (49%). Of those respondents, just under half have not started a succession plan [Table 6]. This proportion is almost identical to that in 2006. There is a significant, positive relationship between farmer identity and developing a succession plan and about 70% of Full-time farmers have at least started a succession plan [Table 6].

To explore the influence of long-term plans on implementation of best-practice NRM the focus is narrowed to three items:

1. *Ownership of the property will stay within the family*
2. *Additional land will be purchased, leased or share farmed*
3. *The property will be sold*

The assumptions are that:

- Those who expect the property to stay within the family will be more likely to implement best-practice NRM;
- Those intending to sell will be less likely to implement best-practice NRM; and
- Those intending to expand will be more likely to implement best-practice NRM, especially those practices linked to sustainable agriculture.

Pairwise comparisons reveal that only Additional land will be purchased, leased or share farmed is significantly related with farmer identity.

The 2019 survey includes 17 items exploring NRM best-practice implementation. There are three time frames: full period of management, last three years, next three years. Three additional items explore adaptation to climate change in the past 12 months. Those items are:
In the past 12 months have you changed your on-property operations as a result of considering:

- *Climate change (financial and on-property)?*
- *Opportunities to capture carbon (e.g. by revegetation, soil management)?*
- *Opportunities to reduce carbon emissions (e.g. solar, wind, gravity systems)?*

Ownership of the property will stay within the family

- **There is a significant positive relationship between this long-term plan and most of the NRM best-practice** (i.e. 13 of 17 items over past 3 years; 11/17 next 3 years) and climate change adaptation items (2 of 3 items for past 12 months).
- These significant positive relationships occur **across both biodiversity conservation** (4 of 7 items for past 3 years; 6/7 next 3 years) and **sustainable farming best-practices** (9/10 items past 3 years, 5/10 next 3 years); and for adaptation to climate change that involve *capturing carbon* and *reducing carbon emissions* over past 12 months.

- **The time frame appears critical.** There is only one best-practice item (*Used minimum tillage*) where there is any relationship with this long-term plan over the full period of management. It seems there is a trend to increased implementation over time.
- The best-practice items include those that may involve the application of few resources but in many instances, action requires considerable planning, effort and funds (e.g. *Applied Lime*, *Established off-stream watering points for stock*, *Upgraded infrastructure to more effectively use existing water supplies*, *Prepared a nutrient map for all/most of the property*).

Additional land will be purchased, leased or share farmed

- **There is a significant positive relationship between this long-term plan and most of the NRM best-practice items** (i.e. 8/17 for full period of management; 15/17 for past 3 years; 16/17 for next 3 years). There is a significant positive relationship with one of the three items exploring adaptation to climate change: *opportunities to capture carbon.*
- **The time frame appears critical for the biodiversity focused NRM best-practices**: significant relationship only occur for the past three years (5/7 items) and the next three years (6/7 items).
- **The time frame is not critical for NRM practices focused on sustainable farming** (e.g. 8/10 items for full period of management; 10/10 past 3 years; 10/10 next 3 years).
- **There is evidence suggesting farmer identity is mediating (i.e. intervening to influence) relationships between the intention to expand the property size and implementation.** There is a significant positive relationship between intention to expand the property area and farmer identity [Table 4]. As discussed in a later section, there is a significant positive relationship between farmer identity and implementation of most NRM best-practice items.

The property will be sold

- **As expected, the significant relationships between intention to *Sell the property* and best-practice NRM are negative.** That is, those intending to *Sell* in the next 10 years are less likely to implement best-practice NRM.
- Those negative relationships occur for items exploring implementation of biodiversity and sustainable farming practices.
- **The time frame appears to be critical.** There are few items where there is a relationship with intention to *Sell* the property and implementation over the full period of management (2/17 items). However, there is a positive relationship with most items for more contemporary periods: 12/17 for past 3 years; 12/17 next three years; and 2/3 items exploring adaptation to climate change over past 12 months (*capturing carbon* and *reducing carbon emissions*).

4 ATTACHED VALUES

4.1 Introduction

An individual's values (i.e. guiding principles or held values; and values attached to their property) are assumed to be relatively stable over time. Our values develop as a result of powerful socialising forces (i.e. family, peers, school, media, church). Of course, the nature and impact of these forces changes over time and there are other societal trends (e.g. information and transport technologies and social movements) shaping the social landscapes in regional areas of Victoria. A more detailed explanation of these ideas is provided in Appendix 1, Conceptual Framework.

Only attached values were explored in the 2006 survey and given space limitations and recent results from social benchmarking surveys the focus in the 2019 CCMA region survey is again on attached values. However, both the 2006 and 2019 surveys included one item drawn from a stewardship ethic scale: *Reduced production in the short-term is justified where there are long-term benefits to the environmen*t.

In 2019 the attached values topic included 15 items, 10 of these are repeated from 2006 [Table 7]. Results for the stewardship ethic item are included in Table 7. Of the top five rated values items in 2006, only one is included in the 2019 survey: *It is an attractive place to live/ Natural setting makes it an attractive place to live.* However, the 2019 items do explore a range of social, economic and environmental values. The response options in the 2019 and 2006 surveys are identical, so results are directly comparable.

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- A mix of economic, social and environmental values are important to most respondents.
- There is considerable overlap in the values that are important to most respondents and these are consistent with the direction of contemporary NRM.
- Despite the extent of common ground there are significant differences in values across the four farmer identity cohorts. Those with a stronger farmer identity give a higher rating to farming as a way of life and the farm business enterprise. Those with a weaker farmer identity give a higher rating to native vegetation and the measure of a stewardship ethic.
- There are significant relationships between attached values and implementation of best-practice NRM. A key point is that those relationships appear to be mediated by farmer identity in that those with a stronger farmer identity are more likely to implement best-practices.

FIGURE 3. ATTACHED VALUES, 2019 (N=663, N=630 TO 625)

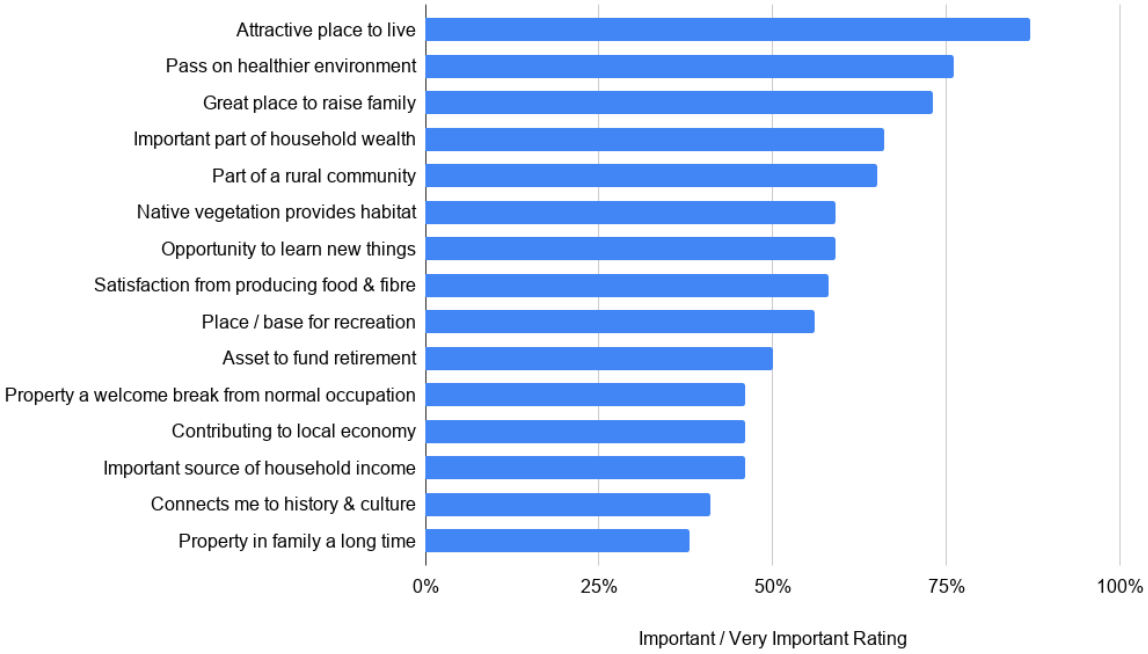


TABLE 7. VALUES ATTACHED TO PROPERTY, 2019 (N=663, N= 630 TO 625) AND 2006

Attached values	Mean	Important	Some importance	Not important	Not Applicable
Natural setting makes this an attractive place to live ###	4.5 (NA)	87% (78%)	6% (11%)	4% (6%)	2% (5%)
A great place to raise a family ***	4.3 (NA)	73% (67%)	10% (9%)	7% (9%)	4% (15%)
Ability to pass on a healthier environment to future generations	4.2	76%	15%	6%	3%
An asset that is an important part of household wealth ###	3.9	66%	15%	13%	6%
Being part of a rural community ###	3.8 (NA)	65% (62%)	20% (21%)	12% (15%)	3% (2%)
Native vegetation provides habitat for native animals ###	3.8 (NA)	59% (40%)	20% (23%)	15% (30%)	6% (8%)
Satisfaction from producing food and fibre for others ###	3.8 (NA)	58% (51%)	16% (20%)	13% (18%)	14% (11%)
Opportunity to learn new things	3.7 (NA)	59% (54%)	23% (29%)	12% (17%)	7% (1%)
Working on the property is a welcome break from my normal occupation ###	3.7 (NA)	46% (30%)	9% (11%)	16% (15%)	29% (44%)
A place or base for recreation ###	3.6 (NA)	56% (45%)	22% (22%)	18% (27%)	5% (6%)
An asset that will fund my retirement	3.5 (NA)	50% (54%)	15% (18%)	23% (20%)	12% (8%)
Contributing to the local economy by providing work and supporting local businesses *** ###	3.5	46%	16%	17%	20%
Provides an important source of household income ###	3.4 (NA)	46% (52%)	12% (14%)	25% (25%)	18% (10%)
The property has been in my family a long time	3.3	38%	11%	24%	27%
Connects me to history and cultural heritage	3.1	41%	20%	33%	7%
Stewardship ethic item Reduced production in the short-term is justified where there are long-term benefits to the environment *** ###	**Mean** 3.6 (NA)	**Agree** 54% (50%)	**Unsure** 30% (30%)	**Disagree** 11% (17%)	**Not Applicable** 5% (3%)

Note: Mean scores calculated after removing N/A responses. So mean out of 5

*** Significant difference across LGAs, Kruskal-Wallis rank sum test, chi-square, p<0.05

Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test, chi-square, p<0.05

Orange shading: social values. Tan shading: economic values. Green shading: environmental values.

() 2006 survey data

4.2 Key findings

There is a mix of economic, social and environmental values in the top five items in the attached values topic and eight of 15 items where close to 60% or more provided an Important/Very important rating. And over half of all respondents Agree/Strongly agree with the item exploring a stewardship ethic [Table 7, Figure 3]. **There is therefor much common ground or shared values amongst the respondents and with the direction of contemporary NRM policies and strategies and the values of most NRM staff.**

There is evidence of change in the rank order of items and the proportion selecting the Important/Very important rating for items included in both surveys. Those trends are consistent with the shift towards multi-functional landscapes. For example:

- The highest ranked items in both surveys are the *Natural setting makes this an attractive place to live* and *A great place to raise a family*. In 2019 there is a substantial increase in the proportion of respondents giving these items Important/Very important ratings.
- *Native vegetation provides habitat for native animals* has moved up from a ranking of nine in 2006 to equal three in 2019. The proportion of respondents selecting the Important/Very important rating has increased substantially from 40% to 59%.
- *Provides an important source of household income* has moved down from a ranking of six in 2006 to 10 in 2019, although there has been little change in the proportion of respondents selecting the Important/Very important rating.
- *Opportunity to learn new things and* A place or base for recreation have similar rankings in both surveys. The proportion of respondents selecting the Important/Very important rating has increased substantially for *A place or base for recreation*.

There are significant differences between the farmer identity cohorts for most items (i.e. nine of 15 attached values items plus the Stewardship ethic item) and these are explored in Table 8. Those differences are mostly as expected and include:

1. Positive linear relationships between farmer identity and the importance attached to five items (blue shading in Table 8). These items focus on farming as a way of life and the farm business enterprise.
2. There is a negative relationship between farmer identity and importance attached to two items focused on the importance of native vegetation; the item exploring a Stewardship ethic, *Reduced production in the short-term is justified where there are long-term benefits to the environmen*t (shaded green in Table 8); and two items focused on amenity values (shaded orange).

Six of the 15 attached values items were selected to explore for significant relationships with best-practice NRM implementation over the full period of management and the three items exploring adaptation to climate change over the past 12 months. The six values items included two reflecting amenity, economic and environmental values; and items with positive, negative and no relationship with farmer identity. The six items are:

1. *Provides an important source of household income*
2. *Satisfaction from producing food and fibre for others*
3. *Opportunity to learn new things*

4. *Place or base for recreation*
5. *Ability to pass on a healthier environment to future generations*
6. *Native vegetation provides habitat for native animals*

The key findings from this analysis are:

- **There are significant relationships between the six items and best-practice NRM implementation [Table 9].** There is also evidence of both positive and negative relationships between the six items and implementation [Table 9].
- **The extent and nature of those relationships appears to be mediated by farmer identity.** As explained in a later section of the report, there is a significant positive relationship between farmer identity and each of the 10 sustainable farming best-practice items (over the full period of management).
    - Relationships between values items and best-practice items are often for sustainable farming best-practices [Table 9].
    - The four values items with the largest number of significant relationships with best-practice items also have a significant relationship with farmer identity [as identified in Table 9 and details of each relationship is provided in Table 8].
- There are few significant positive relationships between the two items focused on amenity/recreation values and best-practice NRM implementation, at least over the full-period of management. Indeed, for the item, *Opportunity to learn new things*, there is no significant relationship with any of the 17 best-practice items over the full period of management. However, there are significant positive relationships between this item and the three items exploring adaptation to climate change over the past 12 months [Table 9]
- **Many of the relationships with best-practice items and the amenity/recreation values item, *A place or base for recreation* are negative. These negative relationships are typically for sustainable farming practices [Table 9].** That is, those giving a higher rating to this value are less likely to implement many sustainable farming practices. This pattern is not surprising given there is a significant negative relationship between this item and farmer identity [Table 8]. However, there are positive relationships between this amenity/recreation values item and one environmental best-practices [Table 9].
- **The attached values item exploring the importance of the property as an *Important source of household income*, which in turn is associated with stronger farmer identity, doesn't appear to be a barrier to implementation of best-practice NRM focused on environmental management** [Table 9].
- There is not a significant positive relationship between the stewardship ethic item and any of the seven best-practice items focused on environmental management over the full-period of management. There is, however, a significant positive relationship between this item and one of the three items exploring adaptation to climate change in the last 12 months: *Have you changed your financial or on-property operations as a result of considering climate change?*

TABLE 8. SIGNIFICANT DIFFERENCES IN VALUES ATTACHED TO THE PROPERTY BY FARMER IDENTITY, 2019 (N=644, N= 630 TO 628)

Values attached to the property	Full-time farmer	Part-time farmer	Hobby farmer	Non-farmer
Provides an important source of household income	4.5 89%	3.3 44%	2.6 20%	2.2 10%
An asset that is an important part of family wealth	4.4 87%	3.9 66%	3.7 57%	3.3 47%
Natural setting makes this an attractive place to live	4.3 84%	4.6 87%	4.7 93%	4.7 87%
Satisfaction from producing food and fibre for others	4.2 80%	4.0 70%	3.5 50%	2.8 18%
Being part of a rural community	4.2 76%	4.0 73%	3.6 60%	3.4 46%
Contributing to the local economy by providing work and supporting local businesses	4.0 75%	3.6 56%	3.0 31%	2.8 16%
Native vegetation provides habitat for native animals	3.4 45%	3.8 65%	4.3 64%	4.2 71%
A place or base for recreation	3.3 39%	3.4 48%	4.0 77%	4.1 71%
Working on the property is a welcome break from my normal occupation	2.6 15%	4.0 60%	4.1 72%	4.0 55%
Stewardship ethic item Reduced production in short-term is justified where there are long-term benefits to the environment	3.3 41%	3.7 63%	3.8 60%	4.0 65%

Mean scores calculated after removing N/A responses. So mean out of 5
All tests were Kruskal-Wallis rank sum tests with chi-square p values <0.05
Blue shading: positive linear relationship with farmer identity; Orange shading: negative linear relationship with farmer identity (fully or partially across cohorts)

TABLE 9. RELATIONSHIPS BETWEEN ATTACHED VALUES AND BEST-PRACTICE NRM, 2019 (N=644)

Best-practice NRM	Amenity/Recreation values		Economic values		Environmental values	
	Learn new things	Place/base recreation	Source of income	Satisfaction producing food & fibre	Pass on healthier environment	Native veg habitat native animals
Best-practice NRM over full period of management						
Environment (7 items)	Nil	1 Yes +	5 Yes +	Nil	2 +	2 +
Sustainable farming (10 items)	Nil	6 Yes –	10 +	10 +	2 +	1 –
Response to climate change challenge past 12 months by changing on-property operations						
***To climate change (1 item)**	Yes +	No	No	No	Yes +	No
To capture carbon (1 item)	Yes +	No	No	No	Yes +	Yes +
To reduce emissions (1 item)	Yes +	No	No	No	Yes +	No

*This item: *Have you changed your financial or on-property operations as a result of considering climate change?*
Results of pairwise comparisons (so just two variables) using Chi square and Kruskal-Wallis rank sum tests, chi-square, p values <0.05
+ Significant positive relationships. – Significant negative relationships.

5 BELIEFS, ATTITUDES AND CONFIDENCE IN BEST-PRACTICES

5.1 Introduction

The Your Views topic in 2019 comprised 26 items exploring beliefs related to climate change; beliefs about private property rights; attitudes about NRM policies, including the social acceptability of willow removal and rock removal; confidence in best-practices; commitment to a personal norms focused on participation in NRM groups; and trust in the CCMA. Trust items are covered in the following section. Only eight of these items were included in the 2006 survey [Tables 10, 11, 12].

Response options for the Your Views topics are the same as in both 2019 and 2006, so results are comparable. The five response options (there are six with Not Applicable/Don't know) are collapsed into three categories (Agree/Strongly agree, Unsure/Neither agree or disagree) and Disagree/Strongly disagree). Mean scores for each item don't include the NA/Don't know responses.

5.2 Beliefs about climate change

Two items in the 2019 survey explore beliefs about human induced climate change:

- *Human activities are influencing changes in climate;* and
- *I'm confident landholders in this region can adapt to expected future changes in rainfall patterns.*

Those items were not included in the 2006 Corangamite survey.

The 2019 survey also included three items exploring responses to climate change: *In the past 12 months have you changed your financial or on-property operations as a result of*:

- *Considering climate change;*
- *Opportunities to capture carbon (e.g. by revegetation, soil management); and*
- *Opportunities to reduce emissions* (e.g. solar, wind, gravity systems) [Table 10].

Respondents were only able to select from Yes or No.

- Most respondents believe that humans are affecting climate.
- Stronger farmer identity is associated with less acceptance of human induced climate change.
- There is limited evidence that belief in climate change influences implementation of best-practice NRM.
- Irrespective of their belief in climate change, rural property owners are taking action consistent with government policies and strategies to address climate change.
- Farmer identity is mediating most of the relationships between belief in human induced climate change and implementation of sustainable agriculture best-practice. Stronger farmer identity is associated with increased adoption of all agriculture best-practices and less acceptance of human induced climate change.

TABLE 10. BELIEFS ABOUT CLIMATE CHANGE AND RESPONSES PAST YEAR, 2019 (N=644, N= 604-593)

Belief about climate change	Mean	Agree	Unsure	Disagree	NA/Don't know
Human activities are influencing changes in climate *** ###	3.9	65%	21%	12%	2%
I'm confident landholders in this region can adapt to expected changes in rainfall patterns *** ###	3.7	59%	29%	8%	4%
In the past 12 months have you changed your financial or on-property operations as a result of considering:					**% Yes**
Climate change ###					13%
Opportunities to capture carbon (e.g. by revegetation, soil management)					13%
Opportunities to reduce carbon emissions (e.g. solar, wind, gravity systems)					18%

Mean scores calculated after removing N/A responses. So mean out of 5
*** Significant difference across LGAs, Kruskal-Wallis rank sum test, chi-square, p<0.05
Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test, chi-square, p<0.05

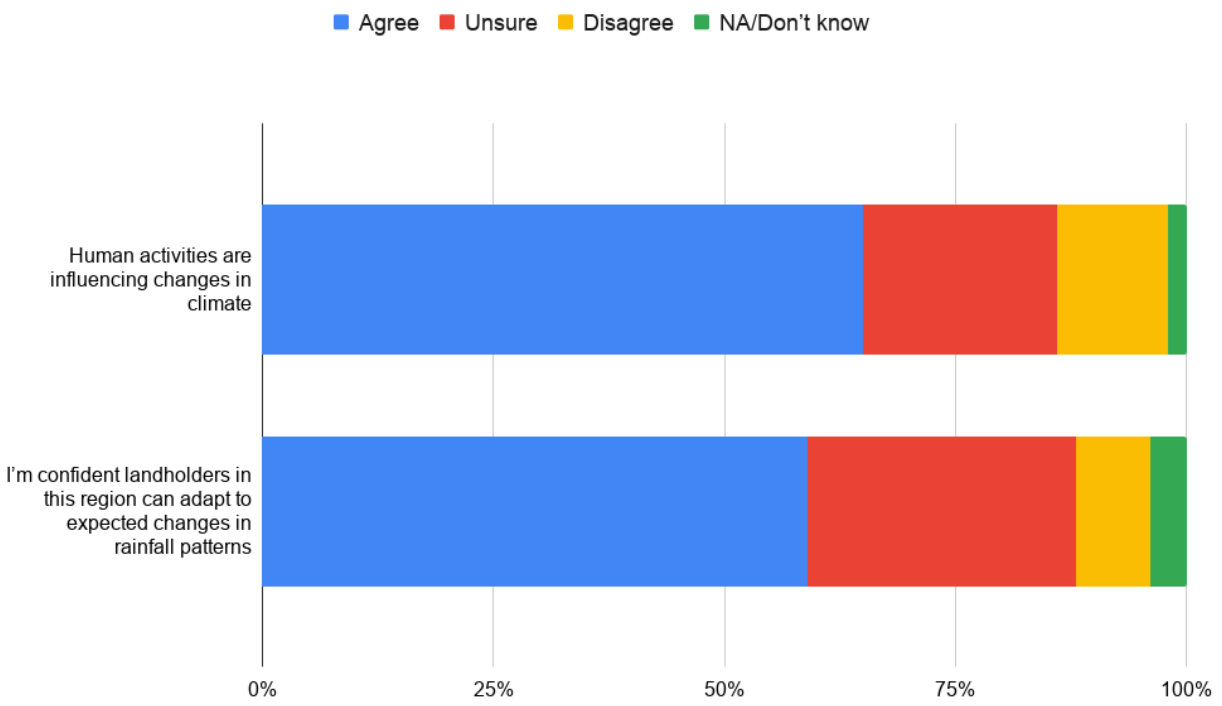


FIGURE 4. BELIEF IN CLIMATE CHANGE, 2019 (N=644, N= 604-593)

TABLE 11. SIGNIFICANT DIFFERENCES IN BELIEFS ABOUT CLIMATE CHANGE AND RESPONSES PAST YEAR BY FARMER IDENTITY, 2019 (N=644, N=604 TO 593)

Belief about climate change	Full-time farmer	Part-time farmer	Hobby farmer	Non-farmer
I'm confident landholders in this region can adapt to expected changes in rainfall patterns	3.9 73%	3.7 59%	3.5 53%	3.4 43%
Human activities are influencing changes in climate	3.5 51%	3.9 65%	4.1 76%	4.3 78%
In the past 12 months have you changed your financial or on-property operations as a result of considering:				
Climate change	15% Yes	16% Yes	15% Yes	5% Yes

Mean scores calculated after removing N/A responses. So mean out of 5
Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test, chi-square, p<0.05
Orange shading: negative linear relationship. Blue: positive (mostly linear) relationships.

The first finding is that almost **two in three respondents acknowledge that humans are changing the climate** [Table 10, Figure 4]. Respondents are slightly less likely to believe that rural property owners in their region can adapt to expected changes in rainfall patterns [Table 10].

There are significant differences across the seven LGAs for both items [Table 10]. The key difference is that almost three in four respondents in Ballarat and Golden Plains say they believe in human induced climate change; about two in three for Greater Geelong, Moorabool and Surf Coast; and just over one in two for Colac Otway and Corangamite.

There are significant differences across the farmer identity cohorts [Table 11]. Those with stronger farmer identity are less likely to accept that *Human activities are influencing changes in climate;* but are more likely to agree that *I'm confident landholders in this region can adapt to expected changes in rainfall patter*ns [Table 11].

Less than one-in-five of the 2019 respondents said they had *changed their financial or on-property operations in the past 12 months as a result of considering the three climate-related adaptation items* [Table 10].

There are 11 items where it seems reasonable to expect belief in human induced climate change will lead to implementation of best-practice NRM. Over the full period of management there is no significant positive relationship between the item measuring belief in human induced climate change and a related environmental best-practice item. That pattern persists for implementation of best-practices over the past three years and intentions for the next three years. There is a significant relationship with four sustainable agriculture best-practice items over the full-period of management but these are all negative relationships. That is the case even for the item exploring *Upgraded infrastructure to more efficiently use existing water supplies*.

It seems that farmer identity is mediating most of the relationships between belief in human induced climate change and implementation of sustainable agriculture best-practice. Stronger farmer identity is associated with increased adoption of all ten sustainable agriculture best-practices (across the three time periods) and less acceptance of human induced climate change.

There is a significant positive relationship between belief in human induced climate change and two of the three items exploring adaptation to climate change in the past 12 months:

- *In the past 12 months have you changed your financial or on-property operations as a result of considering climate change;* and
- *In the past 12 months have you changed your on-property operations as a result of considering opportunities to reduce emissions* (e.g. solar, wind, gravity systems).

5.3 Beliefs about private property rights

The 2019 survey includes three items exploring beliefs/attitudes about the primacy of private property rights [Table 12]. Two of these items were included in the 2006 survey [Table 12].

- Most respondents acknowledge they have a duty of care for biodiversity on their property and that proportion of respondents has increased since 2006.
- Somewhere between a third and a half of respondents believe that their rights as private property owners trump their responsibilities to other property owners or the environment.
- Property owners who are more concerned about their private property rights are less likely to trust the CCMA or other government agencies.

TABLE 12. BELIEFS ABOUT PRIVATE PROPERTY RIGHTS, 2019 (N=644, N=625 TO 621) AND 2006

Belief about private property rights	Mean	Agree	Unsure	Disagree	NA/Don't know
It is reasonable for the wider community to expect that landholders will act in ways that will not harm native plants & animals ###	3.8 (NA)	72% (54%)	16% (32%)	11% (24%)	1% (2%)
Landholders should be able to harvest rainfall on their property, even if that action reduces stream flows ###	3.6 (NA)	56% (69%)	25% (17%)	16% (13%)	3% (1%)
Landholders should be able to develop their property even if that results in the loss of native grasslands *** ###	3.1	38%	30%	29%	2%

Mean scores calculated after removing N/A responses. So mean out of 5
*** Significant difference across LGAs, Kruskal-Wallis rank sum test, chi-square, p<0.05
Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test, chi-square, p<0.05
() 2006 survey data

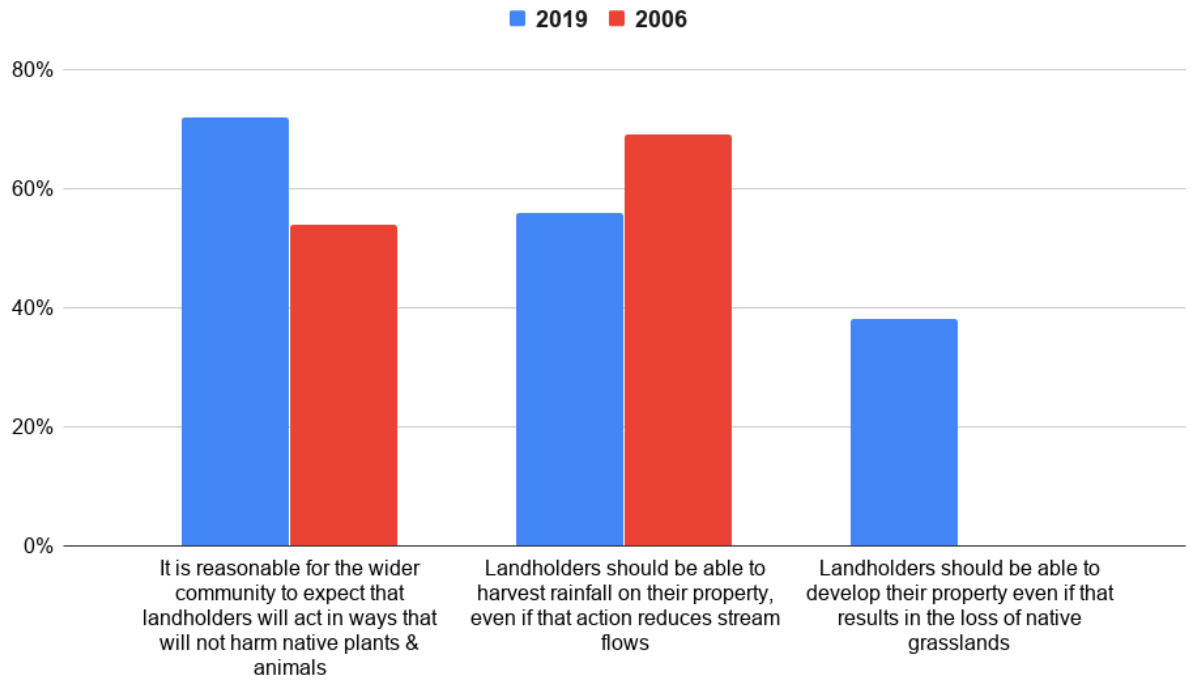


FIGURE 5. BELIEFS ABOUT PRIVATE PROPERTY RIGHTS (AGREE-STRONGLY AGREE), 2019 (N=644, N=625 TO 621)

Almost three in four respondents acknowledge they have a duty of care for biodiversity. The proportion of respondents who Agree/Strongly agree that they have a duty of care for biodiversity has increased from 54% in 2006 to 72% in 2019 [Table 12, Figure 5]. Although there is a significant negative relationship with farmer identity, most Full-time farmers accept they have a duty of care for biodiversity [Table 13].

There is also a substantial reduction in the proportion of respondents who Agree/Strongly agree that private property rights trump the wider public good. The proportion of respondents who Agree/Strongly agree that *Landholders should be able to harvest rainfall on their property, even if that action reduces stream flows* has decreased from 69% in 2006 to 56% in 2019 [Table 12].

However, commitment to a duty of care for biodiversity appears to wane when the context is narrowed to specific NRM topics. For example, over half of all respondents agree that *Landholders should be able to harvest rainfall on their property, even if that action reduces stream flows*; and over a third of all respondents agree that *Landholders should be able to develop their property even if that results in the loss of native grasslands* [Table 12].

There are no significant relationships between commitment to a duty of care for biodiversity and implementation of any of the seven environment best-practices over the full period of management

or the past three years. All of the very few significant relationships between a duty of care for the environment and implementation of the 10 best-practice agriculture items are negative. Again, it seems that farmer identity is mediating the latter set of relationships.

There is a significant positive relationship between commitment to a duty of care for biodiversity and *In the past 12 months have you changed your on-property operations as a result of considering opportunities to capture carbon (e.g. by revegetation, soil management).*

There are no significant relationships between concerns about private property rights (based on responses to the item*, Landholders should be able to harvest rainfall on their property, even if that action reduces stream flows* and implementation of any of the seven environment best-practices over the full period of management or the past three years. There is a significant relationship with this item and two of the 10 best-practice agriculture items (*Applied lime*; and *Used minimum tillage*) for the full period of management. There is also a significant relationship between commitment to private property rights and *In the past 12 months have you changed your on-property operations as a result of considering opportunities to capture carbon (e.g. by revegetation, soil management)*. For the three items, more concern about private property rights is associated with increased likelihood of implementation. Again, it seems that farmer identity is mediating these results.

It is reasonable to assume that property owners who are more concerned about their private property rights are less likely to trust the CCMA or other government agencies responsible for ensuring that wider public interests are protected. It is also probable that those more concerned about their property rights are less predisposed to trust others. The results of pairwise comparisons suggest these assumptions are valid.

- Acceptance of a *duty of care for* biodiversity is associated with more trust in the CCMA.
- Those believing property owners *should be able to harvest rainfall even if that reduces stream flows or develop their properties even if those actions result in the loss of native grasslands* are less likely to trust the CCMA.

There is also a significant relationship between the item measuring predisposition to trust: *One has to be careful or someone is likely to take advantage of you* and two of the three items exploring belief in private property rights: owners *should be able to harvest rainfall even if that reduces stream flows* or *develop their properties even if those actions result in the loss of native grasslands.* Again, those relationships are as expected: those less predisposed to trust are more likely to believe that in these contexts the rights of property owners trump wider public interests.

There is limited evidence that concern about private property rights is an important barrier to implementation of best-practice NRM. **Nevertheless, many rural property owners hold strong views about the primacy of private property rights, particularly Full-time farmers who own most land in the Corangamite region. These beliefs appear to shape their trust in the CCMA Board and staff. NRM practitioners should be mindful of the potential of belief in private property rights to derail engagement efforts**. Trust and trustworthiness are discussed in the latter part of this section.

TABLE 13. SIGNIFICANT DIFFERENCES IN BELIEFS ABOUT PRIVATE PROPERTY RIGHTS BY FARMER IDENTITY, 2019 (N=644, N=624 TO 621)

Belief about private property rights	Full-time farmer	Part-time farmer	Hobby farmer	Non-farmer
Landholders should be able to harvest rainfall on their property, even if that action reduces stream flows	3.8 63%	3.4 47%	3.6 59%	3.4 46%
It is reasonable for the wider community to expect that landholders will act in ways that will not harm native plants & animals	3.6 64%	3.8 72%	3.9 72%	4.2 83%
Landholders should be able to develop their property even if that results in the loss of native grasslands	3.5 52%	3.2 41%	2.9 30%	2.6 22%

Mean scores calculated after removing N/A responses. So mean out of 5
Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test, chi-square, p<0.05
Orange shading: negative linear relationship. Blue: positive (mostly linear) relationships.

5.4 Attitudes about NRM policy

The Your Views topic included four items exploring attitudes about NRM policy: one item exploring the social acceptability of rock removal; one item exploring existence of a personal norm about being part of an NRM group; and two items asking for views about the availability of advice about NRM and the importance of biological activity in soils [Table 14]. Four of these items were included in the 2006 survey. With the same response options, results from the two surveys can be compared.

Results summarised in Table 14 suggest that most private property owners hold views broadly consistent with *contemporary drought policy* [Table 14]. There is a trend for more respondents to Agree/Strongly agree to this statement in 2019 than in 2006 [Table 14].

For the item exploring the *social acceptability of rock removal* over half of all respondents in 2019 selected the Unsure or the Not applicable/Don't know response options. This trend appears to have distorted the results for 2019 compared to 2006 [Table 14]. If this is an important issue for the CCMA (and it is not included in the Issues topic) it seems there is some work to be undertaken to raise awareness of the extent rocks provide important habitat.

There are few significant differences for items 11 by LGA or farmer identity [Table 14]. However, those with a stronger farmer identity are more likely to agree that *In most cases the production benefits of rock removal outweigh the environmental costs;* and are less likely to agree *It is difficult to obtain reliable expert advice on agricultural production topics* [Table 15].

The 2019 survey didn't include items exploring best-practice NRM that are directly related to the items in Table 14. However, there is an assumption that those with a personal commitment to being part of an NRM group are more likely to participate in those groups and as a result, more likely to implement best-practice NRM.

About 40% of respondents Agreed/Strongly agreed that *I feel a personal responsibility to belong to a group working to improve the management of natural resources* [Table 14]. There is a significant positive relationship between this item and *Are you a member or involved in a local Landcare group* but not for a *Local commodity group*.

There are no significant relationships between the personal norm *I feel a personal responsibility to belong to a group working to improve the management of natural resources* and implementation of the 17 best-practice items for the full-period of management. There are significant relationships between this personal norm and two of the items exploring adaptation to climate change over the past 12 months: *In the past 12 months have you changed your financial or on-property operations as a result of considering climate change*; and *… as a result of considering opportunities to capture carbon (e.g. by revegetation, soil management).*

TABLE 14. ATTITUDES ABOUT NRM POLICY & MANAGEMENT, 2019 (N=644, N=623 TO 617) AND 2006

Attitudes about NRM	Mean	Agree	Unsure	Disagree	NA/Don't know
Landholders should manage their properties in expectation of drought events	4.3 (NA)	89% (83%)	8% (8%)	2% (6%)	1% (2%)
There should be financial incentives for landholders to provide environmental services	4.2 (NA)	78% (74%)	14% (17%)	4% (7%)	4% (2%)
State and Local governments should protect farmland from the impact of urban sprawl	4.2	76%	15%	6%	2%
Aboriginal communities and landholders should work together to protects cultural heritage on private property	3.4 (NA)	49% (39%)	27% (27%)	21% (27%)	4% (7%)
Social acceptability assessment					
In most cases the production benefits of rock removal outweigh the environmental costs ###	3.4 (NA)	33% (39%)	34% (35%)	11% (17%)	22% (9%)
Personal norm					
I feel a personal responsibility to belong to a group working to improve the management of natural resources	3.3	43%	33%	18%	6%
Other items					
Biological activity is an important indicator of the productive capacity of soils	4.1	75%	17%	1%	7%
It is difficult to obtain reliable expert advice on agricultural production topics *** ###	2.9	26%	27%	32%	14%

Mean scores calculated after removing N/A responses. So mean out of 5

*** Significant difference across LGAs, Kruskal-Wallis rank sum test, chi-square, p<0.05

Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test, chi-square, p<0.05

() Data for 2006

TABLE 15. SIGNIFICANT DIFFERENCES IN ATTITUDES ABOUT NRM POLICY AND MANAGEMENT BY FARMER IDENTITY, 2019 (N=644, N=621-617)

Attitudes about NRM policy	Full-time farmer	Part-time farmer	Hobby farmer	Non-farmer
In most cases the production benefits of rock removal outweigh the environmental costs	3.7 44%	3.4 37%	3.1 26%	3.0 18%
It is difficult to obtain reliable expert advice on agricultural production topics	2.8 25%	2.9 32%	3.1 31%	3.0 13%

Mean scores calculated after removing N/A responses. So mean out of 5
Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test, chi-square, p<0.0
Blue shading: significant positive linear relationship (i.e. those with stronger farmer identity more likely to agree with rock removal).
Orange shading: significant negative linear relationship across all cohorts except Non-farmer.

5.5 Confidence in best-practice NRM

In the Your Views topic there are six items exploring confidence in the efficacy of key NRM best-practices [Table 16]. Only two of those items were included in the 2006 survey but the response options are the same in 2019 and so results for those two items are compared [Table 16].

There will be some best-practices that are not relevant to different property owners because of their enterprise mix, landscape type, the scale of their enterprise or other factors. For example, *Fencing to exclude stock access to waterways and wetlands* is more relevant to graziers than to croppers. However, each of the 17 best-practice items should be relevant for most rural property contexts in the region. And respondents could select the Not applicable/Don't know response option.

- With the exceptions of *Willow removal* and the *Efficacy of 20 metre buffers for fences to manage stock access along waterways and wetla*nds there is majority support for best-practices included in the survey.
- Stronger farmer identity is associated with lower confidence in practices focused on environmental outcomes.
- Engagement through platforms such as *Landcare* and processes such as *Field days/farm walks/demonstrations (past 12 months)* and *Property planning (prepared or preparing)* are associated with more confidence in best-practice NRM.

TABLE 16. CONFIDENCE IN BEST-PRACTICE NRM, 2019 (N=644, N=622 TO 599) AND 2006

Statements assessing confidence in best-practice NRM	Mean	Agree	Unsure	Disagree	Not applicable/ Don't know
Soil testing is an essential first step in monitoring soil condition and making decisions about inputs	4.2	80%	11%	1%	4%
The benefits of rotational or time controlled grazing outweigh any costs	3.9	60%	22%	5%	13%
The time and expense involved in watering stock off waterways & wetlands is justified by the benefits	3.8 (NA)	57% (51%)	25% (29%)	7% (10%)	11% (10%)
Fencing to exclude stock is essential to improve waterways & wetlands *** ### 2006 item focused on … work required to revegetate waterways	3.8 (NA)	64% (76%)	20% (12%)	11% (8%)	4% (4%)
The cost of willow removal is justified by improvements in the condition of waterways & wetlands *** ###	3.5	46%	30%	13%	12%
The benefits of fencing waterways & wetlands to manage stock access are best achieved by establishing buffers of 20 metres *** ###	3.3	37%	31%	19%	13%

Mean scores calculated after removing N/A responses. So mean out of 5
*** Significant difference across LGAs, Kruskal-Wallis rank sum test, chi-square, p<0.05
Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test, chi-square, p<0.05
() Data for 2006

TABLE 17. CONFIDENCE IN BEST-PRACTICE NRM BY FARMER IDENTITY (N=664, N= 622 TO 602)

Statements assessing confidence	Full-time farmer	Part-time farmer	Hobby farmer	Non-farmer
Fencing to exclude stock is essential to improve waterways & wetlands	3.6 58%	3.9 69%	4.0 73%	4.0 66%
The cost of willow removal is justified by improvements in the condition of waterways & wetlands	3.3 39%	3.4 42%	3.6 53%	3.8 52%
The benefits of fencing waterways & wetlands to manage stock access are best achieved by establishing buffers of 20 metres	3.1 31%	3.2 38%	3.5 45%	3.6 40%

Mean scores calculated after removing N/A responses. So mean out of 5
Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test, chi-square, p<0.05
Orange shading: significant negative relationship with farmer identity

The first finding is that more than 50% of respondents agreed with statements supporting the efficacy of four of the six best-practice items. The exceptions are for *Willow removal* and the *Efficacy of 20 metre buffers for fences to manage stock access along waterways and wetla*nds [Table 16]. On the other hand, if those selecting Not applicable/Don't know are combined with the Disagree/Strongly disagree responses, then from about one in three to one in two respondents were either Unsure or Not confident for five best-practices listed.

For three items exploring confidence there is a significant difference across the four farmer identity cohorts. **The trend is as expected: stronger farmer identity is associated with lower confidence in practices focused on environmental outcomes** [Table 17]. It is important to note that even amongst Hobby and Non-farmers, about half of the respondents are not confident *The cost of willow removal is justified* [Table 17].

The assumption is that higher levels of confidence in a best-practice will lead to increased implementation of that practice. There is at least one companion best-practice for four of the six confidence items in Table 16. The exceptions are *Willow removal* and the *Efficacy of 20 metre buffers for fences to manage stock access along waterways and wetla*nds. These omissions are unfortunate given these practices have the lowest confidence ratings [Table 16]. There is strong evidence suggesting that confidence in best-practices leads to their implementation [Table 18].

There is the remaining question of how to build confidence in best-practices? The assumption is that platforms (e.g. Landcare groups) and processes (e.g. field days/farm walks/demonstrations, short courses, property/management planning) that engage rural property owners in "dialogue, learning and action" will improve their knowledge, understanding and management skills and in doing that, improve confidence in best-practice NRM. Survey data allows for testing of those assumed relationships [Table 19].

It seems that engagement in "dialogue, learning and action" through platforms such as *Landcare* and processes such as *Field days/farm walks/demonstrations (past 12 months)* and *Property planning (prepared or preparing)* do increase confidence in best-practice NRM. The exceptions in this study are engagement through *Short course related to property management (past 5 years);* and confidence in the best-practice, *Willow removal.* **In this study *Landcare* participation appears to be more influential in providing confidence in practices with an environmental focus.**

TABLE 18. RELATIONSHIPS BETWEEN CONFIDENCE IN BEST-PRACTICE NRM AND IMPLEMENTATION, 2019 (N=644, N=563 TO 523)

Confidence measure	Relevant best-practice	Nature of relationship
Soil testing is an essential first step in monitoring soil condition and making decisions about inputs	Tested soils for nutrient status in paddocks where have applied fertiliser/soil conditioners (including lime)	Significant positive Full-period Last 3 years Next 3 years
The benefits of rotational or time controlled grazing outweigh any costs	Used time controlled or rotational grazing	Significant positive Full-period Last 3 years Next 3 years
The time and expense involved in watering stock off waterways & wetlands is justified by the benefits	Established off-stream watering points	Significant positive Full-period Last 3 years
Fencing to exclude stock is essential to improve waterways & wetlands	Fenced waterways & wetlands to exclude stock	Significant positive Last 3 years Next 3 years

Results of pairwise comparisons (so just two variables) using Kruskal-Wallis rank sum tests, p values <0.05
Tan shading: sustainable agriculture best-practices. Green shading: environmental best-practices.

TABLE 19. ENGAGEMENT IN PLATFORMS AND PROCESSES AND CONFIDENCE IN BEST-PRACTICE NRM, 2019 (N=644)

Statements assessing confidence in best-practice NRM	Landcare	Field day	Short course	Property planning
Soil testing is an essential first step in monitoring soil condition and making decisions about inputs	No (n=530)	Yes (n=526)	No (n=527)	Yes (n=504)
The benefits of rotational or time controlled grazing outweigh any costs	No (n=493)	Yes (n=488)	No (n=489)	No (n=466)
The time and expense involved in watering stock off waterways & wetlands is justified by the benefits	Yes (n=520)	Yes (n=512)	No (515)	Yes (n=484)
Fencing to exclude stock is essential to improve waterways & wetlands	Yes (n=563)	Yes (n=556)	No (n=559)	Yes (n=526)
The cost of willow removal is justified by improvements in the condition of waterways & wetlands	No (n=501)	No (n=496)	No (497)	No (n=469)
The benefits of fencing waterways & wetlands to manage stock access are best achieved by establishing buffers of 20 metres	Yes (n=486)	Yes (n=489)	No (n=502)	No (n=470

Results of pairwise comparisons (so just two variables) using Kruskal-Wallis rank sum tests, p values <0.05
Brown shading: sustainable agriculture practices. Green shading: Environmental practices.
Blue shading: significant positive relationship. Orange shading: no relationship.

6 TRUST

6.1 Introduction

The 2019 survey includes items exploring predisposition to trust (one item); trust (i.e. willingness to rely upon) in the Corangamite CMA Board and staff (one item); and judgements about the trustworthiness of the CMA (three items). The topic for the trust and trustworthiness measures is natural resource management (NRM). A filter item asked if respondents were aware of the existence of the CCMA.

Respondents are asked to indicate the extent they agree with each statement in Table 20. A Don't know/Not applicable option is provided. To summarise these data the responses for some options are combined. Strongly agree and Agree are combined as is Strongly disagree and Disagree. Data for the Not applicable/Don't know responses are not included in the calculation of mean scores for each item.

Of the 600 respondents to the filter item, *Are you aware of the existence of the Corangamite CMA*, 59% (n=355) said Yes, they were aware of the CCMA. The number of those completing the trust and trustworthiness items varied from 364 to 360.

There is a significant difference in awareness of the CCMA across the four farmer identity cohorts and by LGA. Full-time farmers are more likely to be aware of the CCMA (73% Yes), than Part-time farmers (67%), Hobby farmers (53%) or Non-farmers (39%).

- Respondents are four times more likely to agree than disagree that they can trust the CCMA.
- Part-time and Hobby farmers rate the CCMA as more trustworthy and are more willing to rely on the CCMA than either Full-time farmers or Non-farmers.
- Most respondents are not predisposed to trust or rely on others.
- Those not predisposed to trust are also more concerned about private property rights.
- Those who trust the CCMA are more likely to be engaged in NRM programs funded by government.

TABLE 20. PREDISPOSITION TO TRUST, TRUST AND TRUSTWORTHINESS ASSESSMENTS, 2019 (N=644, N= 364 TO 360)

Predisposition to trust (n=591)	Mean	Agree	Neutral	Disagree	NA/Don't know
One has to be careful or someone is likely to take advantage of you	3.8	62%	22%	10%	6%
Trust	**Mean**	**Agree**	**Neutral**	**Disagree**	**NA/Don't know**
I can rely on (trust) the CMA Board and staff to provide useful advice about NRM ###	3.3	40%	40%	10%	10%
Trustworthiness	**Mean**	**Agree**	**Neutral**	**Disagree**	**NA/Don't know**
The Corangamite CMA keeps landholders' interests in mind when making decisions about NRM ###	3.2	35%	42%	14%	9%
Sound principles guide the decisions of the Corangamite CMA Board and staff about NRM ###	3.3	34%	44%	10%	12%
The Corangamite CMA staff are very knowledgeable about NRM in my district ###	3.3	36%	43%	11%	11%

Mean scores calculated after removing N/A responses. So mean out of 5
Significant difference across farmer identity cohorts
Kruskal-Wallis rank sum tests, chi-square p<0.05.

6.2 Key findings

Respondents are four times more likely to agree than to disagree that *I can rely on the CCMA Board and staff to provide useful advice about NRM* [Table 20]. Indeed, only one in ten respondents disagreed with the statement exploring trust in the CCMA. This is a very positive result from the CCMA perspective. However, a substantial proportion of respondents selected the neutral response option. Combined with the Not applicable/Don't know responses, 50% of all respondents have yet to decide if they can trust the CCMA.

The mean scores and the proportion of respondents selecting the Strongly agree/Agree response options are almost identical for each of the three items measuring the key elements of trustworthiness: ability; benevolence; and integrity [Table 20].

It appears that most respondents (i.e. >60%) are not predisposed to trust or rely on others [Table 20]. This item is one of three that form a widely used scale or set of items. The three items were recently employed in the North Central CMA region social benchmarking study, with very similar results (i.e. 58%

of respondents agreed with the statement: *One has to be careful or someone is likely to take advantage of you*.)

There is no difference across the LGAs in the mean scores for any of the items in Table 20. There is no difference across the four farmer identity cohorts in the mean scores for the predisposition to trust item but there are significant differences for the trust and trustworthiness items [Table 20]. In each case **there is a negative relationship between farmer identity and trust and trustworthiness judgements.** However, these are typically non-linear relationships. Part-time and Hobby farmers rate the CCMA as more trustworthy and are more willing to rely on the CCMA than either Full-time or Non-farmers.

It seems reasonable to assume that respondents who are not predisposed to trust will also be more concerned about private property rights. The results of pairwise comparisons confirm that assumption: there are significant relationships between items measuring predisposition to trust and: *Landholders should be able to develop their property even if that results in the loss of native grasslands;* and *Landholders should be able to harvest rainfall on property, even if that action reduces stream flows.*

There are significant positive relationships between predisposition to trust and participation in *Landcare groups* but not for *Commodity groups* or *In past 5 years has there been work on your property funded, at least in part, by Government programs*.

There are no significant relationships between predisposition to trust and the 17 items exploring implementation of best-practice NRM over the full period of management; and no significant relationships between predisposition to trust and the three items exploring adaptation to climate change.

There are no significant positive relationships between the item measuring *trust in the CCMA* and the 17 items measuring implementation of best practice NRM over the full period of management or the three items exploring adaptation to climate change. **There is a significant positive relationship between trust in the CCMA and engagement in Government NRM programs:** *In past 5 years has there been work on your property funded, at least in part, by Government programs*.

In summary, it seems that predisposition to trust needs to be considered when setting out to engage rural property owners in NRM, in part because most rural property owners are not predisposed to trust, but also because **those not predisposed to trust are more concerned about private property rights**. Both of these attributes can be important barriers to effective engagement at the project or program level.

While it doesn't appear that trust is a key to engagement in best-practice NRM or NRM programs, there are many reasons to focus on trust building, especially by demonstrating trustworthiness (i.e. ability, benevolence and integrity). Where trust exists, intentions are less likely to be misinterpreted, any errors or unforeseen outcomes of actions are more readily forgiven, local knowledge is more likely to be offered, and it is easier/less costly to engage property owners in projects.

7 FARMER IDENTITY

7.1 Introduction

Two items in the 2019 CCMA survey explore occupational identity. In one section respondents are invited to select the cohort that best describes their occupational identity: Full-time farmer, Part-time farmer, Hobby farmer or Non-farmer. There is another item in a different section where respondents are asked: *What is your main occupation? (e.g. farmer, teacher, accountant, investor, retiree)*.

In the 2006 survey respondents were only asked to nominate their occupation. Those responses were subsequently grouped into five categories: Farmer, Professional, Retired, Trade and Other. Eventually, comparisons were made between Farmers and Non-farmers.

The Key findings section below covers the extent of farmer identity; distribution of the four farmer identity cohorts across the LGAs; the attributes of each farmer identity cohort; and relationships between farmer identity and implementation of best-practice NRM.

7.2 Key findings

7.2.1 The extent of farmer identity

Of the 474 responses to the open-ended item in the 2019 survey: *What is your main occupation? (e.g. farmer, teacher, accountant, investor, retiree)*, 35% said they were a Farmer. In 2006, 53% of all respondents identified as a Farmer on this item.

In 2006, Farmers managed 88% of all land owned by respondents and in 2006 there were important differences in the personal and property attributes of Farmers and Non-farmers. For example, Farmers were more likely to operate larger properties, be Landcare members, live in the district for longer and expect a family member to take on the property. In 2006, Farmers were also more likely than Non-farmers to implement almost all (only two exceptions) best-practices included in the 2006 survey (Curtis et al. 2006 pages 52-53).

For the 2019 survey item where respondents are invited to select from one of the four farmer identity cohorts, 33% said they are a Full-time farmer, 20% a Part-time farmer, 26% a Hobby farmer, and 21% a Non-farmer (n=557).

A comparison of the 2006 and 2019 survey data suggests there has been a large decline in the proportion of respondents identifying as a Farmer (i.e. from 53% to 33%). Including Part-time farmers, those expected to have a strong commitment to agriculture and the business of farming make up just over half (53%) of all respondents in 2019.

The two items exploring occupational identity have almost identical scores for the proportion of Farmer (open-ended item) or Full-time farmer (as one of the four cohorts). There is also a statistically significant positive relationship between the two items. The discussion below therefore draws upon the four cohort typology.

7.2.2 Distribution of the four farmer identity cohorts by LGA

TABLE 21. DISTRIBUTION OF FOUR FARMER IDENTITY COHORTS ACROSS THE CORANGAMITE REGION BY LGA, 2019 (N=644, N=557)

Local Government Area	Full-time Farmers	Part-time Farmers	Hobby farmers	Non-Farmers
Corangamite	62%	22%	10%	6%
Colac Otway	49%	16%	18%	17%
Surf Coast	36%	20%	36%	8%
Moorabool	29%	29%	31%	12%
Golden Plains	19%	23%	29%	29%
Greater Geelong	18%	26%	36%	20%
Ballarat	Nil	8%	27%	65%
Total	33%	20%	26%	21%

Significant differences across LGAs, Pearson's Chi-squared test, X-squared = 145.27, df = NA, p-value = 0.0004998
Brown shading: productivist social landscapes. Orange shading: multi-functional social landscapes.

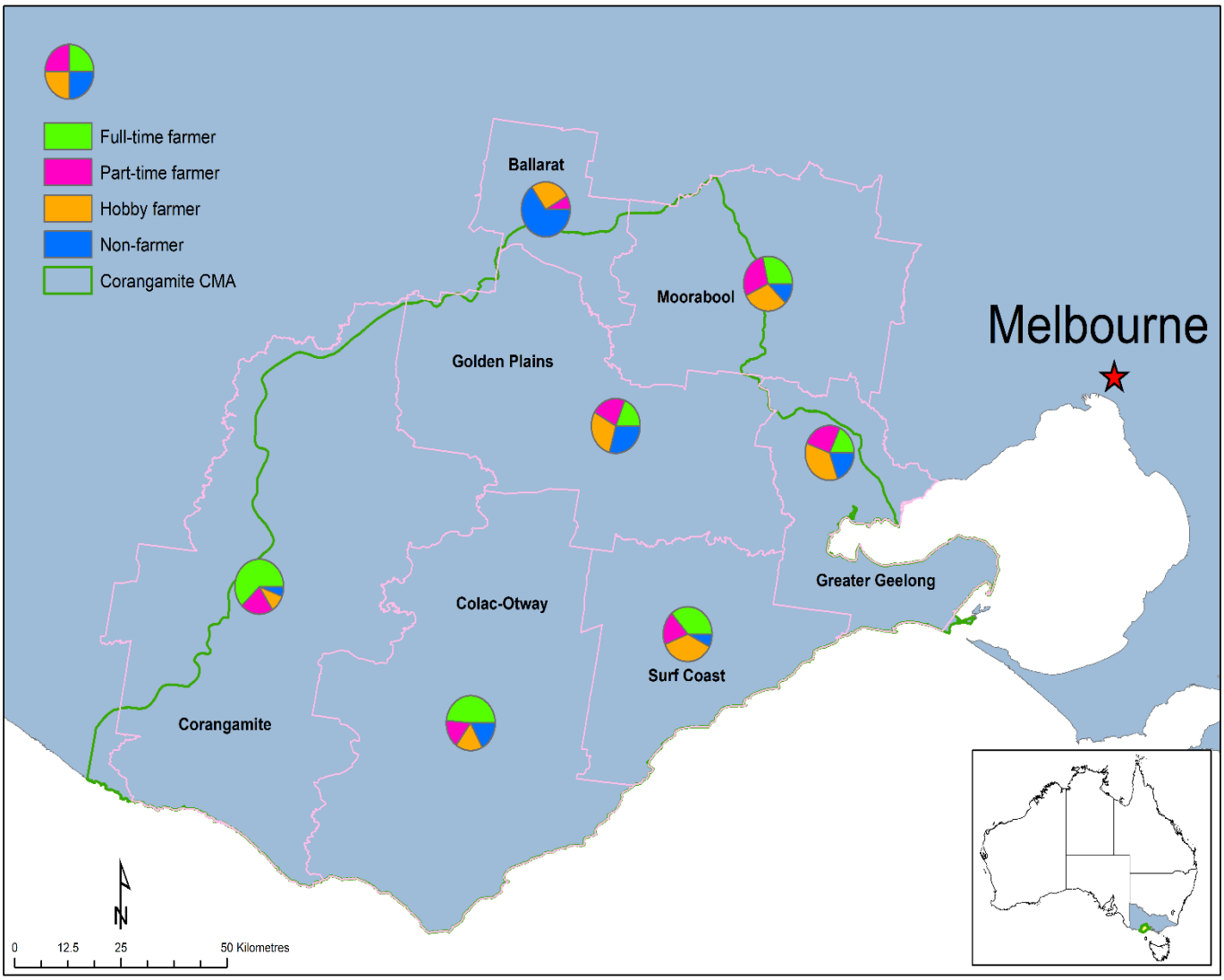
There is a significant difference in farmer identity across the seven LGAs [Table 21 and Map 3]. Full-time farmers are a majority of respondents in two LGAs: Corangamite and Colac Otway. When Full-time farmers and Part-time farmers are combined, this new grouping is a majority of respondents in four LGAs: Corangamite (84%), Colac Otway (65%), Moorabool (58%) and Surf Coast (56%).

Part-time farmers are an important rural property owner cohort. In three of the seven LGAs there are more Part-time farmers than Full-time farmers. In another LGA the number of Part-time farmers is equal to the number of Full-time farmers.

A stark contrast is provided by Ballarat where no respondents identify as a Full-time farmer. Two out of three respondents in Ballarat said they are Non-farmers [Table 21].

To the extent farmer identity is an indicator of multi-functionality (i.e. where a mix of production, amenity and environmental values are expressed, then it seems that **at most two LGAs are mostly productivist social landscapes (i.e. agricultural values are dominant); and five LGAs are multi-functional or transitioning to multi-functional social landscapes** (purple shading in Table 21). The extent of diversity across the seven LGAs is illustrated further in the LGA profiles provided later.

MAP 3. FARMER IDENTITY COHORTS ACROSS THE CORANGAMITE REGION BY LGA, 2019 (N=644, N=557)



7.2.3 Attributes of the four farmer identity cohorts, including links with best-practice NRM

There are significant differences across the four cohorts based on farmer identity for items in every survey topic. Differences for concern about issues (10/15 items), long-term plans (3/14), attached values (9/15), beliefs about private property rights (3/3) and climate change (2/2), a personal norm related to group membership (1/1), attitudes about NRM (1/5), confidence in best-practice NRM (3/6) and trust and trustworthiness assessments (4/4) are presented and discussed in earlier sections of the report. Differences for knowledge of NRM, sources of NRM information, enterprise type and preferred engagement vehicles are identified and discussed in later sections.

At the same time, it is important to note the extent of common ground across the farmer identity cohorts. There are shared values, common concerns about issues (or threats to values), shared beliefs, consensus in attitudes about the direction of NRM policy and agreement about the efficacy of best-practices. And **even where there is a statistically significant difference, it is often the case that most respondents in each cohort will be in agreement**. For example, of the 10 items where there is a significant difference by farmer identity for concern about issues, there are seven items where >50% of respondents in each cohort selected the Important/Very important rating.

There is a significant difference across the four farmer cohorts for implementation over the full period of management for 14 of the 17 best-practices [Table 22] and one of the three items exploring adaptation to climate change [Table 11]. Results for the past three years and intentions for next three years are indicated in Table 22 using notations. Examining those data suggests the overall pattern is the same as for the full period of management (i.e. 15/17 for past three years; 12/17 for next three years).

In each case there is a positive relationship between best-practice NRM implementation and farmer identity. Over the full period of management, that relationship occurs for four of the seven items focused on environmental management as well as all 10 of the items focused on sustainable agriculture [Table 22].

Results for the environmental management best-practices items are somewhat counter-intuitive given that there is a negative relationship between farmer identity and environmental values, including for the *stewardship ethic* and *duty of care for biodiversity* items. This is a consistent finding across the Victorian social benchmarking studies and appears to reflect the higher participation of Full-time farmers in Landcare, Commodity groups and their engagement in NRM programs funded by Australian and Victorian governments [Table 23].

However, there is often little difference between Full-time farmers and Part-time farmers for the implementation of the environmental best-practices and the substantive difference is typically between these two cohorts and Non-farmers [Table 22]. In combination these two cohorts own 90% of the area covered by respondents to the 2019 survey [Table 23].

Table 23 provides a summary of background personal and farming attributes for each farmer identity cohort, including those that are not already covered so far in the report. In most cases there is a significant difference across the four cohorts.

TABLE 22. IMPLEMENTATION OF BEST-PRACTICE NRM BY FARMER IDENTITY, 2019 (N=644)

Best-practice NRM	Full-time farmer	Part-time farmer	Hobby farmer	Non-farmer
Each year worked to control pest animals ### @ PTF, FTF, HF, NF ~ PTF, FTF, HF, NF	50%	35%	41%	28%
Each year worked to control pest plants outside cropped areas @ PTF, FTF, HF, NF	49%	43%	45%	32%
Planted locally indigenous trees & shrubs on other areas of your property @ PTF, HF, FTF, NF	42%	45%	36%	35%
Planted local indigenous trees & shrubs along waterways & wetlands ### @ PTF, HF, FTF, NF	35%	27%	18%	16%
Fenced waterways & wetlands to exclude stock ### @ PTF, FTF, HF, NF ~ PTF, FTF, HF, NF	30%	27%	19%	12%
Established off-stream watering points for stock ###	29%	27%	21%	6%
Fenced native bush/grasslands to exclude stock @ PTF, HF, NF, FTF	20%	30%	25%	17%
Maintained sufficient ground cover to prevent soil erosion on most paddocks at the end of autumn ### @ PTF, FTF, HF, NF ~ HF, PTF, FTF, NF	57%	43%	43%	19%
Tested soils for nutrient status in paddocks where have applied fertiliser/soil conditioners (including lime) ### @ ~	53%	34%	21%	7%
Applied lime to substantial areas of arable land on the property ### @ ~	48%	27%	15%	3%
Used time controlled or rotational grazing ### @ PTF, FTF, HF, NF ~ PTF, FTF, HF, NF	44%	36%	32%	9%
Used minimum tillage (e.g. direct drilling) when sowing grass or crops ### @ ~	40%	27%	20%	8%
Upgraded infrastructure to more effectively use existing water supplies ### @ ~ FTF, HF, PTF, NF	39%	34%	26%	8%
Applied soil treatment other than fertilizer and lime (e.g. organic manure, compost, biochar, soil inoculants) ### @ ~	27%	20%	20%	8%
Used precision farming techniques for cropping ### @ ~	12%	7%	4%	1%
Prepared a nutrient map for all/most of the property) ### @ ~	12%	4%	2%	Nil
Implemented cover cropping ### @	10%	6%	4%	1%

Significant difference across farmer identity cohorts for full period of management, Kruskal-Wallis chi-square, $p<0.05$.

@ Significant difference across farmer identity cohorts for last three years

~ Significant difference across farmer identity cohorts for next three years

Green shading: environmental best-practices. Tan shading: sustainable agriculture best-practices

TABLE 23. PERSONAL AND PROPERTY ATTRIBUTES BY FARMER IDENTITY, 2019 (N=644, N=644 TO 574)

Key attributes	Full-time (33%)	Part-time (20%)	Hobby (26%)	Non-farmer (21)
Property size	250 ha	65 ha	22 ha	21 ha
% land respondents own in CCMA region ***	76%	14%	4%	6%
Property includes waterways & wetlands	69%	72%	55%	53%
Property leased, share farmed, agisted by others	52% Yes 76 ha	57% 28 ha	47% 10 ha	36% 24 ha
Property leased, share farmed, agisted from others	53% Yes 166 ha	46% 40 ha	34% 30 ha	36% 3 ha
Age	61 years	60 years	60 years	61 years
% respondents who are men	76%	81%	59%	60%
Resident on property Years lived on property	88% 40 years	75% 20 years	75% 18 years	58% 14 years
Time lived in local district	54 years	30 years	25 years	23 years
Length of family ownership	51 years	25 years	20 years	20 years
Other family members working full-time on property	44%	7%	7%	8%
Paid off-property work last year (mean)	67% 17 days	75% 129 days	75% 109 days	74% 149 days
You/spouse received net off-property income 2018/19	Yes 44%	Yes 68%	Yes 62%	Yes 62%
Hours work on-property per week past year	50 hours	20 hours	12 hours	5 hours
Income from agriculture 2018/19 (n=588)	95%	85%	33%	7%
If Yes, reported net profit from agriculture 2018/19	75%	49%	21%	21%
% all survey respondents with net profit from agriculture >$50K	39%	8%	Nil	3%
Landcare member/participant	40%	26%	26%	18%
Local commodity group participant	21%	8%	2%	2%
Work funded, at least in part, by Government programs past 5 years	24%	17%	10%	13%
Completed short course past 5 years	23%	13%	9%	9%
Prepared/preparing a property management plan or whole farm plan	56% Yes	49%	32%	27%
Have a business plan	28%	20%	10%	4%
Attend field day/farm walk/demonstration on native plants & animals last 12 months	45%	22%	28%	17%
Attend field day/farm walk/demonstration on soil health last 12 months	42%	18%	13%	2%
Employed a consultant last 12 month	31%	14%	12%	9%
Employed a contractor last 12 months	68%	60%	36%	23%

Data provided are medians unless mean is indicated.

*** % based on N=509, FTF 166, PTF 102, HF 133, NF 108 (from item: *What is the total area of land you own in the Corangamite region*?)

8 ENGAGEMENT IN PLATFORMS AND PROCESSES

8.1 Introduction

The 2019 survey includes items exploring engagement through nine different platforms and processes expected to lead to "dialogue, learning and action". These items examine:

- participation in *Landcare* and *Commodity groups*, *Short courses, Field days/farm walks/demonstrations* and *Programs funded by Australian and Victorian governments*; and
- work on a *Whole farm or property management plan, Business plans*, a *Long-term plan or vision for the property* and *a Plan for family succession*.

TABLE 24. ENGAGEMENT IN PLATFORMS AND PROCESSES LEADING TO DIALOGUE, LEARNING AND ACTION, 2019 (N=644, N=602 TO 559) AND 2006

Platforms and processes for engaging rural property owners	% Yes 2019	% Yes 2006
Landcare group *** ###	30%	35%
Commodity group *** ###	10%	18%
Attended field days/farm walks/demonstrations on native plants & animals in past 12 months ###	30%	NA
Attended field days/farm walks/demonstrations on soil health in past 12 months ###	20%	NA
Completed short course relevant to property management in the past 5 years (e.g. leadership, financial planning, pest management) ###	14%	37%
Work on your property in the past 5 years, funded, at least in part by Australian or Victorian government NRM programs ###	16%	26%
Do you have a long-term plan or vision about the improvements you would like to make on your property? ###	75% 28% > halfway	82% 32% > halfway
Do you have a business plan that describes current enterprises and outlines strategies to accomplish your goals for those new enterprises? *** ###	17% Yes 58% No 25% NA	NA
Prepared/preparing a property management or whole-farm plan that involves a map and/or other documents that address the existing property situation and include future management and development plans? *** ###	57% Yes 21% > halfway	41% Yes 22% > halfway

Significant difference across farmer identity cohorts, Kruskal-Wallis chi-square, p<0.05.
*** Significant differences across LGAs, Kruskal-Wallis chi-square, p<0.05.
Green shading: planning processes. Tan shading: activities for learning and dialogue. Orange shading: group-based approaches to learning, dialogue and action.

8.2 Key findings

For at least five of the items in Table 24 there is a substantive trend of less engagement between 2006 and 2019. This pattern includes engagement in *Landcare, Commodity groups, Short courses, Programs funded by government* and *Property management pl*anning.

There may have been less effort to engage rural property owners through these platforms and processes. It is also possible that the trend to a much smaller proportion of Full-time farmers has impacted property owner participation levels in NRM activities. Indeed, Full-time farmers are far more likely to be engaged in these platforms and process. For example, 40% of Full-time farmers are engaged in *Landcare*, 21% in *Commodity groups*, 42% *Attended a field day/farm walk/demonstration on native plants & animals,* 23% *Completed a short course* and 24% reported involvement in *Programs funded by government.*

The assumption is that engagement through NRM platforms and processes will improve knowledge, management skills and confidence in best-practices amongst rural property owners. In turn, those changes are expected to lead to implementation of best-practice NRM. Together, these topics can be called intermediate NRM outcomes. That is, they are important but not always sufficient, steps on the way to improving the condition of key environmental assets, including soils, wetlands & waterways and native vegetation. As explained earlier, engaging and building human and social capital through these engagement platforms and processes is critical when there is uncertainty about the way forward and how to get there, including uncertainty about the efficacy of best-practices. The soils context is probably the most fraught and is the focus of many of the knowledge, confidence and best-practice items included in the 2019 CCM social benchmarking survey.

With the social benchmarking survey data it is possible to explore most of these assumed relationships. Some of the knowledge topic items are a proxy for management skills. However, it is difficult to untangle causality (e.g. Do more knowledgeable property owners join Landcare or does participation in Landcare improve knowledge of NRM?).

The results from pairwise comparisons are summarised in Table 25. **The weight of evidence suggest that these platforms and processes contribute to or support development of positive social norms, knowledge of NRM, confidence in best-practice NRM and implementation of best-practice NRM. That body of evidence is particularly impressive for the influence of Landcare and Field days/farm walks/demonstrations.**

TABLE 25. SIGNIFICANT POSITIVE RELATIONSHIPS BETWEEN INTERMEDIATE NRM OUTCOMES AND ENGAGEMENT PLATFORMS AND PROCESSES, 2019 (N=644)

Engagement platforms & processes	Personal norm: belong groups	NRM knowledge	Confidence In relevant best-practice	Implemented relevant best-practice Full period management	Adaptation to climate Change 12 months
Landcare	Yes 1/1 +	Yes 12/12 +	Yes 3/6 +	Yes 13/17 +	Yes 3/3 +
Commodity	No	Yes 11/12 +	Yes 1/3 + + Soil testing	Yes 12/17 +	Yes 3/3 +
Short course	NA	Yes 12/12 +	Nil	Yes 14/17 +	Yes 2/3 +
Govt program	Yes 1/1 +	Yes 11/12 +	Yes 3/6 +	Yes 5/17 +	Yes 2/3 +
Property planning	NA	Yes 12/12 +	Yes 3/6 +	Yes 15/17 +	Yes 3/3 +
Business plan	NA	Yes 12/12 +	Yes 1/6 +	Yes 10/10 + Agric No 7/7 + Env	Yes 3/3 +
Field day/farm walk/ demonstrations	Yes 1/1 +	Yes 12/12 +	Yes 5/6 +	Yes 2/7 + Env Yes 9/10 + Agric	Yes 3/3 +

Significant relationships, Kruskal-Wallis chi-square, $p<0.05$.
Blue shading: > half relationships are significant and positive between engagement platform or process and intermediate NRM outcome.
Green shading: half the relationships are significant and positive.
Orange shading: No or <30% of relationships are significant and positive.

9 SOURCES OF INFORMATION ABOUT PROPERTY MANAGEMENT

9. 1 Introduction

The 2019 survey included a list of 32 possible *sources of information over the past 12 months about topics related to the management of your property in the Corangamite region*. Some items refer to platforms where information can be sourced (e.g. *Newspapers*) or interactions occur with other people (e.g. *Field days*); other items refer to organisations that create and disseminate information (e.g. *CCMA*). Respondents selected those that are important. The 2019 survey includes more items than did the 2006 survey (25 items), largely as a result of separating the different types of social media (e.g. *Facebook, Instagram* and *Twitter*) and the inclusion of *YouTube, Water authorities, Rural R&D corporations* and *Banks*. Only *Training courses* is in the 2006 survey but not in the 2019 survey.

- *Bureau of Meteorology, Friends & neighbours and Newspapers* most frequently listed sources of information about property management.
- Ongoing importance of legacy media, including *Newspapers, radio and television*.
- Full-time and Part-time farmers are more likely to use sources of information about property management.
- Trend for information sources to have less audience reach in 2019 than in 2006.
- NRM practitioners will have to work harder to engage Hobby-farmers and Non-farmers.

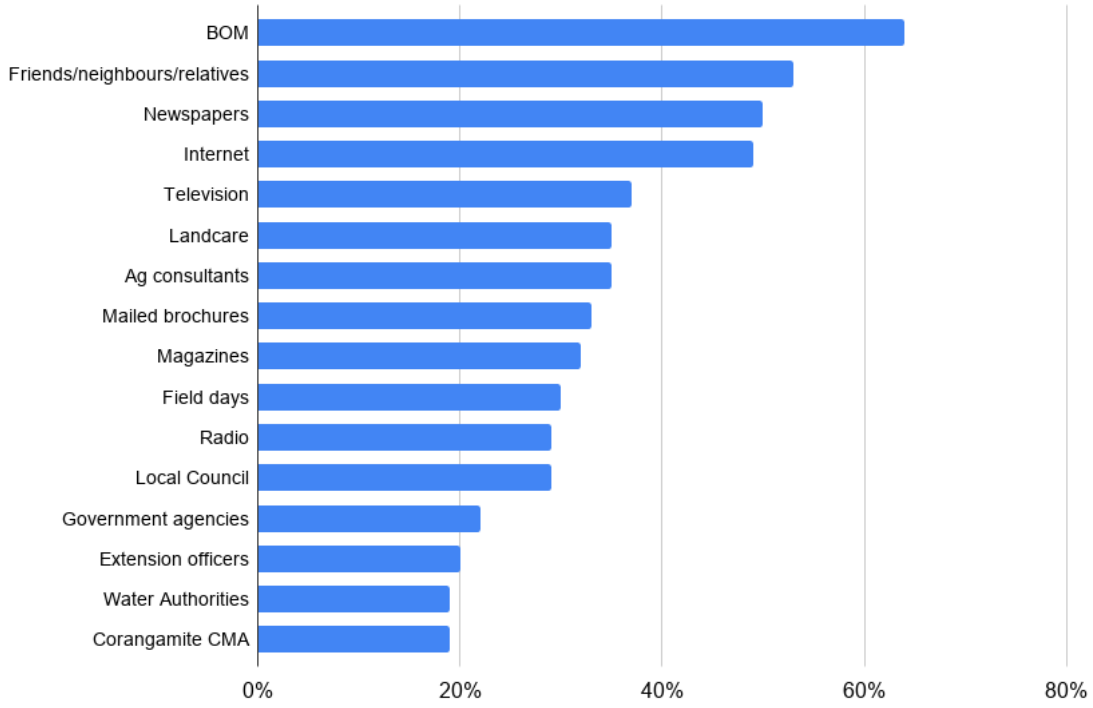


FIGURE 6. TOP 15 SOURCES OF INFORMATION FOR PROPERTY MANAGEMENT, 2019 (N=644)

TABLE 26. SOURCES OF INFORMATION ABOUT PROPERTY MANAGEMENT, 2019 AND 2006 (N=644)

Source	% yes 2019	% yes 2006	Source	% yes 2019	% yes 2006
Bureau of Meteorology ### PTF, FTF, HF, NF	64%	30%	Water Authorities (Barwon Water, Central Highlands Water, Wannon Water)	19%	NA
Friends/neighbours/ Relatives ### HF, PTF, FTF, NF	53%	52%	Corangamite CMA *** ### FTF, PTF, NF, HF	19%	44%
Newspapers ### FTF, PTF, HF, NF	50%	76%	Environmental organisations	15%	25%
Internet	49%	23%	Vic Farmers Federation ### FTF, PTF, NF, HF	15%	27%
Television	37%	38%	Rural R&D corporations ### FTF, PTF, HF, NF	15%	NA
Landcare group/Network ### FTF, PTF, HF, NF	35%	51%	Facebook	14%	NA
Ag consultants, agronomists, stock agents *** ### FTF, PTF, HF, NF	35%	15%	Workshops/Seminars ### FTF, PTF, HF, NF	14%	19%
Mailed brochures/ leaflets/newsletters	33%	60%	Your children ### FTF, HF, NF, PTF	14%	11%
Magazines (included books and journals in 2006) ### FTF, PTF, HF, NF	32% 32%	65%	Universities Academic journals ### PTF, FTF< HF, NF	4% 11%	7%
Field days *** ### FTF, PTF, HT, NF	30%	34%	Industry groups/ Commodity groups ### FTF, PTF, HF, NF	10%	12%
Radio ### FTF, PTF, HF, NF	29%	46%	YouTube	10%	NA
Local Council	29%	22%	Pod casts/Webinars	6%	NA
Government agencies & departments DSE & DPI	22%	35% 28%	Banks ### FTF, NF, PTF, HF	3%	NA
Extension officers / Landcare Facilitators ### FTF, PTF, HF, NF	20%	35%	Instagram	3%	NA
			Waterwatch, Fishcare, Saltwatch	3%	8%
			Twitter	2%	NA
			Training courses	NA	11%

Blue shading: increase in use of source of information. Orange shading: decline in use of source. No shading: no real change in use of source or data not available for one of the two surveys

9. 2 Key findings

The three most frequently listed sources of information about property management are the *Bureau of Meteorology (BOM), Friends & neighbours* and *Newspapers* [Table 26, Figure 6]. Half or more respondents selected each of these sources of information. These results highlight the ongoing relevance of what might be considered legacy or traditional sources of information. Having said that, information provided by the *BO*M and perhaps other organisations is increasingly accessed on-line; and the proportion of respondents selecting the *Internet* has increased substantially since 2006.

For 17 of the 32 sources of information there is a significant difference across the four farmer identity cohorts [Table 26]. **Invariably, a much higher proportion of Full-time farmers and, to a lesser extent, Part-time farmers, identify a source as important.** It seems Full-time and Part-time farmers are more committed to and engaged in the search for information about property management. This is not surprising given their livelihoods are more likely to be affected by their property management.

This finding suggests NRM practitioners will have to work harder to engage the Hobby-farmer and Non-farmer cohorts in NRM where that is a priority. Again, the best approach is to draw out alignment between the values and concerns of these rural property owners and NRM policies, programs and projects. A good illustration of what is possible is provided by survey results. For example, over the past 12 months Hobby-farmers and Non-farmers are far more likely to attend *Field days/Farm walks/Demonstrations on native plants and animals* (28% for Hobby farmers and 17% for Non-farmers) than to attend these activities on *Soil health* (13% for Hobby farmers and 1% for Non-farmers).

Another point is that there are sources of information used by at least one in three respondents where there is little difference across the farmer identity cohorts [Table 26]. For example, the *Internet, Television* and *Brochures/leaflets/newsletters* (posted out). *Landcare* also stands out as engaging rural property owners across the four farmer identity cohorts.

The main changes since 2006 in the use of different sources of information about property management include:

1. More use for the *BOM, Ag consultants/agronomists/stock agents, Local Government and Internet* (Blue shading in Table 26)
2. Less use for *Newspapers, Landcare group/Network, Mailed brochures/leaflets/newsletters, Field days, Radio, Local Council, Government agencies and departments, CCCMA, Environment organisations, VFF, Waterwatch/Fishcare & Saltwatch* (Orange shading in Table 26).

Clearly, the number of sources where there has been a decline in reported use is larger than the number where there has been an increase. This pattern may, at least in part, be attributed to two trends that together, present a substantial additional challenge to NRM practitioners. The first trend is development of social media and the increased diversity of information sources. While it is now possible to engage rural property owners through social media, a new set of skills and additional resources is needed to do that effectively. Secondly, Full-time farmers are now a smaller proportion of rural property owners. So, more property owners are going to be more difficult to engage in NRM. This conclusion appears to be supported by the surprising result that about 40% of respondents said they were *Not aware of the existence of the CCMA*.

10 KNOWLEDGE ABOUT NRM

10.1 Introduction

Self-assessment is an accepted approach to gathering information about NRM knowledge when using mail surveys. This approach, including the response options listed below, has been employed many times over the past 20 plus years in social benchmarking surveys and published in reports and peer-reviewed papers.

The 19 items in this topic [Table 27] are relevant to most rural property owners. However, that may not be the case for some items for many Non-farmers (e.g. *The processes leading to soil acidification*). Respondents could choose the Not applicable response option and these data are also presented in Table 27. Where there is a significant difference across the four farmer identity cohorts those differences are explored further in Table 28.

The set of response options for the Knowledge topic are: No knowledge (1), Very little knowledge (2), Some knowledge (3), Sound knowledge (sufficient to act) (4), and Very sound knowledge (could give a detailed explanation, (5), and Not applicable (6). Response options 1&2 and 4&5 have been collapsed to present data in Table 27. Mean scores don't include the Not applicable responses (so out of 5).

Eight items from the 2006 survey are repeated in the 2019 survey [Table 27]. With the same response options in both surveys the results are comparable.

As explained in the Conceptual framework section, there is abundant evidence of significant positive relationships between higher self-assessed knowledge and implementation of best-practice NRM. Nine of the 12 items have a companion best-practice in the survey. So it is possible to test for assumed relationships between knowledge and implementation [Table 30].

It also seems reasonable to assume that in most contexts that more knowledge leads to increased confidence in best-practice NRM. Of course, it is possible that exposure to a best-practice, including through discussion, field trips/farm walks/demonstrations leads a rural property owner to conclude that a best-practice is not relevant or not suited to their context. Relationships between confidence and practices and processes has been explored in an earlier section. Relationships between knowledge and confidence are explored in this section.

- Most say they don't have sufficient knowledge to act for most knowledge items.
- Trend of improved levels of knowledge since 2006.
- Self-assessed knowledge is typically higher for Full-time farmers.
- Those reporting more knowledge are more confident about the efficacy of NRM best-practices.
- Those reporting more knowledge are more likely to implement best-practice NRM.

TABLE 27. SELF-ASSESSED KNOWLEDGE OF NRM, 2019 (N=644, N=620-610) AND 2006

Knowledge topic	Mean	Sound knowledge	Some knowledge	Little knowledge	Not applicable
How to access up-to-date seasonal weather forecasts for your district ###	3.6	59% (33%)	29%	10%	2%
The benefits of retaining or improving the condition of native vegetation	3.3	41% (34%)	39%	17%	3%
Laws and regulations that apply to the management of rural properties ###	3.3	39%	44%	15%	2%
How to interpret results from soil testing ###	3.2	40% (34%)	33%	23%	5%
How ground cover on grazing or cropping paddocks prevents soil erosion ###	3.2	39% (42%)	35%	22%	4%
Role of logs & plants along streams in supporting native fish populations	3.2	37%	38%	21%	3%
Preparing a farm/property plan allocating land use according to land class ###	2.9	33%	26%	35%	7%
Use soil testing to prepare a nutrient budget to increase soil productivity without the risk of high levels of nutrient run-off *** ###	2.9	32%	29%	33%	6%
The impact of draining or grazing wetlands on native plants ###	2.9	25%	40%	29%	6%
The role of microbiological/soil biota (e.g. bacteria and fungi) in soil health *** ###	2.9	30%	33%	34%	3%
How to interpret the results from water testing ###	2.8	27% (19%)	32%	37%	4%
The processes leading to soil acidification *** ###	2.8	27% (14%)	35%	36%	1%
Role of soil carbon in maintaining soil health *** ###	2.8	27%	32%	40%	2%
The meaning of the term “regenerative farming” ###	2.8	24%	38%	35%	3%
Why 20 metres has been set as the minimum width of buffers along waterways	2.5	17%	30%	50%	4%
Which Aboriginal owner(s) is connected to your district	2.1	14%	20%	61%	5%
Organisations/individuals to contact for advice about management of Aboriginal cultural heritage sites on private property	2.1	10% (6%)	23%	62%	6%
The location of Aboriginal cultural sites in your district (e.g. fish traps, tree scars, middens ### (significant but only NF lower)	2.1	6% (5%)	24%	64%	6%
The NRM priorities of the CCMA *** ###	2.0	6%	25%	65%	4%

Mean scores calculated after removing N/A responses. So mean out of 5

Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test chi-square, $p<0.05$.

() Data for 2006

10.2 Key findings

There is only one item out of the 19 in Table 27 with more than half of the respondents indicating they have Sound/Very sound knowledge. Sound knowledge implied a respondent had *sufficient knowledge to act*; and Very sound knowledge implied they *Can give a detailed explanatio*n. And there are five items where half or more respondents said they had Little/No knowledge. Some of these items are exploratory and set out to establish a benchmark for future surveys rather than assess the outcomes of existing programs and projects. However, the overall pattern of low self-assessed knowledge applies to some topics that have been the focus of NRM and agriculture extension efforts since the 1980's.

A more positive narrative can be drawn from the comparison of 2006 and 2019 survey data [Table 27]. **The overall pattern (for 7/8 items) is for an increase in the proportion of respondents selecting the Sound/Very sound response option.** The exception is *The location of Aboriginal cultural sites in your district (e.g. fish traps, tree scars, middens*).

There is a significant positive relationship between farmer identity and self-reported knowledge for 13 of the 19 items in Table 27. With three exceptions (Orange shading in Table 28) these are linear relationship. So self-assessed knowledge declines from Full-time to Non-farmers (i.e. across the four farmer identity cohorts).

Six of the knowledge items are expected to influence confidence in five in best-practice NRM. With overlap there are eight possible relationships between the items measuring these constructs**. In every case (8/8), there is a significant positive relationship between knowledge and confidence in best-practice NRM** [Table 29].

The remaining question is whether there is a significant positive relationship between the knowledge items and best-practice NRM implementation. **For nine of 18 knowledge items there is at least one best-practice item where it is assumed there will be a significant positive relationship.** Of the 17 items measuring best-practice, fifteen are included in Table 30. An additional item included in the background section (*Have you started preparing a property management plan or whole farm plan*) is also included in Table 30.

The results provide a strong body of evidence suggesting knowledge does influence best-practice implementation. For example, there is a significant positive relationship for the full period of management in each case.

TABLE 28. SIGNIFICANT RELATIONSHIPS BETWEEN FARMER IDENTITY AND SELF-ASSESSED KNOWLEDGE, 2019 (N=644, N=620 TO 610)
By mean scores and % selecting Sound/Very sound response options

Knowledge topic	Full-time farmer	Part-time farmer	Hobby farmer	Non-farmer
How to access up-to-date seasonal weather forecasts for your district	3.8 67%	3.7 65%	3.6 57%	3.4 46%
How ground cover on grazing or cropping paddocks prevents soil erosion	3.9 71%	3.8 68%	3.6 54%	3.1 35%
How to interpret results from soil testing	3.6 56%	3.4 50%	3.0 26%	2.5 14%
Laws and regulations that apply to the management of rural properties	3.5 50%	3.4 48%	3.2 55%	3.0 41%
Use soil testing to prepare a nutrient budget to increase soil productivity without the risk of high levels of nutrient run-off	3.5 48%	3.1 36%	2.5 20%	2.0 9%
Preparing a farm/property plan allocating land use according to land class	3.4 51%	3.0 38%	2.7 21%	2.3 15%
The role of microbiological/soil biota (e.g. bacteria and fungi) in soil health	3.2 37%	2.9 27%	2.7 26%	2.4 16%
How to interpret the results from water testing	3.1 35%	2.9 31%	2.7 21%	2.3 12%
Role of soil carbon in maintaining soil health	3.1 33%	2.9 31%	2.5 21%	2.4 17%
The processes leading to soil acidification	3.0 33%	3.0 40%	2.6 21%	2.2 9%
The impact of draining or grazing wetlands on native plants	3.0 23%	3.1 31%	2.9 25%	2.7 21%
The meaning of the term “regenerative farming”	2.8 22%	2.9 25%	2.9 23%	2.5 16%
The NRM priorities of the CCMA	2.3 9%	2.2 10%	1.9 2%	1.7 3%

Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test chi-square, $p<0.05$
Tan shading: significant positive, linear relationship based on mean scores. Orange shading: significant positive but non-linear relationship based on mean scores.

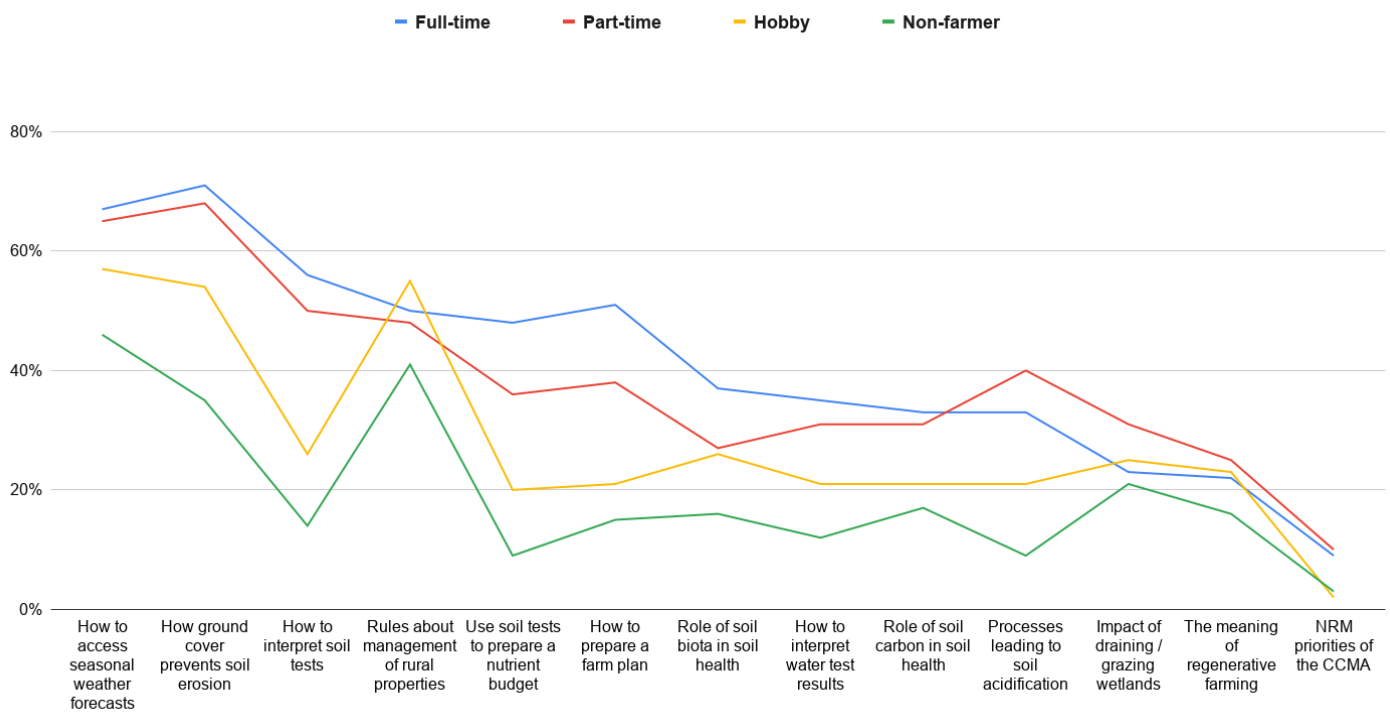


FIGURE 7. SIGNIFICANT RELATIONSHIPS BETWEEN FARMER IDENTITY COHORTS AND SELF-ASSESSED KNOWLEDGE OF NRM, 2019 (N=663)

TABLE 29. RELATIONSHIPS BETWEEN KNOWLEDGE AND CONFIDENCE IN BEST-PRACTICE NRM, 2019 (N=644, N=563 TO 523)

Knowledge items	Confidence measures	Nature of relationship
How to interpret results from soil testing	Soil testing is an essential first step in monitoring soil condition and making decisions about inputs	Significant positive
Use soil testing to prepare a nutrient budget to increase soil productivity without the risk of high levels of nutrient run-off		Significant positive
The benefits of retaining or improving the condition of native vegetation	▪ The time and expense involved in watering stock off waterways & wetlands is justified by the benefits ▪ Fencing to exclude stock is essential to improve waterways & wetlands	Significant positive Significant positive
The impact of draining or grazing wetlands on native plants		Significant positive Significant positive
How ground cover on grazing or cropping paddocks prevents erosion	The benefits of rotational or time-controlled grazing outweigh any costs	Significant positive
Why 20 metres has been set as the minimum width of buffers along waterways	The benefits of fencing waterways & wetlands to manage stock access are best achieved	Significant positive

Results of pairwise comparisons (so just two variables) using Kruskal-Wallis rank sum tests, p values <0.05
Tan shading: sustainable agriculture best-practice. Green shading: environmental best-practice.

TABLE 30. RELATIONSHIPS BETWEEN KNOWLEDGE AND BEST-PRACTICE NRM, 2019 (N=644)

Knowledge items	Relevant best-practice	Nature of relationship
How to interpret the results from soil testing	Tested soils for nutrient status in paddocks where have applied fertiliser/soil conditioners (including lime)	Significant +Full-period. Last 3 years, Next 3 years
Preparing a farm/property plan allocating land use according to land class	Have at least started preparing a property management plan or whole farm plan	Significant +
The benefits of retaining or improving the condition of native vegetation	Fenced native bush/grasslands to exclude stock access	Sig + Full period, Last 3 years, Next 3 years
	Planted locally indigenous trees & shrubs along waterways & wetlands	Sig + Last 3 years, Next 3 years
	Planted locally indigenous trees & shrubs on other areas of property	Sig + Full period, Last 3 years, Next 3 years
	Each year worked to control pest plants outside cropped areas	Sig + Full period, Last 3 years, Next 3 years
The impact of draining or grazing wetlands on native vegetation	Fenced waterways & wetlands to exclude stock access	Sig + Full period, Last 3 years, Next 3 years
	Established off-stream watering points for stock	Sig + Full period, Next 3 years
The processes leading to soil acidification	Applied lime to substantial areas of arable land on the property	Sig + Full period, Last 3 years, Next 3 years
How ground cover on grazing or cropping paddocks prevents soil erosion	Maintained sufficient ground cover to prevent soil erosion on most paddocks at the end of autumn	Sig + Full period, Last 3 years, Next 3 years
	Used minimum tillage (e.g. direct drilling) when sowing grass or crops	Sig + Full period, Last 3 years, Next 3 years
	Implemented cover cropping	Sig + Full period, Last 3 years, Next 3 years
	Used time controlled or rotational grazing	Sig + Full period, Last 3 years, Next 3 years
How to use soil testing to prepare a nutrient budget that will increase soil productivity without the risk of high levels of nutrient runoff	Tested soils for nutrient status in paddocks where have applied fertiliser/soil conditioners (including lime)	Sig + Full period, Last 3 years, Next 3 years
	Prepared a nutrient map for all/most of the property	Sig + Full period, Last 3 years, Next 3 years
Role of microbiology/soil biota (e.g. bacterial and fungi) in soil health	Applied soil treatments other than fertilizer and lime (e.g. organic manure, compost, biochar, soil inoculants)	Sig + Full period, Last 3 years, Next 3 years
The role of soil carbon in maintaining soil health	Implemented cover cropping	Sig + Full period, Last 3 years, Next 3 years
	Used time controlled or rotational grazing	Sig + Full period, Last 3 years, Next 3 years
	Used minimum tillage	Sig + Full period, Last 3 years, Next 3 years

Results of pairwise comparisons (so just two variables) using Kruskal-Wallis rank sum tests, p values <0.05
Tan shading: sustainable agriculture best-practice. Green shading: environmental best-practice.

11 WAYS FORWARD

11.1 Introduction

Through the RCS the CCMA is responsible for implementing Australian and Victorian government NRM programs. As in 2006, the 2019 survey invited respondents to indicate their interest in different ways they could be engaged through these programs. This topic included 11 items in both the 2006 and 2019 surveys [Table 31]. With some minor variations in wording, both the items and response options in the two surveys are the same.

The five main response options have been collapsed into three for presentation of data in tables (e.g. Table 31). Strong interest and Definitely interested become Very interested; Interested becomes Moderate interest; Some interest and Not interested become Limited interest. The proportion of respondents selecting Don't know/Not aware is included in the tables but not in the calculation of mean scores (those are therefore out of five).

11.2 Key findings

The most preferred option is a *Reduction in rates levied by local government*. This level of support for rate reductions is not surprising given that *Increasing land prices pushing up Council rates* is identified as an important issue by almost three quarters of respondents.

None of the listed options was preferred by at least half of all respondents. Even when combining Very interested and Moderate interest only four options are preferred by at least forty percent of respondents [Table 31, Figure 8]. And there are five options where more than half of all respondents said they had Limited interest [Table 31].

For all items in this topic, the proportion selecting Very interested is lower in 2019 than in 2006. There is also a pattern of a relatively high proportion of respondents (i.e. 15% to 27%) selecting the Don't know/Not aware response option. These two trends appear to be related and in turn, reflect, at least in part, the trends away from Full-time farming and engagement in NRM that are evident in survey data.

There is little difference across most items with farmer identity. This topic is also unique in that for each of the three options where there is a difference on farmer identity, it is not a linear trend (either positive or negative). Two of these items are in the top five in Table 31.

It seems there is some work to do to present and explain these options to rural property owners. These results also reinforce the importance of employing a range of policy instruments and allowing rural property owners to choose those that best fit their context.

TABLE 31. WAYS FORWARD: INTEREST IN DIFFERENT APPROACHES TO ENGAGEMENT IN GOVERNMENT PROGRAMS, 2019 (N=644, N=604 TO 586) AND 2006

Ways forward	Very Interested	Moderate Interest	Limited interest	Don't know/Not aware
Reduction in rates levied by local government	47% (47%)	24% (25%)	21% (21%)	8% (7%)
Fixed Grant Incentive Scheme to support onground work administered by CCMA	24% (40%)	24% (26%)	35% (25%)	17% (9%)
Annual payments for environmental services resulting from taking part of property out of production and actively managing ### PTF, HF, NF, FTF	21% (26%)	19% (20%)	45% (45%)	16% (9%)
Tax rebate administered by Aust Govt ### NF, HF, PTF, FTF	21% (38%)	22% (24%	36% (30%)	20% (8%)
Grant scheme administered by government departments	15% (22%)	20% (25%)	46% (43%)	19% (10%)
Extension staff working with landowners ### NF, HF, PTF, FTF	14% (16%)	19% (19%)	52% (57%)	15% (9%)
Through government funding of voluntary groups (e.g. Landcare)	14% (28%)	23% (22%)	51% (42%)	12% (8%)
Tender process: respond to public ads. Paid for work on your property	(10% 19%)	15% (24%)	48% (43%)	27% (14%)
Through non-government organisations (e.g. Greening Australia, Trust for Nature, VFF)	9% (17%)	16% (19%)	60% (55%)	14% (9%)
Access to coordinated voluntary labour to work on your property (e.g. prisoners, ATCV)	8% (13%)	10% (14%)	67% (65%)	15% (8%)
Annual lease payments for your land that would be managed by others (e.g. plantation forestry)	4% (6%)	7% (6%)	74% (77%)	15% (10%

Mean scores calculated after removing N/A responses. So mean out of 5

Significant difference across farmer identity cohorts, Kruskal-Wallis rank sum test chi-square, $p<0.05$.

() Data for 2006

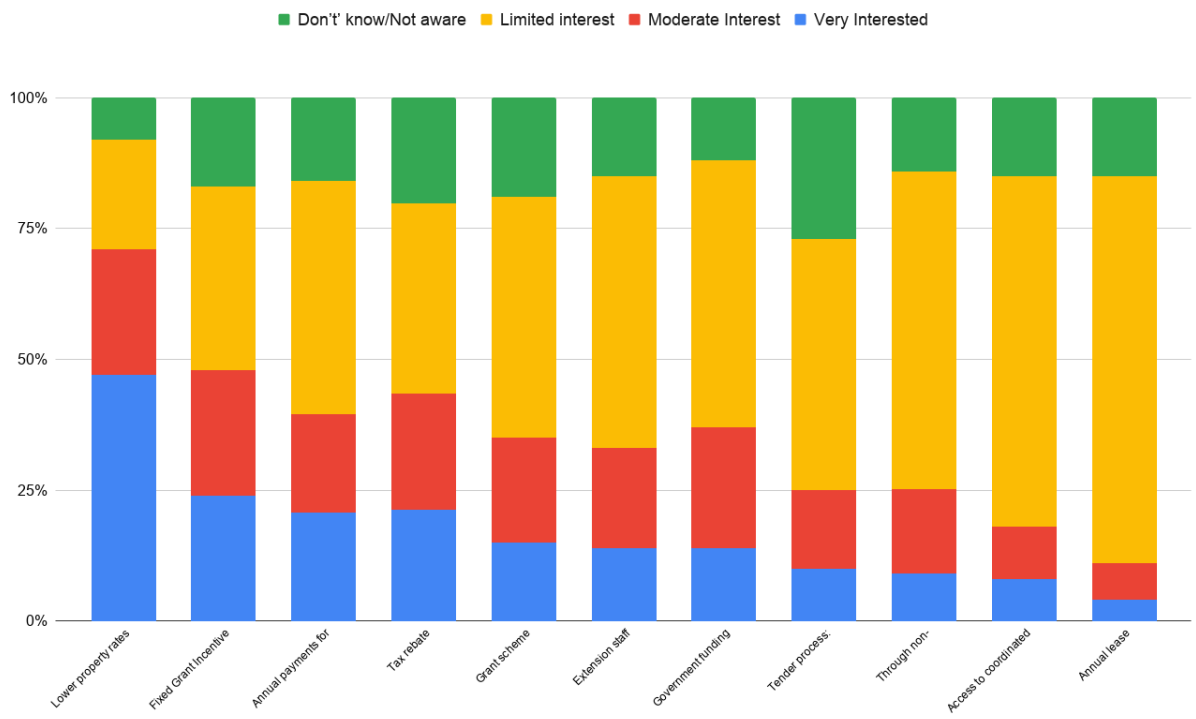


FIGURE 8. INTEREST IN APPROACHES TO ENGAGEMENT IN GOVERNMENT PROGRAMS, 2019 (N=644, N=604 TO 586)

12 LAND USE AND ENTERPRISE MIX

12.1 Introduction

The 2019 survey included 27 items exploring enterprise and land use during 2019. This topic is also in the 2006 survey. Where comparable items exist, data for 2006 are presented in Table 32. Respondents were simply asked to indicate by a tick which enterprises or land uses are relevant. Respondents were not asked for details of the area under each enterprise/land use or the types of crops or numbers of livestock. The Australian Bureau of Statistics Farm Surveys capture those data.

12.2 Key findings

The patterns in land use and enterprise mix and trends over time evident in Table 32 are consistent with the Corangamite region transiting to a multi-functional social landscape. That is, there is a mix of social, economic and environmental values being expressed through land use and enterprise decisions. While agriculture remains the principal land use on most private property, other values will often be more important to many property owners.

Other key evidence supporting the conclusion that the Region is becoming a multi-functional landscape includes:

- There is a large diversity of land uses and enterprises.
- *Broad acre cropping* typically requires expensive equipment and specialist knowledge and skills. *Cropping* is less common than either *Beef cattle* or *Sheep for wool or meat.* **The proportion of respondents with *Broad acre cropping* enterprises has declined by half since 2006.**
- The proportion of respondents engaged in most land uses/enterprises assumed to have a commercial focus, has declined since 2006. That trend is evident for *Irrigated agriculture* as well as *Dairying*, but also for *Beef cattle* or *Sheep for wool or meat*, despite high prices for the latter products.
- *Hay production for sale* is a commercial enterprise but typically requires less effort than either *Broad acre cropping* or *Beef cattle* and *Sheep for wool or meat.* Although there are no data for 2006, in 2019 almost one in three respondents said they were engaged in *Hay production for sale*.
- More than one in three respondents said they had *Areas set aside for living/recreation*; and *Areas where trees had been planted for conservation outcomes*.

TABLE 32. LAND USE AND ENTERPRISE MIX, 2019 (N=644) AND 2006

Land uses and enterprise types	% Yes 2019	% Yes 2006	Difference by LGA	Difference by farmer identity cohort
Pasture: perennial	45%	NA	***	### FTF, PTF, HF, NF
Pasture: annual	34%	NA	***	### FTF, PTF, HF, NF
Beef cattle	44%	53%	***	### FTF, PTF, HF, NF
Area set aside for living/recreation (e.g. gardens, pets, water bodies, vehicles)	39%	NA	***	### NF, HF, FTF, PTF
Trees planted for conservation outcomes (e.g. habitat erosion or recharge control)	37%	NA	No	No
Areas of remnant native vegetation	33%	53%	No	No
Sheep for wool or meat	32%	43%	***	### FTF, PTF, HF, NF
Hay production for sale	29%	NA	***	### FTF, PTF, HF, NF
Non-commercial domestic animals (e.g. horses, goats, sheep, alpaca)	16%	8%	***	### HF, NF, PTF, FTF
Forestry (e.g. bio-energy, woodlots, agroforestry, shelterbelts)	15%	13%	***	No
Broad acre cropping	13%	26%	No	### FTF, PTF, HF, NF
Dairying	12%	21%	***	### FTF (28%)
Energy utilities (e.g. wind, solar, gas)	11%	NA	No	# HF, FTF, PTF, NF
Other commercial livestock enterprises (e.g. goats, deer, horse studs, alpaca, dogs)	4%	NA	No	No
Viticulture	2%	6%	***	No
Horticulture	6%		No	No
Irrigated agriculture	4%	11%	***	### FTF (12%)
Raised bed cropping	4%	6%	No	No
Carbon sequestration (e.g. increase soil carbon)	4%	NA	No	No
Farm-based tourism (e.g. farm stays, B&B)	4%	6%	No	No
Conservation covenant attached to property title (e.g. Trust for Nature)	3%	8%	No	### NF, HF, PTF, FTF
Vegetation offsets	2.5%	NA	No	No
Feedlot animal production	2%	5%	No	### FTF, HF, PTF, NF
Free range pigs or poultry	2%	NA	***	No
Intensive housed/sheded animal production	2%	NA	***	### FTF, HF, PTF, NF
Land managed to conserve Aboriginal cultural heritage	2%	4%	No	No
Seasonal intensive housed/sheded animal production	1%	NA	No	No

All tests for differences used Pearson's Chi-squared test with p-value <0.05

13 IMPLEMENTATION OF BEST-PRACTICE NRM

13.1 Introduction

It is unlikely that implementation of a best-practice by 100% of rural property owners is the target for any NRM program or project. And NRM organisations are unlikely to have sufficient resources to engage all property owners. The key is that NRM organisations commit to and undertake strategic thinking about the level of change required to accomplish condition targets for different landscape assets. And then draw on available data and local knowledge to develop effective engagement strategies, including the suite of policy instruments, or Ways forward.

It is also important to acknowledge that a best-practice is just the approach to a threatening process that has been settled on given current knowledge and experience. For some issues, such as poor streamside vegetation condition, there are widely accepted best-practices. That is not always the case.

The 2019 CCMA survey has 17 items in this topic [Table 33]. Nine items have a companion item in the 2006 survey but only five these are directly comparable [Table 33].

The 2006 survey asked if respondents have implemented a practice and to provide the amount of work completed. In 2019, respondents are asked if they implemented a practice but not the amount of work completed. The 2019 survey also asks respondents if they have implemented each practice over three time periods: their full period of management; the last three years; and their intention for the next three years.

- Respondents more likely to implement environmental best-practices.
- Trend for smaller proportion of respondents to implement NRM best-practices.
- Those with stronger farmer identity are more likely to implement all sustainable agriculture best-practices and most environmental best-practices.
- Reporting any income from agriculture and reporting an on-property profit >$50K are both associated with implementation of NRM best-practice, particularly those focused on sustainable agriculture and involving considerable time, expense, expertise or access to complex technologies.
- Results of regression modelling provide strong validation of the conceptual framework that underpins selection of survey topics and items.

TABLE 33. IMPLEMENTATION OF BEST-PRACTICE NRM, 2019 (N=644) AND 2006

Best-practice NRM	Full period of management		Last 3 years	Next 3 years
	% Yes 2019	% Yes 2006	% Yes 2019	% Yes 2019
Each year have worked to control pest plants outside cropped areas (*NS by farmer identity full period mgt)	42%	88%	45%	33%
Each year have worked to control pest animals ###	39%		40%	30%
Maintained sufficient ground cover to prevent soil erosion on most paddocks at the end of autumn ###	41%	NA	46%	32%
Planted locally indigenous trees & shrubs on other areas of your property (*NS by farmer identity full period mgt)	38%	75%	36%	30%
Planted locally indigenous trees & shrubs along waterways & wetlands ###	24%		20%	17%
Used time controlled or rotational grazing ###	31%	52%	32%	24%
Tested soils for nutrient status in paddocks where have applied fertiliser/soil conditioners (including lime) ###	31%	NA	27%	20%
Upgraded infrastructure to more effectively use existing water supplies ###	27%	NA	25%	14%
Used minimum tillage (e.g. direct drilling) when sowing grass or crops ###	25%	42%	30%	20%
Applied lime to substantial areas of arable land on the property ###	25%	54%	22%	17%
Fenced native bush/grasslands to exclude stock access (*NS by farmer identity full period of mgt)	21%	31%	14%	8%
Fenced waterways & wetlands to exclude stock access ### For those with a waterway or wetland (N=371)	21% 37%	49%	13% 23%	8% 13%
Established off-stream watering points for stock ### For those with a waterway or wetland (N=371)	21% 38%	NA	13% 22%	8% 14%
Applied soil treatments other than fertilizer and lime (e.g. organic manure, compost, biochar, soil inoculants) ###	20%	NA	18%	16%
Implemented cover cropping ### Broad acre cropping (n=84) implemented last 3 years (n=35)	6% 22%	NA	5% 21%	5% 17%
Used precision farming techniques for cropping ### Broad acre cropping (n=84) implemented last 3 years (n=33)	6% 42%	NA	8% 31%	5% 20%
Prepared a nutrient map for all/most of the property ###	39%	NA	6%	7%

Significant difference in implementation across the four farmer identity cohorts.
Brown shading: 10 items focused on sustainable agriculture. Green shading: 7 items focused on environmental management.
*NS not significant across the farmer identity cohorts.

13.2 Key findings

The five best-practice NRM items most frequently listed in Table 33 include those with an environmental focus and those with an agriculture focus, but the pattern is of respondents more frequently implementing environmental best-practice. This is not surprising given that Full-time and Part-time farmers are more likely to implement sustainable farming practices but comprise only half of all respondents. It is also important to acknowledge that these summary data only address frequency and not the amount of work implemented.

Comparisons with 2006 results suggest there has been a decline in the implementation of work for all nine items that are repeated in 2019. That trend occurs for practices with an environmental focus as well as those with an agriculture focus. The latter trend is probably to be expected given the decline in the number of Full-time farmers who are more likely to be *Broad acre croppers* [Table 32].

There is a relationship between farmer identity and four of seven items exploring best-practice environmental management and all ten items for sustainable agriculture (i.e. 14 of 17 items) [Table 33, Table 22]. The results of regression modelling are summarised further on in the report but a brief note is provided here. **Farmer identity remained in the "best" regression model for 13 of the 14 items where pairwise comparisons identified a significant positive relationship.**

So far the impact of on-property income has not been discussed. **Pairwise comparisons reveal there is a significant positive relationship with *Reporting any income from agriculture* and 15 of the 17 best-practice NRM items.**

Somewhat counterintuitively**, there are fewer (only eight) significant positive relationships using pairwise comparisons when the income threshold is *Reported an on-property profit >$50K*.** With one exception (*Planted locally indigenous trees and shrubs on other areas of the property*), **these best-practices are focused on sustainable agriculture and involve considerable time, expense, access to complex technologies or substantial management skills:**

1. *Used minimum tillage;*
2. *Implemented cover cropping;*
3. *Used precision farming techniques;*
4. *Applied lime to substantial areas of arable land on the property;*
5. *Tested soils for nutrient status in paddocks where have applied fertiliser/soil conditioners (including lime);*
6. *Applied soil treatments other than fertiliser and lime (e.g. organic manure, compost, biochar, soil inoculants);* and
7. *Prepared a nutrient map for all/most of the property.*
8. *Planted locally indigenous trees and shrubs on other areas of the property.*

***Reporting any profit from agriculture* is included in the regression models for 13 of the 17 best-practice NRM items.** So, not for *Used precision farming techniques; Used time controlled or rotational grazing*; *Applied soil treatments other than fertiliser and lime (e.g. organic manure, compost, biochar, soil inoculants); and Fenced native bush/grasslands to exclude stock access.*

Reporting an on-property profit >$50K **is part of the regression models for only one environmental management item:** ***Planted trees & shrubs along waterways & wetlands*****. On the other hand,** ***Reporting an on-property profit >$50K*** **is part of the regression models for five of the sustainable agriculture items.**

13.3 Modelling best-practice implementation

This section provides a summary of results from logistic regression. From the results of pairwise comparisons a short list of variables was identified to include in the modelling for each best-practice. Regression modelling is only for the full period of management.

The aim is to develop models representing the 'best combination of factors' that explain implementation of each practice. So we are moving beyond pairwise comparisons that explore relationships between a best-practice item and one independent variable (e.g. a knowledge item) at a time.

Regression modelling is also a way of addressing the issue of multi-collinearity where two or more independent variables (e.g. Landcare participation and Involvement in a Government program) might be correlated and may in turn, have much the same impact on a dependent variable (e.g. fencing of native grasslands). Regression modelling will only include the independent variable with the strongest relationship with the dependent variable (i.e. the best-practice).

For reliable models there should be >20% of respondents selecting Yes, they are/have implemented a best-practice. That criterion is comfortably met for 12/15 items exploring implementation over the full period of management. The exceptions are: *Prepared a nutrient map for all/most of the propert*y; *Used precision farming techniques for cropping*; and *Implemented cover cropping*. In each case around 5% or the 644 survey respondents selected Yes.

Regression modelling can result in large sets of models as different variables are included or statistical criteria for selection of variables is adjusted. Only one model is presented in this report for each best-practice: the model providing the best explanatory power.

A score out of 100 is provided for each model that reflects the ability of the independent variables in the model to accurately predict Yes or No responses for best-practice implementation. The accepted standard is 70% of responses correctly predicted. Of the three models with <20% of respondents selecting Yes, only the model for *Prepared a nutrient map for all/most of the propert*y failed to meet the 70% threshold. No model is presented for this best-practice.

For the CCMA social benchmarking survey, some models correctly predict >95% of Yes and No responses, providing strong validation of the Conceptual framework that underpins selection of survey topics and items. Overall, eight of fourteen models meet the 70% threshold, five models are reasonably close to the threshold (i.e. >60%) and one model scored 58%.

Implemented cover cropping
94% of No responses on this best-practice item are correctly predicted by the items in the model below;
100% of Yes responses on this best-practice item correctly predicted; and
97% of all responses (i.e. No and Yes) are correctly predicted (so meets the 70% threshold)

- (attached value) *An important source of household income*
- (attached value) *Satisfaction from producing food and fibre for others*
- (long-term plan) *Additional land will be purchased, leased or share farmed*
- Extent of farmer occupational identity (FTF compared to others)
- *Income from agriculture last year*
- *Attended field days/farm walks/demonstrations on soil health in past 12 months*
- *Completed a short course relevant to property management in the past 5 year*
- *Have a business plan that describes current enterprises and outlines strategies to accomplish your goals for those or new enterprises*

A model that provides strong confirmation of the Conceptual framework and emphasises the important influence of farmer identity as a construct/concept that encapsulates a range of attributes from values to engagement in processes.

Used precision farming techniques for cropping
Correctly predicted 93% No, 100% Yes, 97% overall (well above the 70% threshold)

- (attached value) *Satisfaction from producing food and fibre for others*
- (issue or threat to values) *The condition or health of soils*
- (long-term plan) *Additional land will be purchased, leased or share farmed*
- Extent of farmer occupational identity (FTF compared to others)
- *Member of a local commodity group*
- *Attended field days/farm walks/demonstrations on soil health in past 12 months*
- *Income from agriculture last year*
- *Had a net profit >$50K last year*

Another example where the survey variables in the model correctly predict almost all responses to the best-practice item. In this case it is clear that farmer identity is the key.

Applied soil treatments other than fertiliser and lime (e.g. organic manure, compost, biochar, soil inoculants)
Correctly predicted 80% No, 83% Yes, 82% overall (above the 70% threshold)

- (attached value) *An important source of household income*
- (attached value) *Ability to pass on a healthier environment to future generations*
- (long-term plan) *Additional land will be purchased, leased or share farmed*
- Extent of farmer occupational identity (FTF compared to others)
- *Had a net profit >$50K last year*
- *Longer length of residence in local district*
- *Member of a local commodity group*
- *Attended field days/farm walks/demonstrations on soil health in past 12 months*
- *Have a business plan that describes current enterprises and outlines strategies to accomplish your goals for those or new enterprises*

Fenced waterways & wetlands to exclude stock access
Correctly predicted 78% No, 71% Yes, 75% overall (so above the 70% threshold)

- (attached value) *Provides an important source of household income*
- (issue or threat to values) *Poorly managed areas next to waterways & wetlands that have been fenced to exclude stock*
- (Confidence in best-practice) *Time and expense involved in watering stock off waterways & wetlands is justified by the benefits, including improvements in bank stability, native vegetation, water quality or stock health*
- *Extent of farmer occupational identity* (FTF compared to others)
- *Earned income from agriculture last year*
- *Longer length of residence in local district*
- *Attended field days/farm walks/demonstrations on native plants & animals in past 12 months*
- *Prepared/preparing a whole farm plan*
- *Completed a short course relevant to property management in the past 5 years*
- *Work funded, at least in part, by Australian and Victorian government programs past 5 years*
- *Property includes waterways & wetlands*

This model is a good illustration of the interaction between some of the key influences on implementation of best-practice NRM identified in the Conceptual framework. In this model there is the influence of values, farmer identity, engagement through platforms and processes (including government programs) and confidence in best-practice NRM.

Tested soils for nutrient status in paddocks where have applied fertiliser/soil conditioners (including lime)
Correctly predicted 73% No, 69% Yes, 71% overall (above the 70% threshold)

- (attached value) *An important source of household income*
- (long-term plan) *Additional land will be purchased, leased or share farmed*
- (confidence in best-practice) *Soil testing is an essential first step in monitoring soil condition and making decisions about inputs*
- Extent of farmer occupational identity (FTF compared to others)
- *Income from agriculture last year*
- *Had a net profit >$50K last year*
- *Longer length of residence in local district*
- *Member or involved with a local Landcare group*
- *Member of a local commodity group*
- *Completed a short course relevant to property management in the past 5 year*
- *Attended field days/farm walks/demonstrations on soil health in past 12 months*

Upgraded infrastructure to more effectively use existing water supplies
Correctly predicted 72% No, 67% Yes, 70% overall (meets the 70% threshold)

- (attached value) *An important source of household income*
- (attached value) *Satisfaction from producing food and fibre for others*
- (attached value) *Ability to pass on a healthier environment to future generations*
- (issue or threat to values) *Risk to life and property from wildfires*
- (long-term plan) *Additional land will be purchased, leased or share farmed*
- Extent of farmer occupational identity (FTF compared to others)
- *Income from agriculture last year*
- *Had a net profit >$50K last year*
- *Longer length of residence in local district*
- *Member of a local commodity group*
- *Completed a short course relevant to property management in the past 5 year*
- *Attended field days/farm walks/demonstrations on soil health in past 12 months*
- *Have a business plan that describes current enterprises and outlines strategies to accomplish your goals for those or new enterprises*
- *Prepared/preparing a whole farm plan*

Planted locally indigenous trees & shrubs along waterways & wetlands
Correctly predicted 78% No, 63% Yes, 70% overall (i.e. No and Yes) (meets the 70% threshold)

- (attached value) *Provides an important source of household income*
- (issue or threat to values) *Poorly managed areas next to waterways & wetlands that have been fenced to exclude stock*
- *Extent of farmer occupational identity* (FTF compared to others)
- *Earned income from agriculture last year*
- *Had a net profit >$50K last year*
- *Member or involved with local Landcare group*
- *Attended field days/farm walks/demonstrations on native plants & animals in past 12 months*
- *Completed a short course relevant to property management in the past 5 years*
- *Property includes waterways & wetlands*

This model is a good illustration of the influence of farmer identity on best-practice implementation by rural property owners in the Corangamite region.

Established off-stream watering points for stock
Correctly predicted 78% No, 61% Yes, 70% overall (so meets the 70% threshold)

- (attached value) *Provides an important source of household income*
- (confidence in best-practice) *Time and expense involved in watering stock off waterways & wetlands is justified by the benefits, including improvements in bank stability, native vegetation, water quality or stock health*
- Extent of farmer occupational identity (FTF compared to others)
- *Earned income from agriculture last year*
- *Longer length of residence in local district*
- *Attended field days/farm walks/demonstrations on native plants & animals in past 12 months*
- *Prepared/preparing a whole farm plan*
- *Property includes waterways & wetlands*

Used minimum tillage (e.g. direct drilling) when sowing grass or crops
Correctly predicted 73% No, 67% Yes, 70% overall (meets the 70% threshold)

- (attached value) *An important source of household income*
- (attached value) *Satisfaction from producing food and fibre for others*
- (issue or threat to values) *The condition or health of soils*
- (long-term plan) *Ownership of the property will stay within the family*
- (long-term plan) *Additional land will be purchased, leased or share farmed*
- Extent of farmer occupational identity (FTF compared to others)
- *Earned income from agriculture last year*
- *Had a net profit >$50K last year*
- *Longer length of residence in local district*
- *Member of a local commodity group*
- *Attended field days/farm walks/demonstrations on soil health in past 12 months*
- *Have a business plan that describes current enterprises and outlines strategies to accomplish your goals for those or new enterprises*

Used time controlled or rotational grazing
Correctly predicted 70% No, 63% Yes, 67% overall

- (attached value) *An important source of household income*
- (attached value) *Satisfaction from producing food and fibre for others*
- issue or threat to values) *The condition or health of soils*
- (long-term plan) *Additional land will be purchased, leased or share farmed*
- (confidence in best-practice) *The benefits of rotational or time controlled grazing outweigh any costs*
- Extent of farmer occupational identity (FTF compared to others)
- *Longer length of residence in local district*
- *Member of a local commodity group*
- *Attended field days/farm walks/demonstrations on soil health in past 12 months*
- *Have a business plan that describes current enterprises and outlines strategies to accomplish your goals for those or new enterprises*
- *Prepared/preparing a whole farm plan*

Maintained sufficient ground cover to prevent soil erosion on most paddocks at the end of autumn
Correctly predicted 67% No 64% Yes, 65% overall

- (attached value) *An important source of household income*
- (attached value) *Satisfaction from producing food and fibre for others*
- (confidence in best-practice) *The benefits of rotational or time controlled grazing outweigh any costs*
- Extent of farmer occupational identity (FTF compared to others)
- *Earned income from agriculture last year*
- *Longer length of residence in local district*
- *Member of a local commodity group*
- *Completed a short course relevant to property management in the past 5 year*
- *Have a business plan that describes current enterprises and outlines strategies to accomplish your goals for those or new enterprises*
- *Prepared/preparing a whole farm plan*

Applied lime to substantial areas of arable land on the property
Correctly predicted 65% No, 62% Yes, 64% overall

- (attached value) *An important source of household income*
- (attached value) *Satisfaction from producing food and fibre for others*
- (issue or threat to values) *The condition or health of soils*
- (long-term plan) *Additional land will be purchased, leased or share farmed*
- Extent of farmer occupational identity (FTF compared to others)
- *Earned income from agriculture last year*
- *Had a net profit >$50K last year*
- *Longer length of residence in local district*
- *Member or involved with a local Landcare group*
- *Member of a local commodity group*
- *Completed a short course relevant to property management in the past 5 year*
- *Attended field days/farm walks/demonstrations on soil health in past 12 months*
- *Have a business plan that describes current enterprises and outlines strategies to accomplish your goals for those or new enterprises*

This model is probably the best illustration of the expected relationship between farmer identity, profitability and implementation of an expensive input (i.e. lime).

Each year worked to control pest animals
Correctly predicted 64% No, 61% Yes, 63% overall

- (attached value) *Provides an important source of household income*
- Extent of farmer occupational identity (FTF compared to others)
- *Earned income from agriculture last year*
- *Longer length of residence in local district*
- *Attended field days/farm walks/demonstrations on native plants & animals in past 12 months*
- *Prepared/preparing a whole farm plan*
- *Completed a short course relevant to property management in the past 5 years*

Planted locally indigenous trees and shrubs on other areas of your property
Correctly predicted 64% No, 61 Yes, 62% overall

- (attached value) *Ability to pass on a healthier environment to future generations*
- (attached value) *Native vegetation provides habitat for native animals*
- *Earned income from agriculture last year*
- *Longer length of residence in local district*
- *Attended field days/farm walks/demonstrations on native plants & animals in past 12 months*
- *Completed a short course relevant to property management in the past 5 years*
- *Prepared/preparing a whole farm plan*

This model is a good illustration of the influence of values and engagement through platforms and processes expected to lead to dialogue, learning and action.

Each year have worked to control pest plants outside cropped areas
Correctly predicted 62% No, 60% Yes, 61% overall

- (attached value) *Provides an important source of household income*
- *Longer length of residence in local district*
- *Member of a local commodity group*
- *Earned income from agriculture last year*
- *Attended field days/farm walks/demonstrations on native plants & animals in past 12 months*
- *Prepared/preparing a whole farm plan*
- *Completed a short course relevant to property management in the past 5 years*

Fenced native bush/grasslands to exclude stock access
Correctly predicted 77% No, 38% Yes, 58% overall

- (attached value) *Ability to pass on a healthier environment to future generations*
- (attached value) *Native vegetation provides habitat for native animals*
- (attached value) *A place or base for recreation*
- (issue or threat to values) *Impact of pest plants & animals on native plants & animal*s
- *Longer length of residence in local district*
- *Attended field days/farm walks/demonstrations on native plants & animals in past 12 months*
- *Prepared/preparing a whole farm plan*
- *Completed a short course relevant to property management in the past 5 years*
- *Work funded, at least in part, by Australian and Victorian government programs past 5 years*
- *Earned income from agriculture last year*

Again, a model illustrating the influence of values and engagement through platforms and processes expected to lead to dialogue, learning and action (including government programs).

Prepared a nutrient map for all/most of the property
No model is presented for this best-practice. There needs to be >20% of respondents selecting Yes for reliable model development. In this case, only 35 respondents said Yes they are/have implemented this practice (i.e. <20%).

14 BACKGROUD PERSONAL AND FARMING ATTRIBUTES

14.1 Introduction and Findings

This section provides a regional profile for the property and personal attributes of respondents. Some of these items have not been covered elsewhere in the report. Summaries at the regional scale mean that important differences by farmer identity and geography are "hidden". Table 23 reveals the extent of differences across the four farmer identity cohorts; and the Local Government profiles in the next section reveal differences across LGAs.

Table 34 provides a useful introductory table and is part of the Executive Summary. **Comparisons with 2006 survey data reveal important trends consistent with the earlier conclusion that the Corangamite region is increasingly a multi-functional social landscape.** The main caveat is that, as indicated earlier in Table 23, Full-time farmers own 76% of the land area owned by survey respondents (88% in 2006) so agriculture remains the dominant land use across the Corangamite region.

Evidence in Table 34 consistent with a multi-functional transition occurring in the Corangamite region includes:

1. Property size down by >50% to 50 ha;
2. More property owners leasing, agisting or share farming (strategy for those engaged in agricultural enterprises to adapt to rising land prices);
3. Full-time farmers down from 53% to 33%;
4. Fewer property owners had agricultural enterprises, including beef cattle;
5. Fewer property owners reported a profit from agriculture;
6. Over one third of property owners have areas set aside for living/recreation;
7. Property owners less engaged in more intensive/complex agriculture enterprises (e.g. broad acre cropping, dairying);
8. More property owners with off-property work;
9. Half of all property owners working <20 hours per week on their property;
10. Close to half the property owners employed a contractor in the last year; and
11. Less property owners were engaged in NRM platforms (e.g. Landcare), processes (e.g. short courses) and government programs.

More women completed the survey in 2019 and women are more likely to be Non-farmers and Hobby farmers (about 40%) than Part-time farmers or Full-time farmers (about 20%). So it seems this trend is part of the multi-functional transition.

The median age increased from 55 years in 2006 to 61 years in 2019. Life expectancy for Australians is increasing, but not by six years over a 13 year period. There is no difference in median age across the four farmer identity cohorts so the increased age of rural property owners cannot be attributed to more Full-time farmers continuing to live on their properties for longer. It seems that new property owners, regardless of their farmer identity, must, on average, be older than 55 years. That could happen as older folk purchase newly subdivided rural land (i.e. no previous owner); or as slightly older folk replace existing rural property owners. To the extent there are younger people taking on farming that trend is

over-whelmed by other trends, including retirees or those semi-retired purchasing a rural property, including with the intention to be a Full-time or Part-time farmer.

TABLE 34. A REGIONAL PROFILE OF PROPERTY AND PERSONAL ATTRIBUTES, 2019 (N=644) AND 2006

Key attributes	2019	2006
% who are full-time farmers	33%	53%
Property size	50 ha	130 ha
Property leased, share farmed or agisted from others	38%/75ha	26%/67 ha
Property leased, share farmed or agisted by others	49%/38ha	24%/NA
Beef cattle	44%	53%
Area set aside for living/recreation (e.g. gardens, pets, dams, vehicles)	39%	NA
Broadacre cropping	13%	26%
Sheep for meat or wool	32%	43%
Other livestock (e.g. goats, deer, horse stud, alpaca, dogs)	16%	8%
Dairying	12%	21%
Wetland or waterway on property	64%	NA
Age	61 years	55 years
Respondents who are women	29%	18%
Absentee owners	25%	23%
Longest period of time you/family owned property	30 years	NA
Time lived in local district	36 years	34 years
Period lived on property	25 years	NA
Paid off-property work last year and mean days	65%/91 days	49%/83 days
You/spouse received net off-property income 2018/19	No 45%, Me 42%, Spouse 13%	NA
Other family members working full-time on property	20%	NA
Hours worked on-property per week past year	20 hours	NA
Income from agriculture 2018/19	59%	NA
% of all survey respondents with net profit from agriculture 2018/19	31%	61%
% all survey respondents with net profit from agriculture >$50K	14%	34%
Landcare member/participant	30%	35%
Local commodity group participant	10%	18%
Work funded, at least in part, by Government programs past 5 years	16%	26%
Completed short course past 5 years	14%	37%
Prepared/preparing a property management plan/whole farm plan	43%	41%
Have a long-term plan or vision about improvements on property	75%	NA
Have a business plan	17%	NA
Attend field day/farm walk/demonstration on native plants & animals last 12 months	30%	NA
Attend field day/farm walk/demonstration on soil health last 12 months	20%	NA
Employed a consultant last 12 month	18%	23%
Employed a contractor last 12 months	49%	NA

15 Local Government profiles

15.1 Introduction and profiles

This section provides profiles for the seven LGAs in the Corangamite region. These profiles reveal some of the regional variation masked by the regional summary in Table 34. Information in Table 35 includes a substantial proportion of the survey items, but not all. The objective in making that selection was to provide useful insights for regional NRM practitioners, especially those new to the region. For some items in the profiles there is a statistically significant difference across the LGAs. But that is not often the case, even when there appears to be some variation. The local governments engaged through the survey process requested a summary of survey data for their LGA. A separate report provides an individual profile for each LGA.

TABLE 35. LGA PROFILES

ASSESSMENT OF ISSUES	BALLARAT	COLAC-OTWAY	CORANGAMITE	GOLDEN PLAINS	GREATER GEELONG	MOORABOOL	SURF COAST
Risk to life and property from wildfires	93%	91%	87%	87%	71%	81%	86%
The condition or health of soils	77%	90%	88%	78%	84%	90%	89%
Increasing land prices pushing up Council rates	63%	80%	73%	69%	79%	78%	76%
Management of pest plants and animals	88%	87%	86%	86%	90%	95%	85%
The impact of pest plants and animals on native plants and animals	75%	70%	74%	78%	82%	73%	76%
Low profitability of farm enterprises	44%	75%	81%	59%	64%	72%	73%
The expected trend to a warmer, drier climate	75%	56%	48%	70%	80%	61%	65%
Impact of large scale forestry enterprises on community viability	32%	55%	52%	35%	27%	37%	38%
Impact of windfarms on landscape quality/amenity	32%	29%	26%	24%	29%	44%	30%
Dams on rural properties reducing runoff to waterways & wetlands	25%	24%	18%	22%	19%	17%	22%

LONG TERM PLANS	BALLARAT	COLAC-OTWAY	CORANGAMITE	GOLDEN PLAINS	GREATER GEELONG	MOORABOOL	SURF COAST
Ownership of the property will stay within the family	63%	61%	54%	68%	61%	67%	65%
I will live on the property	82%	62%	62%	69%	67%	76%	76%
The property will be sold	28%	23%	28%	23%	18%	24%	18%
Additional land will be purchased, leased or share farmed	5%	20%	22%	15%	11%	14%	21%
FAMILY SUCCESSION							
Have family members interested in taking on property in the future	23%	45%	34%	34%	40%	38%	32%
ATTACHED VALUES							
Natural setting makes this an attractive place to live	95%	87%	89%	82%	84%	91%	93%
A great place to raise a family	84%	74%	78%	62%	69%	79%	80%
Ability to pass on a healthier environment to future generations	67%	80%	80%	76%	69%	75%	74%
An asset that is an important part of family wealth	54%	69%	78%	57%	65%	64%	77%
A place or base for recreation	70%	48%	43%	63%	66%	59%	48%
BELIEFS/ATTITUDES							
Landholders should manage their properties in expectation of drought events	91%	88%	85%	89%	90%	91%	96%
State and local governments should protect farmland from the impacts of urban sprawl	74%	81%	64%	82%	63%	91%	73%

BELIEF ABOUT PRIVATE PROPERTY RIGHTS	BALLARAT	COLAC-OTWAY	CORANGAMITE	GOLDEN PLAINS	GREATER GEELONG	MOORABOOL	SURF COAST
Landholders should be able to develop their property even if that results in the loss of native grasslands	33%	45%	51%	30%	37%	43%	27%
WILLOW REMOVAL							
The cost of willow removal is justified by improvements in the condition of waterways & wetlands	55%	49%	43%	46%	38%	37%	51%
BELIEF IN HUMAN INDUCED CLIMATE CHANGE							
Human activities are influencing changes in climate	76%	56%	57%	70%	66%	67%	68%
TRUST IN CCMA							
I can rely on the CMA Board and staff to provide useful advice about NRM	30%	36%	44%	39%	41%	45%	49%
INFORMATION SOURCES							
BOM	74%	64%	71%	57%	69%	61%	63%
Newspapers	44%	59%	56%	50%	44%	39%	40%
Radio	32%	34%	39%	23%	27%	29%	22%
Internet	61%	45%	50%	48%	47%	49%	53%
Local Council	32%	28%	31%	32%	27%	25%	25%
Friends/ neighbours/ relatives	49%	55%	53%	49%	59%	46%	58%
LAND USE							
Dairying	2%	25%	35%	1%	0%	7%	3%
Beef cattle	21%	60%	60%	28%	40%	41%	45%
Sheep for wool or meat	18%	22%	20%	42%	32%	49%	42%
Viticulture	0%	0%	0%	4%	7%	0%	3%
Irrigated agriculture	0%	8%	5%	1%	6%	9%	1%
FARMER IDENTITY							
Full-time farmer	0%	49%	62%	19%	18%	29%	36%
Part-time farmer	8%	16%	22%	23%	26%	29%	20%
Hobby farmer	27%	18%	10%	29%	36%	31%	36%
Non-farmer	65%	17%	6%	29%	20%	12%	8%

AT SOME TIME DURING PERIOD OF MANAGEMENT	BALLARAT	COLAC-OTWAY	CORANGAMITE	GOLDEN PLAINS	GREATER GEELONG	MOORABOOL	SURF COAST
Planted locally indigenous trees & shrubs along waterways & wetlands	11%	30%	28%	23%	21%	20%	32%
Planted locally indigenous trees & shrubs on other areas of your property	32%	41%	35%	37%	46%	31%	45%
Fenced native bush/grasslands to exclude stock access	12%	23%	20%	19%	24%	25%	26%
Fenced waterways & wetlands to exclude stock access	4%	23%	36%	20%	16%	19%	26%
Established off-stream watering points for stock	5%	30%	24%	15%	15%	19%	37%
Each year have worked to control pest plants outside cropped areas	30%	47%	45%	39%	43%	41%	45%
Used minimum tillage (e.g. direct drilling) when sowing grass or crops	5%	33%	26%	20%	28%	22%	28%
Used time controlled or rotational grazing	11%	42%	43%	19%	34%	34%	30%
Maintained sufficient ground cover to prevent soil erosion on most paddocks at the end of autumn	18%	45%	49%	35%	44%	42%	51%
Applied lime to substantial areas of arable land on the property	4%	29%	40%	23%	21%	25%	26%
Tested soils for nutrient status in paddocks where have applied fertiliser/soil conditioners (including lime)	7%	35%	46%	28%	27%	32%	32%
Upgraded infrastructure to more effectively use existing water supplies	11%	31%	33%	26%	19%	19%	38%

PERSONAL AND PROPERTY ATTRIBUTES	BALLARAT	COLAC-OTWAY	CORANGAMITE	GOLDEN PLAINS	GREATER GEELONG	MOORABOOL	SURF COAST
Property is principal place of residence	91%	66%	81%	69%	80%	82%	79%
The area of rural land owned within the Corangamite region	6 ha	162 ha	136 ha	43 ha	32 ha	45 ha	43 ha
Area of additional land managed (lease/ sharefarm/ agist from others)	6% yes 20 ha	28% yes 100 ha	24% yes 80 ha	17% yes 90 ha	10% yes 48 ha	18% yes 29 ha	15% yes 45 ha
Longest period of time you/family owned or managed the property	15 yrs	40 yrs	40 yrs	30 yrs	24 yrs	38 yrs	25 yrs
Other family members working full-time on your property	2%	33%	29%	13%	13%	16%	16%
Respondents who are men	50%	75%	78%	75%	63%	72%	66%
Age	58 yrs	62 yrs	60 yrs	61 yrs	63 yrs	63 yrs	63 yrs
Years lived on property	14 yrs	35 yrs	30 yrs	20 yrs	20 yrs	23 yrs	20 yrs
Member or involved with a local Landcare group	9%	26%	41%	32%	30%	34%	36%
Hours per week worked on property past 12 months	85% yes 10 hrs	93% yes 30 hrs	86% yes 50 hrs	84% yes 17 hrs	84% yes 15 hrs	91% yes 20 hrs	92% yes 20 hrs
Days involved in paid off-property work past 12 months	46% yes 200 days	36% yes 200 days	24% yes 193 days	47% yes 200 days	41% yes 100 days	40% yes 125 days	47% yes 100 days
Attended field days/farm walks/demonstrations on native plants & animals past 12 months	15%	27%	35%	29%	31%	36%	34%
Attended field days/farm walks/demonstrations on soil health past 12 months	11%	23%	28%	16%	16%	20%	25%
Employed a consultant to provide advice on property management past 12 months	2%	26%	21%	15%	14%	14%	21%

Employed a contractor to undertake work on property past 12 months	26%	58%	63%	42%	38%	44%	57%
Work funded by Australian or Victorian government programs in past 5 years	4%	16%	19%	19%	23%	18%	12%
Earned income from agriculture on property in the Corangamite region during 2018/19	19%	73%	83%	46%	52%	69%	66%
Net profit from agriculture >$50,000 2018/19 (% of all respondents)	2%	22%	31%	11%	0%	20%	14%
Received a net off-property income 2018/2019	Me 46% Spouse 10%	Me 34% Spouse 15%	Me 28% Spouse 21%	Me 48% Spouse 11%	Me 47% Spouse 14%	Me 50% Spouse 9%	Me 47% Spouse 11%

16 OTHER COMMENTS

16.1 Introduction and results summary

At the end of the survey (inside rear cover) respondents could provide comments on any topic. A full page was available and respondents were invited to attach additional sheets.

One hundred and eighty-five respondents (29% of all respondents) provide comments. Most of these comments cover a paragraph of text (77%). The longest response is 656 words and the topic is the social and environmental impacts of unmanaged access to public land adjacent to private property. Four other respondents provide lengthy comments. Other respondents provide single sentence comments. Some of these are lengthy sentences, others a few words.

The comments fit four into four broad themes:

1. Issues of concern.
2. CMA, Local government and State and Federal role, policies and administration.
3. The respondent's story, passion and future intentions.
4. The survey booklet and process.

Issues of concern:

The topics highlighted are much the same as those in the survey Issues topic. The most frequently discussed issues are:

1. The threat of wildfires, particularly as a result of poor roadside vegetation management.
2. Pest plants such as gorse, blackberry, ragwort and willows. Some focus on the need to ensure neighbours, including public authorities, discharge their responsibilities.
3. Pest animals, with particular reference to kangaroos wherever there is a large population damaging native plants, fences and there are collisions with vehicles on roads.
4. Council rates are thought to have increased rapidly as property values have risen and are identified as a key constraint to farm business profitability and viability. There are comments from some managing their properties for what they see as public good outcomes (i.e. biodiversity, carbon sinks) complaining that high Council rates are "unfair".
5. There are many comments about the management of waterways and wetlands. There is a large number of issues, including the impacts of irrigation on river and stream flows, similarly for farm dams, pollution as a result of chemical runoff from farmland and roads, stock continuing to access river frontages and wetlands.
6. Climate change is discussed by several respondents with views split between sceptics and believers in human induced changes to climate.
7. Some respondents are very concerned about the impacts of rural subdivision on their way of life, social cohesion and the ability of farmers to operate at the rural-urban interface. Others want the right to subdivide.
8. As with the climate change topic, there are comments by supporters and opponents of windfarms.

9. The management of roads is an important issue for many respondents. Those concerns range from water flowing onto and settling on roads and becoming a traffic hazard, roadside vegetation becoming a fire hazard and the poor quality of rural roads.
10. Willow removal is also a topic of considerable interest. **Most respondents who provided comments believe existing approaches to willow removal are ineffective, largely because property owners and NRM agencies do not return to manage regrowth.** Others support the removal of willows.
11. There are some comments suggesting a 20m buffer along waterways is insufficient. Others are concerned that CCMA rules are too much a "one size fits all" approach.
12. Some respondents are concerned about soil health issues.
13. There are concerns about the destruction of native vegetation as a result of illegal clearing of trees and also as a result of ploughing grasslands for fire breaks.

A small sample of those comments is provided below. The quotes illustrate the level of concern about issues, the diversity of opinion on issues amongst respondents and include some suggestions of ways forward. Above all, the comments emphasise the passion, commitment and attachment of rural property owners to their properties.

Encourage all CFA Brigades to undertake more burning of major firebreaks, this enhances the health of native grass and flowers, while reducing wildfire situations. Encourage Vicroads and local shire councils to undertake removal of scrub and trees presently growing in rural road reserves. An example is C145 Winchelsea to Inverleigh road. 8k from Winchelsea, large trees within a metre of the sealed 100 km/hour road. This reduces road accident risk. It also reduces fire risk as grass mower could then mow all the road reserve back to the fence. Inverleigh common appears to be a major fire disaster waiting to happen. A prudent action would be to double the width of the fire break on southern boundary.

My main areas of concern are the increasing problem of feral animals and noxious weeds, both in cleared and forested areas. While there has always been a problem with foxes and feral cats, there is now a massive problem with feral deer. Even when using wire mesh guards when planting mana gum and other trees, deer destroy plants as they grow past waist height. There are no issues with kangaroos and wallabies, however deer are relentless in their destruction of plants. The other concern is blackberries growing upstream of our property on Sandy creek. Until 10 years ago, there were only ferns, blackwoods, eucalyptus and other native plant species. Now blackberries are taking over parts of this once pristine area. I would welcome the opportunity to show anyone at CCMA the area I'm referring to. There is also an increasing number of unknown plant species growing along Sandy Creek. I'm unsure if these are weeds or native species. Any guidance on this would be much appreciated.

I do not believe that willows are a weed. They were planted 60+ years ago to stabilise banks from erosion. I have seen the results of my neighbours who did so. Global warming and flash floods are a distant threat to our creeks and rivers. They provide deep shade pools to the benefit of fish. Eucalypts do not. They are also the source of the most widely used medicine in the world - aspirin. Once felled they are instantly devoured by livestock, leaves bark, the lot. Almost all trees provide habitat and sustenance for birds and other wildlife not just natives. Nothing annoys me more than botanical bigotry.

Having lived and farmed for 60 years I believe my experience should count for a lot more than some bureaucrat or green person telling me how wonderful it would be to fence off a waterway, put in pump and troughs for livestock

drinking, but those people do not have to maintain those areas, fences and pumps etc. when flood happens, it may be one in so many years or in 2 weeks time (again) What a mess! Keep fences 20 metre buffer is not possible in some cases road access/bridge access and confined valley topography. Pioneer neighbour showed me how to care for the creek by planting willow trees. Shock horror in this politically correct brainwashed age, willows have held the stream (fast flowing) banks together where eucalypts washed away. Platypus and fish have flourished, willows are not a problem on a fast flowing stream next to the ocean - that may be different inland. Also willows are not a fire hazard.

The unique natural amenity that is Lake Modewarre is a natural asset that was previously a tremendous source of leisure opportunities, indigenous wild life and aboriginal history. What is the CMA going to do about protecting, nurturing and enhancing this unique asset? In the past few decades climate change, diversion of catchment flows from Mt Moriac by Vic roads, Surf Coast shire and Barwon waters need for our water have destroyed this tremendous amenity. What is the CMA doing about this?

Local shires should be more active in managing weed control along road sides. SA is not sufficient to just say it is a Vic roads responsibility. CCMA and water authorities should be more active in willows removal from waterways rivers etc and ongoing weed control along water ways.

Council rates are very concerning. Please listen to us as ratepayers. Rates make up 2-4% of a % when compared to our income. It directly affects our businesses and therefore our community, less spending etc. Our ability to service these costs have not increased like our land values. Action is needed. We are not seeing anything done. Yes we are listened to but NO ACTION. We cannot be more disappointed.

Waterways though Agriculture (dairying) running through property - polluted. EPA - Pathetic !!!

The biggest issue for the region is urban encroachment and re zoning. Councils are using it as a cash grab that will have huge negative impact on both the environment and farm profitability going forward. We need to stop zoning now. Stop breaking up sustainable farms into suburbs on hobby harms. We are destroying the environment and community we all love.

In the past year have had CMA arrange for spraying of blackberries along our frontage of the river (outside our boundary). This is appreciated and needs to be an ongoing project. Two major wildlife concerns are the proliferation of kangaroos (we like them around but not in plague numbers) and the dramatic decline in koala numbers.

Roadside conservation areas do not make sense, I do not know if anyone has done the risk assessment. You want to encourage landowners to keep them clear. Traffic usually at high speed on these roads and you want to maximise visibility and discourage animals to frequent or inhabit the area. It is unsafe for animals and motorbikes. We barely have the human resources to establish these areas, we do not have resources to manage them. They get overidden by weeds, pests and become heavily overloaded by fuel. These areas and roadsides need to be incorporated into rotational grazing by landholders.

The 20 metre protect zone around waterways is a) unclear how measured. b) (A) should be put on website. c) 20 metres if both sides of stream (40 metres) seems excessive and take up to much land. d) a smaller area would

encourage people to plant out area. Need use of agricultural contractors on website to help absentee owner to find contractors.

CMA, Local government and State and Federal role, policies and administration

There are many comments on this topic and most focus on planning/zoning issues. It seems some respondents are particularly affected by conservation and farming zone overlays. For these people, existing rules are too restrictive and there is too much red-tape.

Many respondents believe the effectiveness of NRM programs would improve if follow-up was funded as part of the initial program. There are many comments about the importance of state agencies use existing rules to ensure property owners take action to manage weed.

One-off grants for fencing waterways and wetlands is a great incentive, but it is the ongoing maintenance and cost that is borne by the landowner. That is the greatest burden. Weed control is the greatest problem as water carries and disperses weed seed. A percentage of any grant for say fencing, water supply and revegetation should be quarantined for a five to ten year annual maintenance program until programs are fully established and become self-maintaining.

I object to the overlord attitudes of Colac/council/CMA/CFA. I'd like to build a small holiday cottage but the planning permits are so expensive and overloaded with contradictory requirements and are making my future on this property untenable.

Leasing salt affected land on the edge of Lake Corangamite should be stopped and back paid to land holders. If it's salty nothing grows properly. Irrigation around alive area should be capped annually and over users charged substantial amounts as fines. It seems the pumping of groundwater around Alvie has lowered the groundwater to the point of all lakes drying up. Tyrangower creek should be cleaned out regularly to allow in flow in to Corangamite Lake.

Of particular concern to me are weed control which in places like Lavers Hill is non existing on both farms and small properties. Far more attention needs to be given to enforcement. Water harvesting on properties requires control. Harvesting for stock use is ok. However, harvesting for pasture/crop irrigation should be controlled to ensure environmental stream flows are maintained. Pumping from aquifers should be strictly restricted to ensure longer term sustainability, using realistic recharge rates based on actual long term data for climate change. The interaction between streams and aquifers must also be fully understood to ensure environmental stream flows. Long-term monitoring of bore date at stream interface sites is required where these sites are some distance away from the bore field site.

Insufficient pressure is placed on neighbouring properties that do not address serrated tussock issues.

1. Reducing the dependency on irrigation water and watering systems to satisfactorily increase crop yield to profitable levels. 2. Increasing range of saleable farm products, thereby insulating income streams from major price/income fluctuations. 3. Maximise farm yields for existing Walnut crops by the collection and analysis of tree characteristics. 4. Destroy vermin and pests currently on farm and those that visit seasonally to destroy crops. E.g. cockatoos!! 5. Visit other successful farm enterprises that have "live examples" of farm improvements. 6. Quicker

response times and financial support to spend on farm and in-river issues. E.g. Annual river flooding and willow removal that's done properly and responsibly. i.e. No short- term quick fix. Regrowth follow-ups.

Need more training/development on the best-management practices for maintaining significant natural ecosystems. I seem to get conflicting advice sometimes. Help especially for weed control in native grasslands either manual help or advice or financial incentive would be good.

Unfortunately Landcare operations in Grenville district were rigged to benefit large Farmers who put up (paid for) fencing but did not replant when tree banks failed. Whereas 'blockies' busily planted trees and encouraged native wildlife. This needs to be rectified as more farms get divided up, and new people move into the district. We are proud to be surrounded by wind farms, they are an essential part of our future. Gorse and blackberries are serious problems and some land holders obviously need 'help' to contain/reduce their problem area. We were disappointed with the damage done by the removal of willows along the river. There has been little repair and replacement work done in local affected areas.

Property is covered under a conservation overlay so I am expected to weed and look after the bush and have to pay for the privilege and not allowed to do a thing on it according to Golden Plains Shire.

I think there needs to be a shift from expecting most nature conservation being carried out by volunteers in rural communities. We should all do some/however most should be funded by Government, with landholders input to agreed levels. Funding dollars will go further if there is greater acceptance of landholders undertaking the nature conservation work on their own property. For example, I can achieve more for the environment by doing environmental work myself (as well as giving me additional income), so I can continue in land management as compared to what can be achieved through solely using contractors to do the environmental works. Looking forward to seeing the responses once compiled to the overall survey.

The respondent's story, passion and future intentions

Many respondents provided explanations of what they had set out to do on their property, had accomplished or intended to do in the future. Others simply explained their current situation in terms of who managed their property now. This wonderful quote sums up the content of many Other Comments*: PS. This is not exactly what the survey is for but is the story in our case.*

After 4 Generations having farmed the farm, family are not interested so we have leased it to a neighbour while we contemplate our future.

We have had the property for over 30 years when we first purchased it was almost barren except for a few cypress trees which are now dying. We used to have more acreage but have subdivided in the 30 years. We planted up to 10,000 trees local native ones. We now have more native animals, more birds on our property. As we are aging we are unable to plant anymore like we did, those steep hills are killers. We know the benefits of planting and hope people in the future do the same. We would like to one day possibly subdivide again as maintenance is getting more difficult. Climate change is here, plant more trees.

I retired from plumbing in 2000 mainly because of ill health which eventually turned out to be bowel cancer. Improvement to property mainly moving a house and renovating it and building sheds fencing etc turned out to be

a few years and took a fair bit of savings over time. We ran cows and calves for a few years but your money goes round and round and you eventually run out. Always wanted to be a Farmer would not change anything. My wife and I both aged but loved the life. Raised 3 great children, lovely neighbours. All is well. Old age pension has helped us survive. PS. This is not exactly what the survey is for but is the story in our case.

I'm just a hobby Farmer that is producing food for my family. Just want to be self-sustaining and like having space to do my own thing without neighbours right next to me. Plus its great life for kids to grow up on a bit of land rather than in a city or big town.

We look after all our needs on this land with great care, we plant trees every year. We have tree allotments which we maintain. We do not overstock. We do not allow anybody on the property we do not know for security reasons. Living on rural land is a privilege, so we look after it as you should. We do not want windfarms in our district which will ruin the views and ambiance of the area. Thank you for your interest.

Property used 100% for recreational purposes.

We bought 55 hectares of bush 10 years ago. Nine years ago we put a TFN conservation covenant on the property. Property is bounded on 2 sides by Brisbane Ranges National Park and one side by a covenanted property. One side is shared with a Farmer. We have removed 40,000 thistles, 100s of pine trees, gorse and weeds. We have a management plan and continue to work at it. The property is zoned farming on overlays. We receive no rates reduction. Golden Plains has no interest in us or our aims to protect the environment. Our aim is to protect the bush wisely of this property. We receive no offsets, no income and no support except from Trust for Nature and Land for Wildlife. The property has 6 acres of wetlands. Happy to take part in the research.

We are a small lifestyle farm holder our land might be small but we do have big ideas for it that are limited by resources such as machinery and large scale cost of diversifying our land. We would welcome practical help in establishing a more sustainable way of farming or using our land such as based on permaculture principles but cost, resources and man power limit us.

The survey booklet and process

A relatively small number of comments are, at least in part, linked to the survey process. There is a comment expressing reservations about the privacy of data provided; another expressing the judgement that the survey was pushing respondents to provide responses that would support CCMA/Victorian government policy/management; another raising questions about the cost of conducting the survey; statements that the survey topics/items didn't exactly fit the respondent's circumstances (e.g. non-farmers, absentees); and some comments about the value of identifying social trends through survey data, that respondents are looking forward to seeing the results of the survey and that the survey had prompted them to reflect on their management and consider possible sources of support for environmental management.

Please note that my rural property is a holiday home only, so many of the questions in this survey are not really relevant to my situation. Apart from the house, my property has been allowed to return to native bushland. This survey has prompted me to consider the possibility of a conservation covenant.

Some responses were deemed 'not applicable' due to the pristine environment proximate to our property. Minimal commercial farming and minimal contamination from human sources. An interesting survey, some apparent political overtones.

What a waste of money on a glossy cover letter and survey booklet. Is this where the Corangamite CMA money is being used?

Questionnaire has been completed in the main by retired farming couple. Daughter and son-in-law (50's) now manage this property with the next generation keen to have input into land management and farming practices. All answer have been checked and reflect views of the current managers.

I found some questions difficult to answer because one answer didn't fit all, there are specific instances where a yes applies and a no but not just the word unsure.

All information produced may not be absolutely accurate.

Is this survey going to bring in enforcements to effect landowners that is not warranted? Most Farmers are conscious and caring of animals and the land they own. After spending a lot of time filling out this survey are we going to have a conclusion on results?

This survey does not cover my situation. I am an elderly resident who leases the property. I have no involvement in the management of my land.

I look forward to reading the results and outcomes from this survey and if there is a reflected trend in the datasets that shows any upcoming agricultural changes of value-added production systems over commodity farming. Well done on putting together such a comprehensive survey.

Some questions in this are intrusive. I don't have confidence my details will remain private and not be sold by survey people in the past – i.e. marketing calls start coming after survey is completed.

This survey was addressed to two people but only room for one response - suggest that any future surveys have two columns so that each property owner (if there are two) can respond to each issue as listed - a far truer survey result will surely develop

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APPENDIX 1: CONCEPTUAL FRAMEWORK

This section outlines the conceptual framework underpinning this research.

Lay definitions of key concepts

- Values: guiding principles/what is important to people.
- Beliefs: what we think is true.
- Norms: how we/others think we ought to behave. These can be personal norms or social norms.
- Attitudes: what we think should happen in relation to a specific social issue.
- Knowledge: grasp of facts, understanding of process.
- Skills: ability to implement or perform a task.
- Trust: willingness of those who are vulnerable to rely on others, which in part depends on the trustworthiness of those seeking to be trusted. Trustworthiness is based on assessments by others of our ability, benevolence and integrity.

Responding to complexity

Changing human behaviour can be difficult, and engaging rural property owners in practice change is no exception. There is a large set of possible factors influencing decisions and these vary according to each technology, property owner, social context, intervention and over time. How then should researchers and practitioners proceed? And what topics should be included in a survey setting out to inform engagement of rural property owners in the Corangamite region?

Unless there are strong economic drivers supporting implementation, effecting change is often problematic because the private benefits of action by rural property owners to address environmental degradation are often uncertain. There is often limited commitment by governments to legislate and/or enforce compliance with existing laws and regulations. And, with some issues the way forward is uncertain, in part because every landscape has been modified (i.e. we are uncertain about where we are headed and how to get there).

Further complicating the task for those implementing the RCS in the Corangamite region is the scope and pace of social change in rural areas across much of Victoria (Curtis & Mendham 2015). As conceptualised by the Multi-functional Rural Transition (Holmes 2006), many rural areas are shaped by a mix of production (e.g. agriculture), consumption (e.g. recreation and amenity) and conservation values (Barr 2005). Agriculture may remain the dominant land use, but primary production is not the principal focus of many landowners or indeed, their main source of income.

The scope and pace of these changes is particularly acute in parts of the CCMA region, including the areas west of Melbourne between Geelong and Ballarat and along the coastal fringe. There are typically more landowners with diverse interests, increased numbers of smaller land parcels, a large variety of land uses/enterprise types, more non-resident owners and more property owners with limited understanding of natural resource management (NRM) and connection to existing NRM networks (Curtis and Curtis 2018).

Best-practice NRM and responding to uncertainty

Where NRM practitioners are confident about the appropriateness of the outcomes they are seeking and the science that links proposed interventions and desired outcomes, they can apply best-practice recommendations. For example, with riparian management there are widely accepted best-practices that include fencing to manage stock access, providing off-stream watering points for stock, eradicating pest plants and planting trees and shrubs. Under these circumstances, those setting out to achieve change need to make an assessment of the adoptability of those best-practices and respond appropriately (Pannell, 2011). For example, if awareness, knowledge or management skills are important constraints, then activities that address those topics are appropriate. If the issue is that the change involves considerable expense and appears to offer limited financial returns to landowners, then some form of cost-sharing between government and private landowners might be appropriate.

Curtis and Lefroy (2010) made the additional point that NRM occurs in modified environments where there is often uncertainty about the way forward and even, the desired condition to aim for. They argued that under these circumstances it is important to engage property owners (and other stakeholders) in dialogue, learning and action which typically involves engaging and building human (i.e. knowledge and skills) and social capital (i.e. positive social norms, relationships built on trust and reciprocity, networks as platforms). For example, there is considerable uncertainty about how to maintain soil health under cropping regimes. Experience suggests that farmers will lack confidence in practices that have not been trialed in their local area.

CCMA staff identified important constraints to the implementation of best-practice NRM by rural property owners, including lack of awareness of degradation, insufficient knowledge of key threatening processes, insufficient confidence in recommendations and the cost of taking action. Items exploring these constraints are included in the 2019 survey as are items exploring the implementation of best-practice NRM. The 2019 survey covers these topics and for best-practice implementation, respondents are asked about the full-period of their management, the last three years, the past 12 months and intentions for the next three years.

Values and beliefs: difficult to change but important for effective engagement

Researchers typically distinguish between ‘assigned values’ and ‘held values’. Assigned values are those that individuals attach to specific physical goods, activities or services (Lockwood, 1999). ‘Held’ values are ideas or principles that people hold as important to them (Lockwood, 1999) and are generally highly abstract, generic and conceptual, but guide personal action (McIntyre, Moore, & Yuan, 2008).

Value orientations are the position a person takes when a particular set of held values are more important to them than other held values (Axelrod, 1994). Individuals can hold more than one value orientation simultaneously (Lockwood, 1999; Stern, 2000). This is an important point and one confirmed by results of social benchmarking surveys across Victoria. Indeed, across all regions, almost all survey respondents give a high rating to items measuring social, economic and environmental held and assigned values (Curtis and Curtis 2018).

A number of theoretical approaches have been developed and applied to explain the relationship between values and behaviour. Values-Belief-Norm Theory (VBN) explains an individual's motivation for environmental behaviour. VBN theory suggests that individual behaviour is derived from core elements of personality and belief structures. These inform people's specific beliefs about human-environmental interactions, consequences and an individual's responsibility for taking action.

VBN theory hypothesises that environmental behaviour is more likely if the individual believes that there may be adverse consequences for something that they value highly (Stern, Dietz, & Kalof 1993). VBN theory proposes a chain of elements, with one component influencing the next. The elements of VBN theory include values, beliefs (awareness of consequences or does the condition of the asset affect yourself, others or the environment; ascribed responsibility beliefs; and general environmental concern), personal norms and behaviour (Stern 2000). VBN is an important theory that underpins much contemporary social research, including the 2019 CCMA region social benchmarking survey.

Previous social benchmarking studies in the North Central region and the Wimmera region have employed items exploring held values based on the scale developed by de Groot and Steg (2007). Those items have in turn, been based on Schwartz's value typology that distinguishes between biospheric, egoistic and altruistic held values (Schwartz 1992, 1994).

No items exploring held values were included in the 2006 CCMA survey and they are not in the 2019 CCMA survey. Apart from the need to limit the number of survey topics, results from the previous social benchmarking surveys suggest that items exploring attached values provide more useful insights for regional NRM practitioners, including for understanding influences on best-practice NRM implementation (e.g. Curtis & Luke 2020).

There are 15 items in the 2019 CCMA survey exploring the importance of values attached to property and these span aspects of the farm business, relationships with the family and wider community and the local environment. These items draw on previous research by those working with Allan Curtis, including in regions adjoining the Corangamite region (e.g. Seymour, Curtis, Pannell, Allan, & Roberts 2010).

Some beliefs and attitudes related to private property rights appear to be important for some property owners who are likely to be difficult to engage in NRM. For example, results from previous social benchmarking surveys suggest about one in four landowners are concerned about protecting private property rights and their beliefs appear to be an impediment to their engagement in government programs (Curtis and Mendham 2015). The 2019 CCMA survey includes several items exploring belief in the primacy of private property rights.

VBN and related theories arising from the Theory of Planned Behaviour do not account for the larger set of factors, including seasonal conditions and markets that influence land use and management decisions by rural property owners (Pannell et al. 2006). While it is possible that values, beliefs and personal norms (VBN) may mediate or moderate some of these other factors, it is difficult to change these deep-seated personal attributes (i.e. VBN) in the short or medium term. Nevertheless, it is critical to understand the values and beliefs of rural property owners if they are to be effectively engaged.

Extent of farmer identity: the basis for a useful landowner typology

An increasing proportion of rural property owners in parts of Victoria are identifying as non-farmers by occupation (Curtis and Curtis 2018). It turns out that farmer identity is an important influence on the extent landowners are engaged in NRM, their knowledge and management skills and their implementation of best-practices for sustainable farming and biodiversity conservation (Curtis and Mendham 2015; Groth et al. 2014).

An associated trend is for considerable change in rural property ownership, estimated at 4% to 5% per annum across Victoria, including the regions surrounding Melbourne, Ballarat, Bendigo and Geelong (Mendham and Curtis 2010). That rate of change suggests 40-50% of rural properties will change ownership in a decade. New and longer-term property owners are different and those differences present both a challenge and opportunity for NRM practitioners. For example, new owners are typically less experienced and less knowledgeable about NRM and less connected to existing NRM networks. At the same time, new owners are typically more committed to environmental values and less reliant on on-property income and are often seeking advice about ways to better manage their properties. Items in the 2019 CCMA survey explored these topics.

One of the responses of social researchers tasked with advising NRM practitioners on effective engagement is to develop typologies that distinguish groups/types based on key attributes. Those attributes might include the main industry (e.g. forestry or farming), enterprise type (e.g. dairy, beef, sheep, horticulture), land class (e.g. floodplains or hills), management approaches (irrigation or dryland, adoption of conservation practices), property types (large or small), and/or personal characteristics such as values or attitudes.

Typologies appeal as a useful aid for NRM practitioners if they include all rural property owners (e.g. not just farmers by occupation); are soundly based (i.e. grounded in relevant theory); and are constructed using reliable methods (e.g. not based on the intuition of researchers). Unfortunately, there are few examples where these criteria are met. It is also important that typologies enable NRM practitioners to readily identify different cohorts when they set out to engage rural property owners.

As part of her PhD, Theresa Groth included a series of items in the 2014 North Central survey to measure the extent respondents held a farmer identity. Theresa's Farmer Collective Identity Construct scale (FCIC) has 12 items across seven dimensions (i.e. self-categorisation; behavioural involvement; evaluation; importance; social embeddedness; attachment and sense of independence) (Groth et al. 2016). The technical report (Curtis & Mendham 2015) and five journal papers provide a comprehensive explanation of how the FCIC scale was developed; the items included; the results of tests of scale reliability and validity; the approach to typology development using the scale; the characteristics of the four types of landowners (i.e. Full-time farmers, Part-time farmers, Hobby farmers, Non-farmers); and implications of farmer identity for NRM.

The key points are that:

1. Farmer identity is an important influence on land use and management.
2. Part-time farmers are an important cohort, distinct from Hobby farmers and closer to Full-time farmers in that they typically have a strong business focus.

3. Occupational identity varies spatially with distance from Melbourne and regional centres, across different environmental assets and with the agricultural capacity of land (refer to Groth & Curtis 2017).
4. Theresa Groth's typology provides a useful guide (heuristic) for NRM practitioners setting out to engage rural property owners, enabling practitioners to readily classify property owners when they meet them.

Given the limitations of space in the 2019 survey and results indicating a strong positive relationship respondent's scores on Groth's FCIC scale and their self-declaration as Full-time farmer (FTF), Part-time farmer (PTF), Hobby farmer (HF) or Non-farmer (NF), the 2019 CCMA survey did not include the FCIC scale. Instead, respondents were asked to select from the four categories listed above; and in a later section, to write in their main occupation (e.g. farmer, teacher, retiree).

Effective NRM interventions/engagement

Researchers have also identified what can be considered "levers" to effect change (e.g. improving knowledge and management skills); and processes or platforms that engage rural property owners in learning, dialogue and action (e.g. Landcare and commodity groups). Government programs that engage property owners, including through cost-sharing where there are public benefits from work on private property, can also have a positive influence on implementation of best-practice NRM. The 2019 CCMA region survey included a topic exploring interest in engagement through incentive schemes and other policy instruments.

The 2019 CCMA survey included a topic asking respondents to self-assess their knowledge across 19 items. The survey also included items exploring engagement through various platforms (e.g. Landcare, and commodity groups) and processes (e.g. training, field days, government programs).

Social norms are an important but often neglected aspect of a community's social capital. Of course, social norms can be both positive and negative influences on NRM (Minato et al. 2010). Indeed, a key outcome of Landcare participation has been the establishment of positive social norms about what sustainable farming involves in a local context (Curtis et al. 2014). Social norms are best identified through qualitative research within a community where there are "ties that bind". However it is possible to explore personal norms through surveys and these may reflect social norms. The 2019 CCMA survey included an item exploring personal norms related to belonging to a group to improve the management of natural resources.

Trust (i.e. willingness to rely on others) is an important element of the social capital of organisations, whether they be government agencies, private businesses or volunteer organisations. Where trust in an organisation is high, partners will be more likely to accept advice, enter partnerships to develop and implement plans, forgive mistakes and provide positive recommendations to others (Sharp and Curtis 2014).

A key point from the limited number of studies examining landowner trust in NRM organisations is that many rural property owners are not predisposed to trust others (e.g. Curtis & Mendham 2017). Judgements about the trustworthiness of individuals and organisations also influence landowner

willingness to trust. Trustworthiness involves assessments of three key elements: capability; benevolence; and integrity (Sharp and Curtis 2014; Mayer, Davis and Schoorman 1995).

The 2019 CCMA survey included a measure of respondent's predisposition to trust (Leahy and Anderson 2008; Smith, Leahy, Anderson and Davenport 2013); judgements of the trustworthiness of the CCMA; and trust in (i.e. willingness to rely on) the CCMA. The topic is "natural resource management".

Results from social benchmarking studies in the North Central and Wimmera regions that join the Corangamite region suggest that most rural property owners are not pre-disposed to take risks. The 2019 CCMA survey includes one item from an established scale exploring propensity to take risks (Meertens & Lion 2008).

APPENDIX 2: DATA ANALYSIS AND PRESENTATION

Data analysis

Descriptive statistics such as frequencies, means and medians summarise responses to all survey questions ("not applicable" and missing responses were removed from the analysis of means). For items that asked respondents to specify an amount (e.g. days of paid off-property work in past 12 months) zeros were excluded in the calculation of means and medians (hence, these were treated as a 'no' response). In these situations, the means and medians should be treated as the mean or median of those who had undertaken the practice.

Further analyses include examination of data for statistically significant differences between different groups (e.g. Full-time farmer, Part-time farmer, Hobby farmer and Non-farmer). Kruskal Wallis Rank Sum Tests were used to test for differences on a continuous variable or a Likert scale variable (e.g. age or agreement with an issue) based on a grouping variable (e.g. farmer identity cohorts). Chi Squared Tests were used to examine dependence between two grouping variables. Similarly, Pearson's Chi-squared test with simulated values was used to test for differences on a Yes/No (so nominal data as for Landcare participant) based on a grouping variable (e.g. the farmer identity cohorts).

To explore relationships between variables in the survey, pairwise comparisons were conducted between each item and all other items in the survey. Kruskal Wallis Rank Sum Tests were used to test for relationships between Likert-type response and a grouping variable (e.g. Full-time farmer, Part-time Farmer, Hobby farmer and Non-farmer) (results in an H value). Chi Squared Tests were used to examine dependence between two categorical (or grouping) variables (e.g. between Yes/No for management action implemented and Landcare member/Landcare non-membership) (results in an X value).

Pairwise comparisons tested for relationships (positive and negative) between variables expected to influence implementation (i.e. independent variables) of the NRM best-practices (i.e. dependent variables). Those practices covered both environmental management and sustainable agriculture. Most practices were thought to be relevant to most property contexts. However, respondents were given the opportunity to choose Don't know/Not applicable. As might be expected, the proportion selecting this option varied across the best-practice items. Those data are reported. Comparisons across the farmer identity cohorts and LGAs are also reported and provide useful insights.

In all analyses the *p* statistic represents the significance level where a value below 0.05 is considered to be statistically significant. A *p* value below 0.05 means that it is unlikely (probability of less than five percent) that the observed relationship or difference has occurred purely by chance. Only those relationships or differences where the p value is <0.05 are included in the tables and notes that accompany them.

Survey recipients are asked to provide information about implementation of best-practice NRM for 17 items across the full period of their management, the past three years, and their intentions for the next three years; as well as three items exploring adaptations in response to climate change. Summary data are provided for each time period. Reporting of pairwise comparisons draws upon all data for all time periods. Regression modelling focusses on the full period of management.

Pairwise comparisons of social benchmarking survey data typically result in large data sets. Those results include information about the direction (positive/negative, linear/non-linear), probability (likelihood) and strength of relationships. Interpretation of those results can provide important insights/findings for researchers and NRM practitioners. At the same time, researchers can be swamped by data and it may be difficult to tease out which are the most important independent variables. Regression modelling is one way of addressing these issues.

Logistic regression modelling was used to explore the extent a small number of independent variables contribute to the presence or absence (as most were assessed using yes/no) of best- practice NRM implementation. Experience with previous reports suggests that a model with from four to 10 variables provides useful guidance for NRM practitioners.

Regression modelling also addresses the thorny question of multicollinearity between independent variables (i.e. to prevent two variables essentially explaining the same thing being included in the analysis). However, experience with social benchmarking data suggests that those efforts may lead to important variables (i.e. levers in the NRM context) being excluded from models. For example, pairwise comparisons may reveal a significant relationship between implementation of a best-practice and both participation in a soil health group and property size. If participation in a soil health group and property size are also correlated, regression modelling may exclude one of these variables. There are sophisticated statistical technique that can help to further tease out causality but these are beyond the scope of this research project.

Interpretation of the results of the pairwise comparisons resulted in the identification of a small number (<15) independent variables to include in the modelling for each best-practice. Some variables were included in most models (e.g. extent of farmer identity) others were specific to a best practice (e.g. concern about a threat/issue or knowledge related to a best-practice). The selected variables were then entered in a stepwise modelling process using Akaikes Information Criterion (AIC) as the step criteria.

For logistic regression modelling, the proportion of all responses for the dependent variable that are correctly predicted by the model provides an indication of the value of the model. A model is considered useful if it correctly predicts at least 70% of the Yes and No responses to implementation of a best-practice.

All statistical analyses were performed using SPLUS software and Microsoft Excel.

Presentation of results

The following sections present key data for each of the topics in the 2019 survey and include comparisons with data from the 2006 survey where comparable items are included. There are no comparisons with 2013 data given the different approach to sampling by the RMCG consultants. Survey data are summarised using tables and figures and include:

1. descriptive statistics for each survey topic;
2. comparisons across different groups (e.g. those based on extent of farmer identity) and across the seven LGAs;

3. relationships between variables (e.g. influences on best-practice implementation); and
4. profiles for each LGA.

While the tables summarising data for each survey topic indicate where there is a significant difference across the four farmer identity cohorts and the seven LGAs, more detailed information is only presented in additional tables for the farmer identity cohorts. Summaries of key attributes across the LGAs are provided in a later section of the report.

The focus on farmer identity reflects the assumption, based on experience with other social benchmarking surveys, that there are more differences by farmer identity than by geography and that differences in geography are often related to differences in farmer identity. Indeed, there is a significant relationship between farmer identity and LGA in the CCMA survey data (X-squared = 1671, df = NA, p-value = 0.0004998).

As will be explained in the results section on farmer identity, of the 557 respondents to that item, 33% identified as a Full-time farmer, 20% as a Part-time farmer, 26% as a Hobby farmer and 21% as a non-Farmer. There is a distinct pattern across LGAs in the % of respondents self-identifying as Full-time farmers: from 62% in Corangamite, 49% in Colac-Otway, 36% in Surf Coast, 29% Moorabool, 19% in Golden Plains, 18% in Greater Geelong and Nil % in Ballarat. Where trends in survey items are inconsistent with the pattern for farmer identity, those anomalies are highlighted in each section.

For some survey topics respondents were asked to rate how strongly they agreed with a topic, how important an issue was for them, or how likely an outcome was for them on a Likert-type scale of 1 (Not likely, Not important, Strongly disagree) to 5 (Highly likely, Very important, Strongly agree). Not applicable/Don't know is a separate response option (6).

To simplify the presentation of data, the response options have been collapsed into four categories: "Unimportant" (combining Not important and of Minimal importance), "Some importance", "Important" (combining Important and Very important) and "Don't know/Not applicable". For items asking respondents whether they agreed with a statement, the response options have been collapsed into "Disagree" (Strongly disagree and Disagree), "Unsure", "Agree" (combining Agree and Strongly agree) and "Don't know/Not applicable". For items asking the likelihood of a certain outcome, response options have been collapsed into "Unlikely" (Highly unlikely and Unlikely), "Unsure", "Likely" (Likely and Highly likely) and "Don't know/Not applicable".

Mean values are typically reported in the tables and items in each topic are typically sorted according to means (i.e. from highest to lowest). In each case the mean is calculated from a range between 1 (Strongly disagree/Not important/Highly unlikely) through to 5 (Strongly agree/Very important/Highly likely). A mean of 4 can be interpreted as a high level of agreement, concern or knowledge, while a mean of 2 can be interpreted as a lower level.

APPENDIX 3: 2019 SURVEY INTRUMENT

CORANGAMITE CMA

SURVEY NO.

SUPPORTING LANDHOLDERS IN THE CORANGAMITE REGION

RURAL LANDHOLDER SURVEY 2019




decoy Media+Marketing

SUPPORTING LANDHOLDERS IN THE CORANGAMITE REGION

Dear property owner,

This survey will identify the priority issues for rural landholders in the Corangamite region and the important influences on their property management decisions. Your contribution will guide the Board, professional staff and volunteers who develop and implement the Corangamite Catchment Management Authority (CCMA) 20120-2026 Regional Catchment Strategy (RCS).

The RCS will deliver advice and financial and material resources provided by the Victorian and Australian Governments and non-government organisations to support landholders as they work to accomplish their goals.

The shires of Colac-Otway, Corangamite, Golden Plains, Moorabool and Surf Coast and the cities of Ballarat and Greater Geelong are key partners working with the Corangamite CMA. Your information will also underpin the decisions and activities of these local governments.

Surveys have been sent to a random selection of 2,000 landholders covering small and large properties. There is no other way to obtain the property information gathered through this survey. Professor Allan Curtis led a similar survey in 2006 and comparing data from the 2006 and 2019 surveys will provide important insights into trends over time.

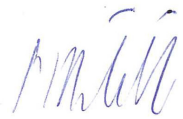
We are seeking the views of the person(s) primarily responsible for managing the property/enterprise. If you are not involved in the management of the property please forward the survey to the property manager or return the survey in the return envelope. We ask that you only provide information for property/s within the Corangamite CMA region (refer to the map on the rear cover page).

It should take you about 25 minutes to complete the survey. For most survey items there is no right or wrong answer and there is no need to think at great length about your responses. If you have any questions about the survey, please phone Allan Curtis on 0407 486 776; or Mr Leigh Dennis at the Corangamite CMA on (03) 5232 9100 or email leigh.dennis@ccma.vic.gov.au

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

Thank you for your assistance,

Professor Allan Curtis



Mr John Riddiford | Corangamite CMA CEO

1. 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/ DON'T KNOW
1	2	3	4	5	6

IMPORTANCE OF ISSUES AFFECTING YOUR LOCAL DISTRICT	YOUR VIEW
Risk to life and property from wildfires	
Poorly managed areas next to waterways & wetlands that have been fenced to exclude stock	
Impact of windfarms on landscape quality/amenity	
Dams on rural properties reducing runoff to waterways & wetlands	
The expected trend to a warmer, drier climate	
Low profitability of farm enterprises	
Management of pest plants and animals	
Large scale solar farms on productive farming land	
The condition or health of soils	
Ability to engage contractors (e.g. weed spraying, fencing, sowing pastures)	
Increasing land prices pushing up Council rates	
The impact of pest plants and animals on native plants and animals	
The impact of increased number of small properties	
Loss of native plants and animals	
Impact of large scale forestry enterprises on community viability	
Soil acidity undermining productive capacity of farmland	
Nutrient and chemical runoff reducing water quality	
The impact of changes in river/stream flows on the health of waterways & wetlands	
The impact of intensive industries such as piggeries and poultry	
Other issues (please list)	

2. 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 (neither unlikely or likely)	LIKELY	HIGHLY LIKELY	NOT APPLICABLE
1	2	3	4	5	6

LIKELIHOOD YOUR LONG-TERM PLANS WILL INVOLVE	YOUR VIEW
Ownership of the property will stay within the family	
I will live on the property	
I will move off the property around/soon after reaching age 65 years	
The property will be sold	
The property will be subdivided and a large part of the property sold	
The property will be subdivided and a small part of the property sold	
All or most of the property will be leased	
All or most of the property will be share farmed	
Additional land will be purchased, leased or share farmed	
Some part of the property will be placed under a conservation covenant	
The enterprise mix will be changed to diversify income sources	
The enterprise mix will be changed to more intensive enterprises	
The enterprise mix will be changed to less intensive enterprises	
I will seek additional off-property work	

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

◯ Yes ◯ No ◯ Unsure/too early to know

If Yes, has your family agreed to a **succession plan**? *Please tick your answer.*

◯ Not started discussions ◯ Early stages ◯ Halfway through discussions ◯ Well advanced ◯ Reached agreement

3. 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	NOT APPLICABLE
1	2	3	4	5	6

WHY YOUR PROPERTY IS IMPORTANT TO YOU	YOUR VIEW
Natural setting makes this an attractive place to live	
A great place to raise a family	
Connects me to history and cultural heritage	
The property has been in my family a long time	
Ability to pass on a healthier environment to future generations	
Satisfaction from producing food and fibre for others	
Opportunity to learn new things	
A place or base for recreation	
Working on the property is a welcome break from my normal occupation	
An asset that will fund my retirement	
Native vegetation provides habitat for native animals	
Provides an important source of household income	
Being part of a rural community	
An asset that is an important part of family wealth	
Contributing to the local economy by providing work and supporting local businesses	

4. YOUR VIEWS

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	UNSURE (neither disagree or agree)	AGREE	STRONGLY AGREE	NOT APPLICABLE/ DON'T KNOW
1	2	3	4	5	6

STATEMENTS	YOUR VIEW
Landholders should manage their properties in expectation of drought events	
In most cases the production benefits of rock removal outweigh the environmental costs	
Fencing to exclude stock is essential to improve waterways & wetlands	
There should be financial incentives for landholders to provide environmental services	
The time and expense involved in watering stock off waterways & wetlands is justified by the benefits, including improvements in bank stability, native vegetation, water quality or stock health	
The benefits of fencing waterways & wetlands to manage stock access are best achieved by establishing buffers of at least 20 metres	
It is reasonable for the wider community to expect that landholders will act in ways that will not harm native plants & animals	
I feel a personal responsibility to belong to a group working to improve the management of natural resources	
Reduced production in the short-term is justified where there are long-term benefits to the environment	
Landholders should be able to develop their property even if that results in the loss of native grasslands	
It is difficult to obtain reliable expert advice on agricultural production topics	
Landholders should be able to harvest rainfall on their property, even if that action reduces stream flows	
State and local governments should protect farmland from the impacts of urban sprawl	
Aboriginal communities and landholders should work together to protect cultural heritage on private property	

4. YOUR VIEWS (CONT.)

STATEMENTS	YOUR VIEW
The benefits of rotational or time controlled grazing outweigh any costs	
Soil testing is an essential first step in monitoring soil condition and making decisions about inputs	
I'm confident landholders in this region can adapt to expected future changes in rainfall patterns	
The cost of willow removal is justified by improvements in the condition of waterways & wetlands	
Biological activity is an important indicator of the productive capacity of soils	
One has to be careful or someone is likely to take advantage of you	
Human activities are influencing changes in climate	

Are you aware of the existence of the Corangamite CMA? ◯ Yes ◯ No

If Yes, please answer the next items. **If no**, please move to the next topic.

STATEMENTS	YOUR VIEW
I can rely on the CMA Board and staff to provide useful advice about natural resource management	
The Corangamite CMA keeps landholders' interests in mind when making decisions about natural resource management	
Sound principles guide the decisions of the Corangamite CMA Board and staff about natural resource management	
Corangamite CMA staff are very knowledgeable about natural resource management in my district	

5. YOUR KNOWLEDGE

In this section we would like you to provide **an assessment of your knowledge** for a number of different topics. Please examine the response options. For each knowledge item, 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

TOPICS	YOUR VIEW
How to access up-to-date seasonal weather forecasts for your district	
Laws and regulations that apply to the management of rural properties	
How to interpret results from soil testing	
The location of Aboriginal cultural sites in your district (e.g. fish traps, tree scars, middens)	
How to interpret results from water testing	
Preparing a farm or property plan allocating land use according to land class	
The benefits of retaining or improving the condition of native vegetation	
Appropriate organisations or individuals to contact for advice about the management of Aboriginal cultural heritage sites on private property	
The impact of draining or grazing wetlands on native plants	
The natural resource management priorities of the Corangamite CMA	
The processes leading to soil acidification	
How ground cover on grazing or cropping paddocks prevents soil erosion	
How to use soil testing to prepare a nutrient budget that will increase soil productivity without the risk of high levels of nutrient run-off	
The role of microbiology/soil biota (e.g. bacteria and fungi) in soil health	
Why 20 metres has been set as the minimum width of buffers along waterways	
The meaning of the term "regenerative farming"	
The role of logs & plants along streams in supporting native fish populations	
Which traditional Aboriginal owner(s) is connected to your district	
The role of soil carbon in maintaining soil health	

6. SOURCES OF INFORMATION FOR PROPERTY MANAGEMENT

In the past 12 months what have been your sources of i**nformation about topics related to the management of your property in the Corangamite region?** *Please place a tick beside any relevant sources of information in the table below.*

SOURCE OF INFORMATION		SOURCE OF INFORMATION	
Television	○	Facebook	○
Books	○	YouTube	○
Academic Journals	○	Twitter	○
Magazines	○	Instagram	○
Corangamite CMA	○	Internet	○
Victorian Farmers Federation	○	Landcare group/network	○
Bureau of Meteorology	○	Local Council	○
Water Authorities (e.g. Barwon Water, Central Highlands Water, Wannon Water)	○	Mailed brochures/leaflets/community newsletters	○
State government agencies/departments	○	Rural R&D corporations (e.g. MLA, GRDC)	○
Waterwatch/Fishcare/Saltwatch/EstuaryWatch	○	Landcare coordinators and extension officers	○
Newspapers	○	Environmental organisations	○
Field days	○	Commodity/industry groups	○
Radio	○	Friends/neighbours/relatives	○
Podcasts/Webinars	○	Agricultural consultants, agronomists and stock agents	○
Banks	○	Face-to-face workshops and seminars	○
Your children	○	Universities	○

7. ENTERPRISE/ LAND USE MIX

This topic is seeking **information about your current land use/enterprise mix**. *Please place a tick beside any correct response in the '**Situation Now**' column.* Please answer with the land you own within the Corangamite region in mind.

ENTERPRISES / LAND USE ON YOUR PROPERTY IN 2019	SITUATION NOW	ENTERPRISES / LAND USE ON YOUR PROPERTY IN 2019	SITUATION NOW
Raised bed cropping	○	Viticulture	○
Broadacre cropping	○	Horticulture	○
Pasture: annual	○	Vegetation offsets	○
Pasture: perennial	○	Irrigated agriculture	○
Hay production for sale	○	Area of remnant native vegetation (e.g. trees, grasslands, wetlands)	○
Dairying	○	Forestry (e.g. bio-energy, woodlots, agroforestry, shelterbelts)	○
Beef cattle	○	Trees planted for conservation outcomes (e.g. habitat, erosion or recharge control)	○
Sheep for wool or meat	○	Farm-based tourism (e.g. farm stays, B&B)	○
Intensive housed/sheded animal production	○	Conservation covenant attached to property title (e.g. Trust For Nature)	○
Seasonal intensive housed/sheded animal production	○	Area set aside for living/recreation (e.g. gardens, pets, water bodies, vehicles)	○
Feedlot animal production	○	Land managed to conserve Aboriginal cultural heritage	○
Free range pigs or poultry	○	Carbon sequestration (e.g. increase soil carbon)	○
Other commercial livestock enterprises (e.g. goats, deer, horse studs, alpaca, dogs)	○	Energy utilities (e.g. wind, solar, gas)	○
Non-commercial domestic animals (e.g. horses, goats, sheep, alpaca)	○	Other	

8. EXTENT OF FARMER IDENTITY

Please **place a tick** besides the descriptor/term that best describes your **occupational identity:**

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

9. MANAGEMENT PRACTICES ON YOUR PROPERTY

This section asks about practices undertaken on your main or 'home' property in the Corangamite region during the **full period of your management**; the **past 3 years**, and those you intend to implement **next 3 years**.

Some actions may not be relevant to your situation. Please ignore those topics.

If you have owned your property for less than 12 months, please leave this topic and go to the next page.

PRACTICES IMPLEMENTED ON YOUR MAIN OR "HOME" PROPERTY IN THE CORANGAMITE REGION	AT SOME TIME DURING PERIOD OF MANAGEMENT	PAST 3 YEARS (2017-2019)	INTEND NEXT 3 YEARS (2020-2022)
Planted locally indigenous trees & shrubs along waterways & wetlands	○	○	○
Planted locally indigenous trees & shrubs on other areas of your property	○	○	○
Fenced native bush/grasslands to exclude stock access	○	○	○
Fenced waterways & wetlands to exclude stock access	○	○	○
Established off-stream watering points for stock	○	○	○
Each year have worked to control pest animals	○	○	○
Each year have worked to control pest plants outside cropped areas	○	○	○
Used minimum tillage (e.g. direct drilling) when sowing grass or crops	○	○	○
Used time controlled or rotational grazing	○	○	○
Maintained sufficient ground cover to prevent soil erosion on most paddocks at the end of autumn	○	○	○
Applied soil treatments other than fertilizer and lime (e.g. organic manure, compost, biochar, soil innoculants)	○	○	○
Implemented cover cropping	○	○	○
Used precision farming techniques for cropping	○	○	○
Applied lime to substantial areas of arable land on the property	○	○	○
Tested soils for nutrient status in paddocks where have applied fertiliser/soil conditioners (including lime)	○	○	○
Upgraded infrastructure to more effectively use existing water supplies	○	○	○
Prepared a nutrient map for all/most of the property	○	○	○

10. BACKGROUND INFORMATION

BACKGROUND INFORMATION	PLEASE TICK OR FILL IN YOUR RESPONSE
What is the total area of rural land you own within the Corangamite CMA region? (excluding land you manage but do not own)	_____ total Ha owned
Is this property your principal place of residence?	◯ Yes ◯ No
What area of additional land do you manage (lease/sharefarm/agist from others) within the Corangamite CMA region (additional to the figure you provided above)?	_____ additional Ha managed
What is the longest period of time you or your family have owned or managed all/some part of your property?	_____ yrs
What area of your property is leased, share farmed or agisted by others?	_____ Ha
How many rural properties do you own that are within or outside the Corangamite region (i.e. zoned for farming)	_____ No. of properties
How many of these properties are within the Corangamite CMA region?	_____ No. of properties
Does your property include any waterways or wetlands?	◯ Yes ◯ No
Are other family members working full time on your property?	◯ Yes ◯ No
Your gender (for person who has competed all/most of the survey)?	_____
What is your age?	_____ yrs
How long have you lived in your local district?	_____ yrs
How long have you lived on your property?	_____yrs
What is your main occupation? (e.g. farmer, teacher, accountant, investor, retiree)	_____
Are you a member or involved with a local Landcare group?	◯ Yes ◯ No
Are you a member or involved with a local commodity group? (e.g. Better Beef, Best Wool, FM 500, Target 10, Southern Farming Systems)	◯ Yes ◯ No
Estimate the average number of hours per week that you worked on farming/property related activities over the past 12 months.	_____ hr/wk
Estimate the number of days that you were involved in paid off-property work in the past 12 months	_____ days
Did you attend field days/farm walks/demonstrations on native plants & animals in the past 12 months?	◯ Yes ◯ No
Did you attend field days/farm walks/demonstrations focused on soil health in the past 12 months?	◯ Yes ◯ No
In the past 12 months have you changed your financial or on-property operations as a result of considering climate change?	◯ Yes ◯ No

In the past 12 months have you changed your on-property operations as a result of considering opportunities to capture carbon (e.g. by revegetation, soil management)?	◯ Yes ◯ No
In the past 12 months have you changed your on-property operations as a result of considering opportunities to reduce carbon emissions (e.g. solar, wind, gravity systems)?	◯ Yes ◯ No
In the past 12 months have you employed a consultant to provide advice on any aspect of on-property management?	◯ Yes ◯ No
In the past 12 months have you employed a contractor to undertake work on your property (other than to build or renovate a dwelling)?	◯ Yes ◯ No
In the past 5 years have you completed a short course relevant to property management? (e.g. leadership, financial planning, integrated pest management)	◯ Yes ◯ No
In the past 5 years has there been work on your property funded, at least in part, by Australian or Victorian government programs (e.g. National Landcare Program or Victorian Landcare Program)?	◯ Yes ◯ No
Did you earn income from agriculture on your property in the Corangamite region during 2018/19 financial year? If yes, did your property return a net profit from agriculture (income exceeded all paid expenses before tax) in 2018/19? If yes, was the net profit from agriculture in 2018/19 above $50,000?	◯ Yes ◯ No ◯ Yes ◯ No ◯ Yes ◯ No
Did you or your spouse/partner receive a net off-property income (after expenses and before tax) **last financial year** (2018/2019)?	◯ Yes, me ◯ No ◯ Yes, my spouse

Have you prepared/are you preparing a **property management plan or whole farm plan t**hat involves a map and/or other documents that address the existing property situation and include future management and development plans?

◯ Not started ◯ Early stages ◯ Halfway ◯ Well advanced ◯ Completed/ongoing

Do you have a **long-term plan or 'vision'** about the improvements you would like to make on your property?

◯ Yes ◯ No

If YES, how much of your 'vision' have you accomplished?

◯ Not started ◯ Early stages ◯ Halfway ◯ Well advanced ◯ Completed/ongoing

Do you have a **business plan** that describes current enterprises and outlines strategies to accomplish your goals for those or new enterprises?	◯ Yes ◯ No ◯ N/A

11. WAYS FORWARD

Through its Regional Catchment Strategy, the Corangamite CMA is responsible for implementing national and state natural resource management programs in your region. The CCMA wants to know how you would prefer to be involved in activities funded by these programs. *Please indicate your interest in the funding arrangements listed below.*

DON'T KNOW/ NOT AWARE	NOT INTERESTED	SOME INTEREST	INTERESTED	STRONG INTEREST	DEFINITELY INTERESTED
1	2	3	4	5	6

ARRANGEMENTS FOR INVOLVING LANDHOLDERS	YOUR VIEW
Fixed Grant Incentive Scheme to support onground work that is administered by the Corangamite CMA (e.g. payment for fencing, or for plants)	
Grant scheme administered by a government department	
Reduction in rates levied by local government	
Landholders specify what they require to be paid to undertake work on their property in response to a public advertisement by a government department or the Corangamite CMA (i.e. a tender process)	
Tax rebate administered by the Commonwealth Government	
Annual payment for taking part of your property out of production or for active management that protects or enhances the environment/ biodiversity (i.e. payment for providing environmental services that can extend over many years)	
A person (i.e. extension staff) who provides support, including technical advice to landowners, facilitates planning for local projects and coordinates access to volunteer labour	
Annual lease payments for your land that would be managed by others (e.g. plantation forestry)	
Access to coordinated unpaid or voluntary labour to undertake onground work on your property (e.g. prisoners, ATCV)	
Through government funding of voluntary local groups (e.g. Landcare)	
Through non-government organisations (e.g. Greening Australia, Trust for Nature, VFF)	

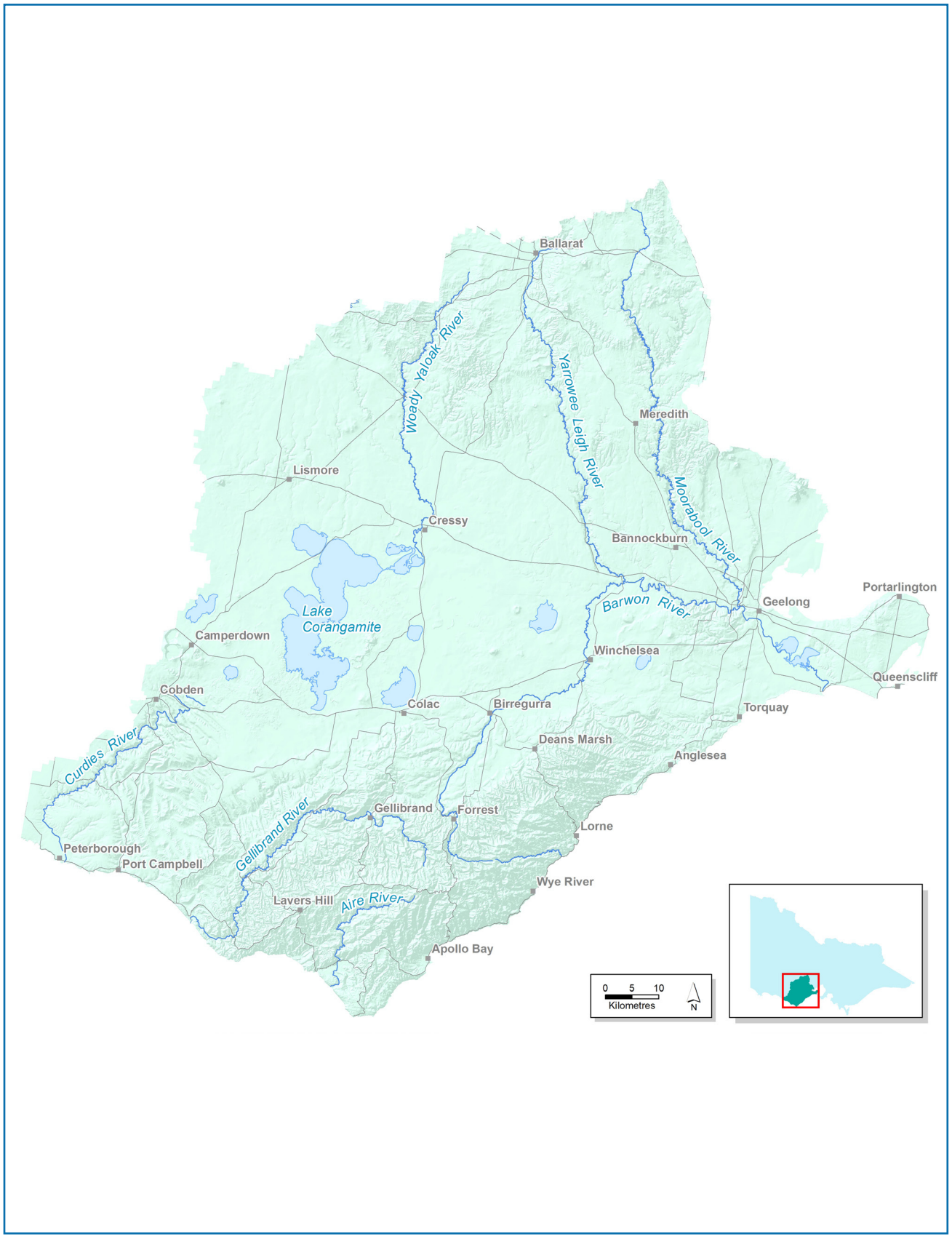
OTHER COMMENTS AND **THANK YOU FOR YOUR TIME**

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 Corangamite CMA region? Please use the space provided to write your answers 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 envelope provided that is addressed to Professor Curtis.**

If you need assistance with the survey, or wish to make specific comments about it, please contact Allan Curtis by phone on 0407486776 or email al@decoymarketing.com.au

MAP OF THE CORANGAMITE CMA REGION



Map prepared by the Corangamite CMA