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Wet Tropics Sustainable Agriculture Survey - Interim Report

A survey of rural landholders in the Wet Tropics Natural Resource Management region

Nick Emtage and John Reghenzani



Australian Government
**Department of the Environment,
Water, Heritage and the Arts**

Wet Tropics Sustainable Agriculture Survey Interim Report

A Survey of Rural Landholders within the Wet Tropics Natural Resource Management Region

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Acronyms Used In This Report

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
BRS	Bureau of Rural Science
BSES	Bureau of Sugar Experiment Stations
CERF	Commonwealth Environment Research Facilities
CRC	Cooperative Research Centre
CRPs	Currently Recommended Practices
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCDB	Digital Cadastral Database
DEH	Commonwealth Department of the Environment and Heritage, now known as the Department of the Environment, Water, Heritage and the Arts
DSD	Queensland Department of State Development, now known as the Department of Tourism, Regional Development and Industry
FNQ	Far North Queensland
FNQ NRM	Far North Queensland Natural Resource Management Pty Ltd, now known as Terrain NRM Ltd
GBR	Great Barrier Reef
IAG	Industry Advisory Group
LGA	Local Government Group
MTSRF	Marine and Tropical Sciences Research Facility
NLWRA	National Land and Water Resources Audit
NRM	Natural Resource Management
NTFPs	Non-timber forest products
PFNQ	Private Forestry North Queensland
QDNRW	Queensland Department of Natural Resources and Water
QDPI	Queensland Department of Primary Industries and Fisheries
QEPA	Queensland Environmental Protection Agency
RRRC	Reef and Rainforest Research Centre Limited
RSE	Relative Standard Error
WTWHA	Wet Tropics World Heritage Area

Abbreviations Used In This Report

N	Number of responses
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Summary

This report describes the results of a survey conducted among 1,600 rural landholders in the Wet Tropics region of Far North Queensland in 2007-2008. The main purpose of the survey was to investigate key social and economic issues affecting landholders' decision making in regards to the use of natural resource management practices, and to examine landholders' adoption of and attitudes toward selected currently recommended practices for various industries. A total of 320 usable responses were received. This report provides a summary of responses to the survey using descriptive statistics, with a breakdown of the responses according to the primary purpose for land ownership provided where this break-down is appropriate. Reports of the analyses of relationships between responses to various topics and socio-economic characteristics will be compiled following completion of the current report and are expected to be released in May 2008.

The survey was undertaken one and a half years after Severe Tropical Cyclone *Larry* caused a great deal of destruction to the environment, crops and built infrastructure in the Innisfail and southern Atherton Tablelands parts of the region.

The survey covered a variety of landholdings in terms of the size of their area, the climate they experience, their topography and the landholders' main purpose for owning rural land. Landholders targeted in the survey were a random selection of people who have freehold properties of greater than two hectares in area. Respondents ranged from those with two-hectare rural residential landholdings with no agricultural enterprises through to landholders whose properties are used for grazing and cropping enterprises and cover more than 70,000 ha, which are located on the boundaries of the region where the climate can be described as the 'dry tropics'.

Sixty percent of respondents reported the primary purpose for land ownership as 'agricultural production', 16% were rural residential landholders, 14% were hobby farmers and 7% reported the primary reason for land ownership as 'conservation'.

Forty-three percent of all respondents and 57% of respondents with agricultural enterprises reported some level of profit from their on-property enterprises in 2006/2007. Of these, 70% reported profits of less than \$30,000, and 45% less than \$20,000. Profitability varied between enterprise types, with approximately 60% of those with cropping enterprises and 40% of those with grazing enterprises reporting making a profit. Approximately 75% of the respondents reported receiving income from sources other than their property enterprises. Most (60%) of the respondents reported working off-farm, a quarter of them full-time. Other landholders who received income from non-farm sources and who did not work for paid employment relied on investments or pensions. Approximately 20% of respondents work off-farm full-time, another 20% part-time, and 10% are employed off-farm on a casual basis.

Assessment of issues

The greatest concerns for the majority of commercially-orientated landholders were issues affecting the financial viability of agricultural enterprises. Landholders reported weed management as their greatest concern and weed management is the most commonly reported and costly natural resource management (NRM) activity. While graziers in western parts of the region had concerns about the impacts of introduced pest species, most landholders reported that few NRM issues are a problem on their properties apart from weed management.

The majority of respondents thought they should receive payments for the provision of environmental services and that current activity on their property would not affect the use of

the property by future generations. The majority of respondents were also concerned that increasing government regulation left them with less time to manage their properties. Respondents were aware that the activities undertaken on their properties could affect their neighbours, and most thought their neighbours would consider the impact of their activities on them.

Property planning and management objectives

Respondents reported that the pursuit of lifestyle objectives and the general environmental health of the region were the most important objectives for their property management. Approximately 80% reported they are highly attached to their property. Approximately 25% reported having a written property or business plan, and a further 9% reported that they are in the process of developing a plan.

More than 60% of respondents indicated they are likely or very likely to continue to live on a rural property in the region, and a similar proportion indicated that their property would be passed on to family members. Approximately 30% of respondents indicated that all or part of the property would be sold or alternatively that they would intensify or diversify current enterprises. Less than 20% of respondents plan to live on an excised block, place a covenant on their property or lease all or part of their property in the future.

Participation in social activities and trust within the community

Of the people assessed in the survey, respondents were most trusting of their neighbours and other landholders in the region and least trusting of government agencies in general. Landholders involved in the sugar industry reported high levels of trust in the Productivity Boards and the Bureau of Sugar Experiment Stations (BSES).

Most respondents participated in some group activities throughout the year, with the most commonly reported social group activity including participation in sporting groups followed by school groups. Approximately 25% of respondents reported attending Landcare group activities at least once a year.

Use of information sources and training courses

Respondents reported that they find books and magazines as the most useful sources of information to assist management decisions, followed by other farmers, family and field days. Agribusiness agents and private consultants were rated as the least useful potential sources of information, partly because they had never been used by approximately half of all respondents.

Overall, approximately 35% of respondents reported attending a training course related to property management over the past five years. Only 10% of landholders whose properties are used only for residential purposes, hobby farmers and those who listed their property land use as *conservation* have attended courses. Approximately 30% of those with livestock enterprises and more than 60% of those involved in cropping enterprises have attended a course.

Courses on chemical handling comprise 50% of all courses listed by respondents. Crop management courses were the next most frequently mentioned followed by nutrient management, pest and weed management and stock breeding and management. Institutions and individuals running the training courses included government agencies to specialised training companies, individuals and agribusiness corporations. The BSES ran one-third or 54 of the 153 courses (including a number who attended the same courses) attended by respondents including many of the chemical handling (ChemCert) and other cane

management courses. Other commonly mentioned course providers were Queensland Department of Primary Industries and Fisheries (QDPIF) and Canegrowers with their Compass, FutureCane and Six Easy Steps programs.

Native vegetation management

Approximately 60% of respondents reported having some remnant native vegetation on their landholding. The mean area of native vegetation reported was 48 ha and the median area 7 ha. For those respondents with native vegetation, on average the vegetation covers 43% of their property with a median value of 36%. As expected, those respondents whose primary reason for property ownership is agricultural production have, on average, the largest areas of native vegetation on their properties. This is primarily due to the fact that these landholders have the largest property areas, these respondents also having the lowest proportion of their landholdings under native vegetation. Approximately 17% of respondents or 25% of those with areas of native vegetation reported having a map of these areas provided by the Queensland Environmental Protection Agency (QEPA).

The majority of respondents appreciate the aesthetic values of native forests, with more than 80% of respondents agreeing with the statement 'native forest areas improve the look of my property'. Only 20% agreed with the statement that 'native forest decreases the value of my property'. Personal interest in native vegetation is seen by respondents as important, with more than 70% of respondents agreeing with the statement 'I have a personal interest in native forests'. On average across all respondents, the factors of excessive government regulation and a lack of finance were viewed as the greatest constraints to management activities. Approximately 25% of respondents reported that their forest areas are suitable for harvesting timber and that this could be a profitable enterprise in the future. Some frustration about government regulation of vegetation management was also evident. Just over 30% of respondents agreed with the statement that 'it is better to clear forest regrowth where possible so the government does not prevent use of that land for agriculture in the future'.

Approximately 60% of respondents indicated they had encouraged the growth of native vegetation on their land and nearly 20% had established fencing around some of their forest areas. Approximately 30% of respondents with native vegetation areas reported not undertaking any management activities in these areas. The most commonly reported management activity by approximately 50% of those with native vegetation areas was road maintenance and use of the area for various recreation activities. Approximately 30% of respondents allowed others to access their native forest areas with 12% of these people receiving some payment for this activity. Maintenance of walking tracks and pruning of vegetation were practiced by 25% of forest owners, with less than 20% thinning, gathering non-timber forest products (NTFPs) or harvesting timber. Seventeen percent of respondents reported thinning some areas of native vegetation, and 15% reported activities to improve pastures in these areas

Livestock enterprises

Approximately 40% of respondents reported having some grazing land. More than 149,000 ha (75%) of the total 192,000 ha of non-irrigated grazing lands reported by respondents are managed by two landholders in the Mareeba and Herberton local government areas. More than half the respondents have less than 50 ha of non-irrigated grazing land.

The number of stock kept by landholders ranged from herd sizes of 2 to 6,000 head. The median size of dairy herds was 100 head and the median size of beef cattle herds was 57 head.

Of the grazing management practices assessed, the most commonly used practice was controlled grazing to maintain surface cover, which was fully adopted by more than 50% of respondents with livestock and partly adopted by a further 30%. Approximately 60% of respondents use some soil testing to determine fertiliser requirements and had fenced off waterways in at least some of their paddocks, and 50% had fenced off some of their areas of native vegetation. Approximately 40% of respondents reported that that fencing sensitive areas made them more difficult to manage, and approximately 60% agreed that installing off-stream watering points is not always viable.

Cropping enterprises

A total of 128 respondents (40%) reported growing some type of crop. Of those growing crops, 60% reported growing sugar cane, with a combined total area of 28,000 ha. This total includes four growers with more than 1,000 ha of land that is used to grow sugar cane, one of whom operates their cane growing enterprise on more than 10,000 ha of land. Other major crop types reported by respondents include bananas, pawpaws, various pasture grasses, a variety of tropical fruits (including rambuttan, mangoes and lychees) and other crops including peanuts, ginger, lemon grass, mixed bush foods and vegetables.

Participants were asked to indicate whether they use each of a number of practices that are currently recommended by members within their industry as the best means to maintain healthy soil and water resources. Most respondents (>80%) supported the statement that reduced tillage improves soil health and reduces erosion, and approximately half the respondents agreed that reduced tillage increases the need for herbicides. Nearly 80% of respondents think that the high cost of new machinery constrains practice change.

Of the other currently recommended cropping practices assessed in the survey, maintaining grass headlands is already used by more than half the respondents and a higher proportion (more than 70%) expect to use the practice in future. Minimum tillage, the use of earthworks, stubble retention and soil and nutrient testing are used by approximately 60% of respondents and partially used by approximately 20% of respondents. In general, respondents reported that the use of the practices that were examined will increase in future.

Approximately one-third (100 respondents) reporting using irrigation on their properties. The most commonly reported type of irrigation used was low pressure spray irrigation, followed by high pressure spray irrigation, drip and flood irrigation. Nearly 40% of irrigators reported using mulch in some paddocks or more to control water loss, and approximately 25% reported using an irrigation schedule and, or, monitoring of soil moisture to aid decisions about the timing and volume of irrigation. Approximately 18% reported using their irrigation set-up to apply fertiliser; less than 10% reported using an automated irrigation control system.

Pest and Weed management

More respondents reported undertaking weed control (72% of the sample) compared to pest control (44% of the sample). The efforts on weed control in both time and money exceeded that for pest control on average, although the median values for both activities are similar.

Future analysis and reporting

This report is an interim report which provides descriptive statistics from responses to the survey. Future releases to be published via the RRRC website will include a technical and background report for the survey. This report will describe the development of the survey instrument (questionnaire); the sampling frame used; the review of previous research into the topics examined in the survey; a description of the non-response bias testing that has been

undertaken; and a description of the theoretical basis for the methods used to guide the research. The next stage of the research will involve undertaking a series of personal interviews with rural landholders to further explore issues raised in responses to the questionnaire. Information gathered in this round of the survey will be incorporated into the final report of the survey research. The final report will include analysis of the relationships between the topics investigated. For example, we will investigate the relationships between property management goals, landholders' management intentions, their socio-demographic characteristics, and their trust of institutions, communication behaviour and the adoption of currently recommended practices in various rural industries. This report is due for release in July 2008. The final report will also discuss possible means to improve the effectiveness of policies and programs designed to assist NRM in a manner that suits landholders with varying management objectives and in differing circumstances.

Introduction

This research project was undertaken to help gather and report on the socio-economic characteristics, values, objectives and current management practices of landholders in the Wet Tropics region of Far North Queensland (illustrated in Figure 1). The basic objective for the research is to assist in the design and delivery of NRM programs and development of NRM policies in the Wet Tropics. In particular, the research will contribute to implementing the management action targets described in the Wet Tropics NRM Plan¹. The action targets are based on two main activities namely:

- Raising landholders' awareness about NRM issues, best management practices and programs they can access for support; and
- Developing effective incentives to encourage land managers to adopt currently recommended practices (CRPs).

Design of effective communication programs is critical to implementing these policies and programs, and requires information about the communication practices of rural land managers. The design of effective programs to provide incentives for land managers to adopt CRPs requires an understanding of their perceptions of the practices and an indication of the relationship between these perceptions and the various forms of capital (or capacity) available to landholders (Ellis 2000; Nelson *et al.* 2006).

Improved understanding of the social, economic and environmental implications of various NRM practices is required if efficient incentive programs for promoting sustainable NRM are to be devised. Developing an understanding of the nature of the costs and benefits of various NRM practices is required.

Purpose of the report

This report is intended to provide an overview of the responses to the survey of rural landholders undertaken in the Wet Tropics region in late 2007 and early 2008. The report concentrates on providing descriptive statistics (including averages, median values, frequency distributions and percentages) of the responses. Details about the methods used to conduct the survey are provided in a separate background and technical report published through the RRRC website (http://www.rrrc.org.au/mtsr/f/theme_4/project_4_9_4.html).

Following the publication of this report the research team intend to undertake extensive statistical analyse of the responses. These analyses will examine the relationships between variables, that is, the relationships between respondents' socio-economic characteristics and their property management objectives, attitudes to practices, and their current and intended practices. These analyses will be used to define and describe a set of landholder types in relation to NRM activities on private rural landholdings in the Wet Tropics region.

¹ 'Sustaining the Wet Tropics: A Regional Plan for Natural Resource Management 2004-2008' available for download from <http://www.terrain.org.au/>

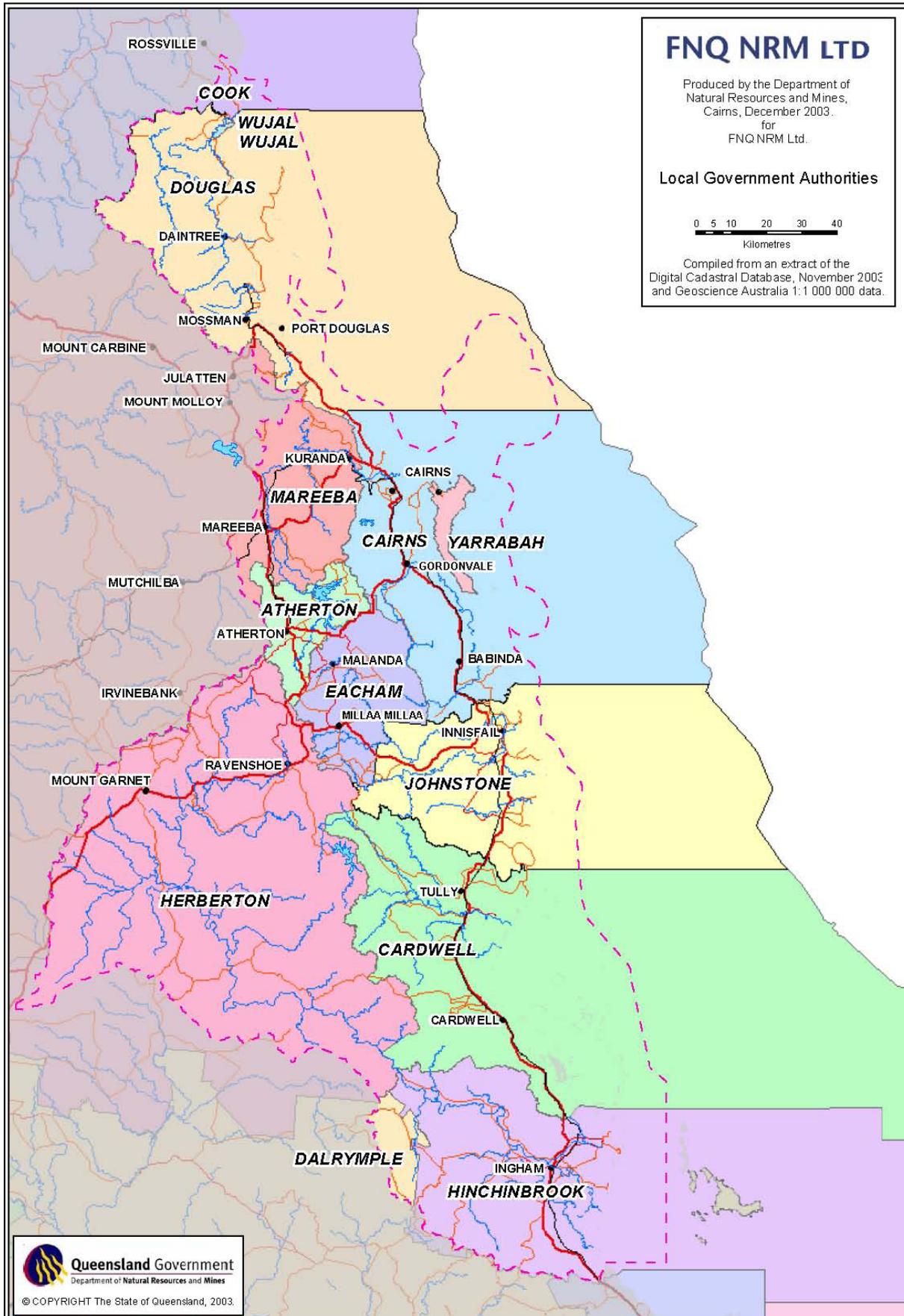


Figure 1: Local Government Areas included in the Wet Tropics Natural Resource Management region. Source: McDonald and Weston (2004).

Methodology

The research team developed a self-administered mail based questionnaire to gather data from rural landholders. The survey was designed following a review of the previous research into the topics in the region and at the State and National scale. A brief review of these studies and a copy of the questionnaire used are provided in the background and technical reports for this project.

The survey was undertaken using a self-administered questionnaire that was mailed to a random selection of 1,600 landholders in the region stratified into a series of land size classes. The questionnaires were mailed to landholders on 28 November 2007. A series of postcard-sized reminders were sent to non-respondents in the same sample two, three and four weeks after the initial mailout. A second copy of the questionnaire was sent to sample members' respondents that had not replied or contacted the survey team on 10 January 2008.

In order to achieve comparability with other regional-based surveys, the questionnaire was designed to be consistent with the previous regional surveys undertaken to provide socio-economic information for NRM purposes undertaken by the Bureau of Rural Sciences (BRS) in other parts of Australia. Where possible, similar questions were used to those used in the BRS surveys, adjusted to account for regional differences in terminologies used and the types of NRM and rural development issues prevalent in the region. The design of the survey was also informed by the study reported by Sing (2004). In this study Sing worked with a variety of industry groups to define currently recommended practices for rural enterprises in the region. These practices are those listed as desirable in the regions NRM plan and the plan calls for efforts to be made to encourage adoption of these practices to various levels of uptake. The advice of the Terrain Industry Advisory Group (IAG) and others knowledgeable about these practices (in particular John Reghenzani of Terrain) was sought to reduce the number of practices under consideration to a number that was suitable for a self-administered, mail-based survey.

The final topics included in the survey and the items within each of the topics were as follows:

Characteristics of landholders and their holdings

- Age, education, time on property, in district and on rural properties, involvement in community organisations, main occupation, time spent on property work per week, reliance on property income, number of dependents, off- and on-farm income levels, equity levels; and
- Size of landholding, number of titles owned, distance from residence, types and extent of various land uses, types and extent of native vegetation.

Perception of importance of NRM issues on own property

- Perceived importance of eighteen potential NRM issues.

Perception of rural development issues regionally

- Perceived importance of 22 rural development issues, NRM and other; and
- View of neighbours and sustainability issues.

Goals for property management

- Importance attached to various potential management objectives.

Property planning

- If respondents have a property management plan;
- If respondents have an environmental management system; and
- Likelihood of various outcomes (i.e. sell, lease, diversify, scale back, etc.).

Trust of local organisations

- Level of trust of various government and non-government agencies.

Use of information sources and training

- Perceived usefulness of 22 potential sources of information to aid property management;
- Attendance at training, course types attended and training wanted;

Native vegetation management

- Areas of various types of vegetation owned;
- If respondents have encouraged, cleared or fenced native vegetation areas;
- Perception of various reasons for and constraints to vegetation management; and
- Current management practices (in regards to eight activities).

Livestock enterprises

- Stock numbers and types;
- Adoption of currently recommended practices (CRPs);
- Perception of the appropriateness of CRPs; and
- Whether to use potential new CRPs, extent to which they match property goals and resources, whether will continue or adopt their use.

Cropping enterprises

- Crop types and areas;
- Fertiliser application rates;
- Adoption of currently recommended practices (CRPs) regarding crop establishment, harvest and irrigation;
- Perception of the appropriateness of CRPs; and
- Whether to use potential new CRPs, extent to which they match property goals and resources, whether will continue or adopt their use.

Pest and weed management

- Labour and money spent controlling non-crop pests and weeds.

Sampling framework

The sampling framework was based on the selection of property lots rather than owners because a database about land ownership was not available. The sample framework for the survey was developed by analysing the digital cadastral database of QDNRW. Under a data sharing agreement between Terrain and the QDNRW, Terrain has access to the digital cadastral database (DCDB) maintained by QDNRW.

Details on the development of the sampling frame are provided in the background and technical reports for the survey. There is some discrepancy between the number of lots in

various size classes in the calculated sample and the number of lots in each class in the final sample as presented in Tables 1 and 2. The primary reason for this is that many landholders with rural properties own more than one parcel of land. For example, if a lot was randomly selected for the 2-5 ha size class and this lot was actually only one of several owned by the person or persons, in the final sample they would appear in a higher size class than the class that was first anticipated. Examination of the differences in the number of lots in each size class between the calculated and final samples reveals a consistent under-representation of the smaller size classes and corresponding over-representation in the larger classes. Given that no data were available about landholders total landholding area which could be used to select the sample frame, and that landholders with larger lot sizes own most of the land in the region, it was assumed that the process provided a reasonably representative sample of private landholders in the region.

Table 1: Identified sample frame and final (in brackets) sample frame per lot size class and Local Government Area.

Size class (ha)	Atherton	Cairns	Cardwell	Douglas	Eacham	Herberton	Hinchinbrook	Johnstone	Mareeba	Total
2 - 5	25 (22)	45 (33)	30 (25)	36 (25)	34 (32)	47 (39)	41 (17)	58 (35)	90 (84)	407 (312)
5 to 10	20 (16)	33 (16)	22 (16)	20 (15)	15 (12)	16 (17)	36 (8)	45 (25)	20 (15)	225 (140)
10 to 20	20 (9)	37 (19)	30 (16)	21 (8)	19 (11)	12 (11)	49 (18)	74 (33)	19 (15)	281 (140)
20 to 50	36 (23)	58 (44)	50 (33)	23 (22)	34 (24)	19 (20)	102 (72)	77 (58)	24 (24)	424 (320)
50 to 100	15 (23)	21 (46)	20 (28)	9 (20)	49 (35)	19 (15)	31 (82)	25 (77)	18 (21)	207 (347)
100 to 200	1 (21)	4 (33)	7 (23)	2 (11)	3 (29)	5 (4)	10 (49)	5 (41)	4 (10)	40 (221)
200 to 500	0 (5)	0 (5)	3 (18)	0 (10)	0 (11)	2 (9)	4 (21)	1 (11)	2 (8)	13 (98)
500 to 1,000	0 (0)	0 (3)	1 (6)	0 (0)	0 (0)	1 (2)	1 (7)	0 (4)	0 (2)	3 (16)
> 1,000	0 (0)	0 (1)	0 (2)	0 (0)	0 (0)	0 (2)	0 (3)	0 (0)	0 (2)	1 (10)

Table 2: Variation in the number of landholdings between initial sample frame and final sample frame.

Size class (ha)	Atherton	Cairns	Cardwell	Douglas	Eacham	Herberton	Hinchinbrook	Johnstone	Mareeba	Total
2 - 5	-3	-12	-5	-11	-2	-8	-24	-23	-6	-95
5 to 10	-4	-17	-6	-5	-3	1	-28	-20	-5	-85
10 to 20	-11	-18	-14	-13	-8	-1	-31	-41	-4	-141
20 to 50	-13	-14	-17	-1	-10	1	-30	-19	0	-104
50 to 100	8	25	8	11	-14	-4	51	52	3	140
100 to 200	20	29	16	9	26	-1	39	36	6	181
200 to 500	5	5	15	10	11	7	17	10	6	85
500 to 1,000	0	2	3	0	0	1	3	4	0	13
> 1,000	0	1	2	0	0	2	3	0	2	9

Results

The effective response rate for the survey was 21%. Of the initial questionnaires sent out, 84 were returned as 'address unknown' or 'wrong address'. Three percent of those who were sent questionnaires returned them with a note to indicate they did not want to or could not participate in the survey (Table 3).

Response rates varied between landholding size classes and between local government areas (LGAs). The highest response rates were in the larger size classes and lowest in the 20-49.99 ha size class. Across the LGAs, the highest response rates were in Eacham and Atherton Shires with the lowest rates in Cardwell and Douglas shires (Tables 4 and 5).

Table 3: Number and proportion of survey responses.

	N	Proportion
Questionnaires sent out	1,600	
Questionnaires returned 'address unknown' or 'wrong address'	84	5%
Questionnaires returned blank	9	1%
Respondents gave reasons for not participating in survey	47	3%
Valid responses received	305	19%
Effective response rate	21%	

Table 4: Number of valid responses by area of land class and Local Government Area.

Area of total landholding classes (ha)	Local Government Area									All LGAs
	Atherton	Cairns	Cardwell	Douglas	Eacham	Herberton	Hinchinbrook	Johnstone	Mareeba	
2 -4.99	6	2	1	5	6	7	0	7	22	56
5-9.99	2	1	2	3	3	4	3	1	5	24
10-19.99	2	2	1	0	2	2	2	6	4	21
20-49.99	5	1	4	3	6	5	2	8	1	35
50-99.99	5	8	4	1	9	3	10	13	2	55
100-199.99	5	10	4	3	10	1	9	11	2	55
200-499.99	3	3	3	0	5	0	15	2	1	32
500-999.99	0	1	0	0	1	0	1	3	0	6
>1000	1	2	1	0	0	1	4	0	1	10
Total	29	30	20	15	42	23	46	51	38	294

Table 5: Response rate by landholding class size and Local Government Area.

Area of total landholding classes (ha)	Local Government Area									All LGAs (%)
	Atherton (%)	Cairns (%)	Cardwell (%)	Douglas (%)	Eacham (%)	Herberton (%)	Hinchinbrook (%)	Johnstone (%)	Mareeba (%)	
2 -4.99	27	6	4	20	19	18	0	20	26	18
5-9.99	13	6	13	20	25	24	38	4	33	17
10-19.99	22	11	6	0	18	18	11	18	27	15
20-49.99	22	2	12	14	25	25	3	14	4	11
50-99.99	22	17	14	5	26	20	12	17	10	16
100-199.99	24	30	17	27	34	25	18	27	20	25
200-499.99	60	60	17	0	45	0	71	18	13	33
500-999.99	0	50	0	0	0	0	25	75	0	38
>1000	0	200	50	0	0	50	133	0	50	100
Total	24	15	12	14	27	19	17	18	21	18

Characteristics of landholders and their properties

Age and gender of respondents

The average age of respondents is 55 years (Table 6). On average they had lived in their local district for 33 years and on their current property for 23 years. Approximately 75% of respondents were male and 25% female.

Table 6: Age of respondents and time of residence in the district and on the property.

Demographic variable	N	Minimum	Maximum	Mean	Std. Error	Std. Deviation
Age	277	22	83	55.3	0.71	11.86
Time lived on rural properties	282	0	80	30.3	1.29	21.60
Time lived in local district	280	0	83	32.6	1.37	22.94
Time lived on current property	278	0	80	22.9	1.18	19.62

The median age of farmers and farm managers in Queensland according to the 2001 census was 50 years, although it is also noted that people involved in the cane growing and beef grazing industries are generally older (QDPI 2008a). The average age of respondents is thus close to the state average. The slightly older average age of the respondents could be due to the high proportion of cane and beef farmers in the survey respondents. There is little difference in the mean age of the respondents who reported varying primary purposes for managing their landholding (Table 7).

Table 7: Age of respondents by primary purpose of landholding.

Primary purpose	Mean	Std. Error	Mediam	N	RSE (%)
Agriculture	54.4	0.96	56	143	2
Conservation	55.7	3.04	53	18	5
Hobby/lifestyle farm	53.8	1.91	55	33	4
Residential	57.9	2.24	59	36	4
Other	50.8	4.93	55	5	10

The mean number of people living on each property is 3.1, with 8% of properties having no resident, 9% only one resident and 40% two residents (Table 8). The properties financially support an average of 2.6 people (Table 9).

Formal education levels varied among respondents from primary school to post-graduate degree levels (Table 10). Those with primary school only were found to be significantly older than those with other levels of education (one way ANOVA: $F = 10.668$, $d.f. = 4$, $prob < 0.000$), reflecting the education policies and programs of the era in which these people attended school.

Formal education levels varied among respondents from primary school to post-graduate degree levels (Table 10). Those with primary school only were found to be significantly older

than those with other levels of education (one way ANOVA: $F = 10.668$, $d.f. = 4$, $prob < 0.000$), reflecting the education policies and programs of the era in which these people attended school.

Table 8: Number of people who live on properties owned by respondents.

Number of people	Frequency	Percent	Valid percent	Cumulative percent
0	23	8	8	8
1	28	9	10	18
2	118	39	42	60
3	24	8	9	69
4	40	13	14	83
5	15	5	5	89
6	9	3	3	92
7	5	2	2	94
8 or more	18	6	6	100
Sub total	280	92	100	
Missing	25	8		

Table 9: Number of people living on and supported by respondents' properties.

Variable	N	Minimum	Maximum	Mean	Std. Error	RSE
Number of people that live on property	280	0	20	3.1	0.16	5%
Number of people supported by property	270	0	65	2.6	0.30	12%

Table 10: Education level of respondents.

Level of formal education	Frequency	Percent	Valid percent	Cumulative percent
Primary	32	10.5	11.1	11.1
Secondary to Year 10	85	27.9	29.6	40.8
Secondary to Year 12	62	20.3	21.6	62.4
Diploma or Degree	83	27.2	28.9	91.3
Postgraduate Degree	25	8.2	8.7	100.0
Total	287	94.1	100.0	
Missing	18	5.9		
Total	305	100.0		

Landholding area

Respondents to the survey operated a diverse range of enterprises at a range of scales (Figure 2). The land area operated by respondents ranged from 2 ha to 78,000 ha. Median land area values varied considerably between with differing purposes (Tables 11 and 12) and between properties in different (pre-amalgamation) LGAs (Table 13). The highest mean and median sizes of landholdings were for properties whose primary use is for agriculture. Respondents included two households with landholdings of more than 70,000ha size, one of more than 20,000 ha and one of 12,000 ha. On average the largest mean size of landholdings were in the Herberton and Mareeba shires, with the largest median values in the Hinchinbrook, Cairns and Cardwell shires. The smallest median values were in the Mareeba and Douglas shires.

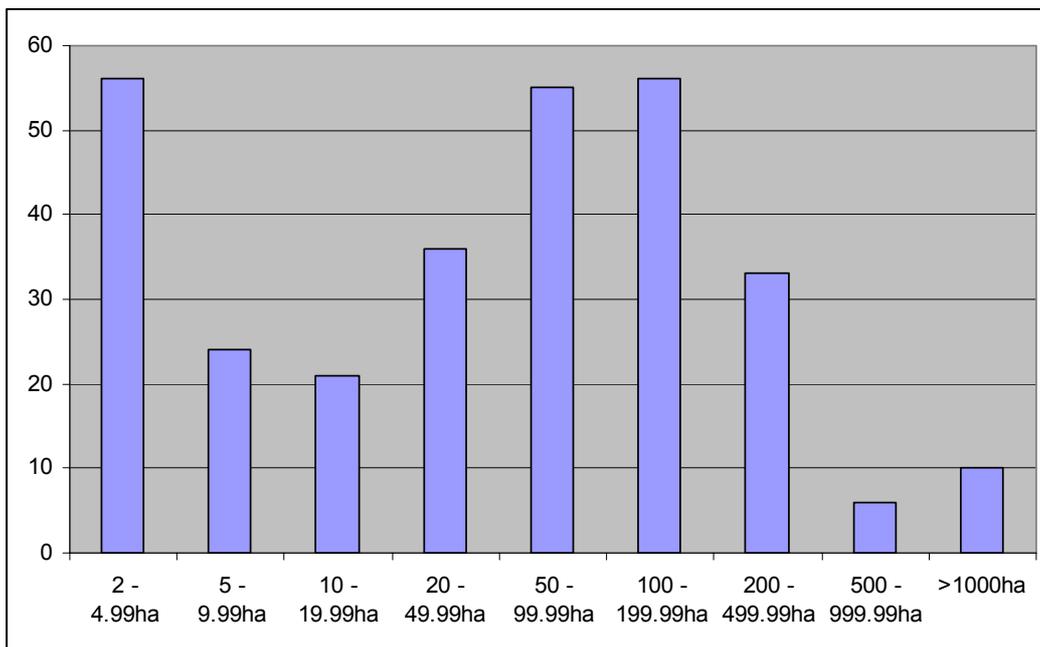


Figure 2: Number of respondents with landholdings in various class sizes.

Table 11: Land area owned by primary purpose for land ownership.

Primary purpose	N	Relative frequency (%)	Total size of landholding (ha)			RSE Area (%)
			Mean	Std. Error	Median	
Agriculture	183	60	1268.3	619.54	113.5	49
Conservation	21	7	42.5	12.23	20	29
Hobby/lifestyle farm	42	14	21.4	5.30	7.4	25
Residential	47	16	7.9	1.66	3.6	21
Other	8	3	43.5	14.76	31.7	34

Table 12: Size of total landholding class by primary purpose for land ownership.

Size of total landholding classes (ha)	Primary purposes for land ownership					Total
	Agriculture	Conservation	Hobby / lifestyle farm	Residential	Other	
2-4.99	5	5	16	28	1	55
5-9.99	4	1	9	9	1	24
10-19.99	6	4	6	4	0	20
20-49.99	21	5	5	2	3	36
50-99.99	43	4	4	2	2	55
100-199.99	50	1	2	0	1	54
200-499.99	32	1	0	0	0	33
500-999.99	6	0	0	0	0	6
>1000	10	0	0	0	0	10
Total	177	21	42	45	8	293

Table 13: Characteristics of the land area (ha) owned per respondent by Local Government Area.

Local Government Area	Total size of landholding (ha)						Total
	N	Mean	Std. Error	Median	Minimum	Maximum	
Atherton	29	128.6	53.93	32	2.0	1,550	42%
Cairns	20	952.7	731.85	106.5	2.7	22,000	77%
Cardwell	30	263.3	161.46	76.5	3.2	3,300	61%
Douglas	15	44.3	14.84	8	2.0	163	33%
Eacham	42	113.0	23.95	61.5	2.3	869	21%
Herberton	23	3,111.5	3085.85	12.5	2.0	71,000	99%
Hinchinbrook	45	540.6	267.37	156	5.0	12,000	49%
Johnstone	49	104.8	22.72	59	2.4	800	22%
Mareeba	37	2,139.7	2114.98	4.2	2.0	78,278	99%

An alternative breakdown of the respondents land uses is presented in Tables 14 and 15. Approximately 16% of the respondents own residential landholdings. Cropping operators are the highest proportion of respondents overall. Fifteen percent of respondents reported having grazing activities, and only 7% of respondents reported having grazing and cropping operations. The 'other' category includes those 27% of respondents who identified their primary land use as 'lifestyle/hobby farms' (42) or 'conservation' (21) plus varied other land uses (8)

Table 14: Proportions of respondents with various land-use types in the final sample.

Land use type	Proportion of final sample (%)
Residential only	16
Grazing	18
Cropping	32
Grazing and cropping	7
Other	27

Note: The *Other* category in this analysis includes hobby farms, conservation properties plus various other land uses.

Table 15: Frequency of respondents' land use types in various Local Government Areas.

Local Government Area	Residential only	Grazing	Cropping	Grazing and cropping	Other	Total
Atherton	3	10	3	3	10	29
Cairns	2	3	18	2	3	28
Cardwell	3	2	6	3	6	20
Douglas	5	1	4	0	5	15
Eacham	3	22	1	0	18	44
Herberton	10	3	0	1	9	23
Hinchinbrook	1	1	30	9	3	44
Johnstone	4	5	29	4	11	53
Mareeba	15	5	4	0	14	38
Total	46	52	95	22	79	294

Note: The *Other* category includes those respondents who identified their primary land use as 'lifestyle / hobby farms' (42) or 'conservation' (21) plus various other land uses (8).

There is evidence of variation in the areas of landholding owned by respondents with different reported land uses (Tables 16 and 17, Figure 3). As expected, the smallest land areas are dominated by residential and 'other' uses; these have median property sizes of 3.4 and 12 ha respectively. The majority of grazing and cropping only enterprises are in the 50 to 200 ha size classes, although a third of these operators have more than 200 ha. The median size of grazing enterprises is 117 ha and the median size of cropping operations is 100 ha. The owners of the largest three properties (one at over 20,000 ha and two of more than 70,000ha) involved in the survey are all involved in grazing enterprises which is reflected in the large standard deviation and standard error for the group (Table 17). Those landholders with mixed cropping and livestock enterprises tend to have larger property sizes.

Table 16: Reported land-use types by property size class.

Size of total landholding class (ha)	Residential only	Grazing	Cropping	Grazing and cropping	Other	Total
2-4.99	28	-	5	-	23	56
5-9.99	9	2	1	-	12	24
10-19.99	4	1	2	1	13	21
20-49.99	2	6	11	4	13	36
50-99.99	1	14	28	-	11	54
100-199.99	-	14	30	4	5	53
200-499.99	-	8	14	7	2	31
500-999.99	-	2	4	-	0	6
>1000	-	3	1	6	0	10
Total	44	50	96	22	79	291

Table 17: Average and median property sizes (ha) of respondents with grazing and cropping land uses.

Enterprise type	Mean	Std. Error	Median	N	RSE (%)
Grazing	3,577.1	2120.40	116.6	50	59
Cropping	173.4	32.16	100.5	96	19
Grazing and cropping	1,110.3	548.54	226.5	22	49

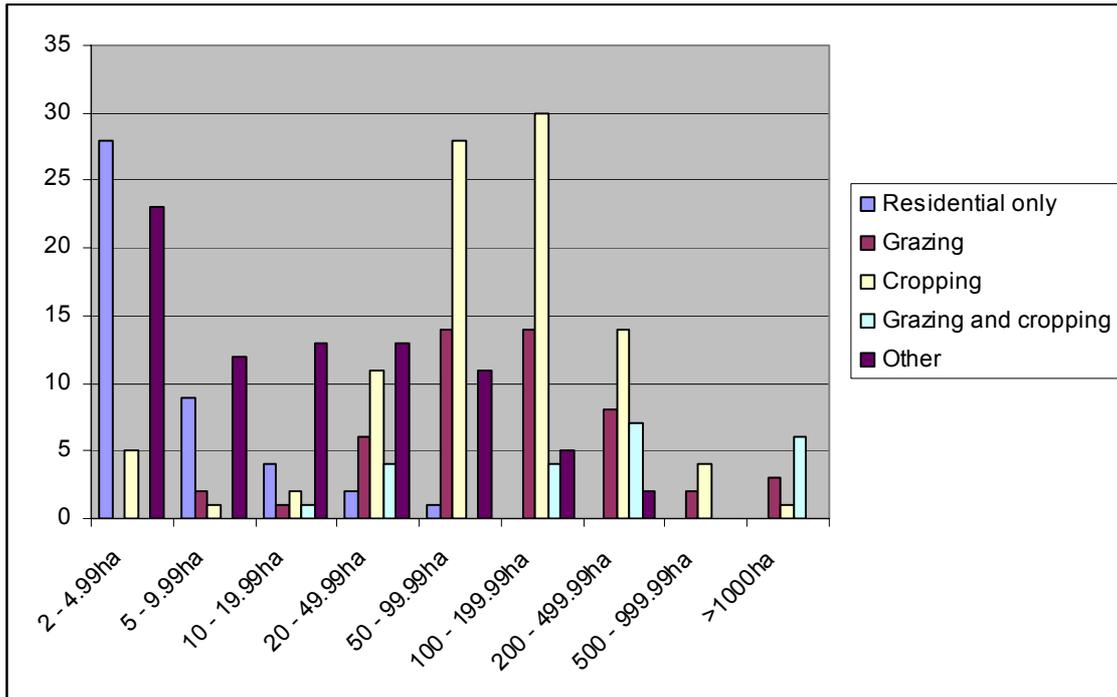


Figure 3: Frequency of respondents in various landholding size classes by main property land use.

Cropping types and practices

A total of 128 respondents reported growing some type of crops. Approximately 60% of respondents reported growing sugar cane crops with a combined total area of 28,000 ha (Table 18 and 19). This total includes four growers with more than 1,000 ha of land that is used to grow sugar cane, one of whom operates their cane growing enterprise on more than 10,000 ha of land. Other major crop types reported by respondents include bananas, pawpaws, various pasture grasses, a variety of tropical fruits (including rambuttan, mangoes and lychees) and other crops including peanuts, ginger, lemon grass, mixed bush foods and vegetables.

Most sugar cane crops are grown on land parcels of between 50 and 200 ha (Table 20). According to responses, the majority of other crops, other than pasture grasses, are grown on smaller land parcels. Tropical fruit crops in particular are grown in smaller areas, the majority less than 10 ha.

Table 18: Mean and median areas of the major crops grown by respondents.

Crop type	Total area (ha)	N	Mean area (ha)
Sugar cane	28,040.1	93	301.5
Bananas	151.0	9	16.8
Pawpaw	34.5	5	6.9
Other tropical fruits	167.5	17	9.9
Grasses	762.0	11	69.3
Other	231.7	22	10.5

Note: This was a multiple response question with respondents able to list up to five crop types.

Table 19: Types of crops grown by respondents in 2007.

Crop type	Frequency	Relative frequency
Sugar cane	96	58
Bananas	9	5
Pawpaw	5	3
Other tropical fruits	18	11
Grasses	13	8
Other	24	15

Table 20: Frequency of areas of crops by crop type.

Type of crop	0-4.99 ha	5-9.99 ha	10-19.99 ha	20-49.99 ha	50-99.99 ha	100-199.99 ha	200-499.99 ha	500-999.99 ha	> 1,000 ha	All area classes
Sugar cane	0	2	2	17	27	22	12	3	4	89
Banana	1	2	2	1	1	0	0	0	0	7
Pawpaw	3	0	2	0	0	0	0	0	0	5
Other fruit	7	2	2	1	1	0	0	0	0	13
Grasses	0	0	1	2	3	1	2	0	0	9
Other	13	1	3	3	1	0	0	0	0	21
	24	7	12	24	33	23	14	3	4	144

Adoption of currently recommended practices for cropping

Participants were asked to indicate whether they use a number of practices that are currently recommended by members within their industry as the best means to maintain healthy soil and water resources. Most respondents (>80%) supported the statement that reduced tillage improves soil health and reduces erosion and approximately half the respondents agreed that reduced tillage increases the need for herbicides (Figure 4). Nearly 80% of respondents think that the cost of new machinery constrains practice change.

Participants were asked to indicate the extent to which they currently use various cropping practices, the likelihood of whether these practices would be continued, and how well the practices fit their property management goals and their resources. Of the practices assessed, maintaining grass headlands is already used by more than half the respondents and a higher proportion (more than 70%) expect to use the practice in future (Tables 21 to 24). The other practices except the use of legume rotations are fully used by 55-60 % of respondents and partially used by approximately 20% of respondents (Table 22 and Figure 5). In general terms respondents reported that the use of the practices that were examined will increase (Table 25 and Figure 6). Similar patterns of response are evident in respondents' appraisals of whether the practices fit with their management goals (Table 25, Figure 7) and whether they fit with their resources (Table 26, Figure 8). Details of the adoption of the various practices by respondents in different industries are included in Appendix A.

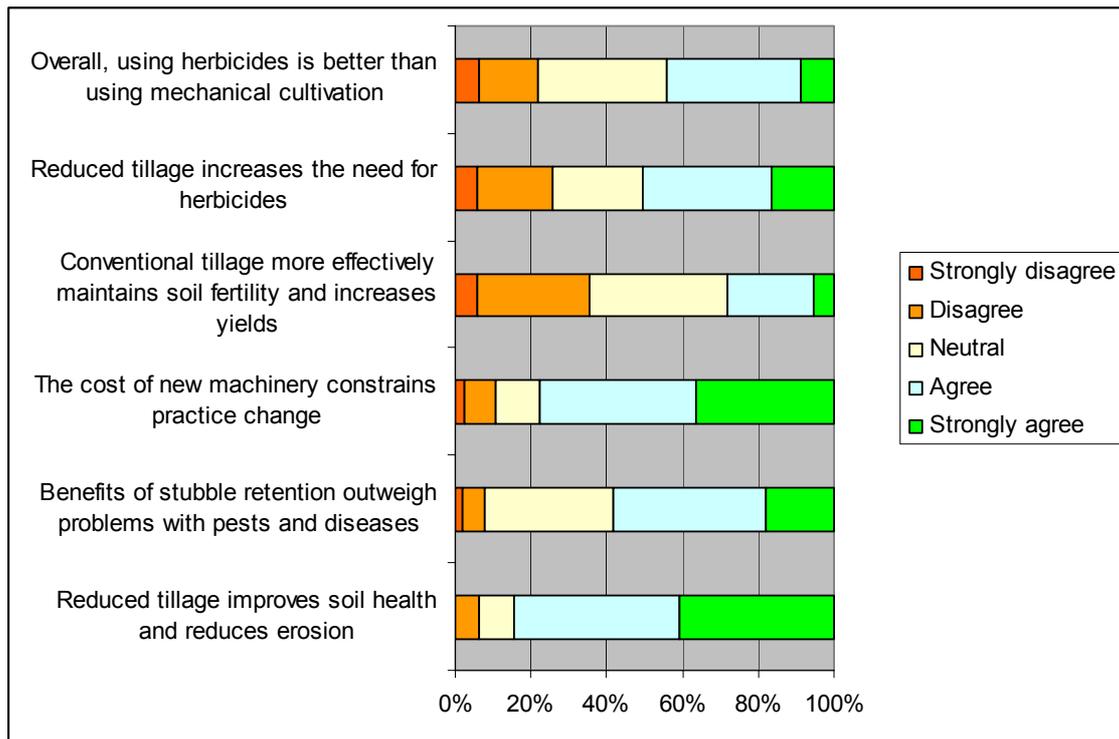


Figure 4: Respondents' views about aspects of currently recommended practices.

Table 21: Current use of various cropping practices, number of respondents.

Use of cropping practices	Grass headlands	Soil nutrient testing	Stubble retention	Use earthworks	Minimum tillage	Legume rotation
No	13	36	28	31	29	59
Partly	26	31	31	36	36	27
Yes	105	84	83	79	78	64
Valid	144	151	142	146	143	150
Missing	161	154	163	159	162	155
Total N	305	305	305	305	305	305

Table 22: Proportion of landholders with cropping enterprises who have adopted various recommended practices.

Use of cropping practices	Grass headlands (%)	Soil nutrient testing (%)	Stubble retention (%)	Use earthworks (%)	Minimum tillage (%)	Legume rotation (%)
No	9	24	20	21	20	39
Partly	18	21	22	25	25	18
Yes	73	56	58	54	55	43

Table 23: Frequency of respondents reporting current use of various recommended cropping practices.

Area of property covered	Retained stubble or pasture residue	Applied lime and/or gypsum over previous five years	Earthworks for soil conservation and water management	Applied lime and/or gypsum in 2006	Used GPS or precision cropping techniques
None	17	20	27	30	76
Some paddocks	13	36	35	48	12
Most paddocks	67	43	36	21	10
All paddocks	1	1	1	1	1
Don't know	1	0	1	0	1
Valid	144	157	153	154	154
Missing	161	148	152	151	151
Total	305	305	305	305	305

Table 24: Proportion of landholders with cropping enterprises who have adopted various recommended practices.

Continue use	Grass headlands	Soil nutrient testing	Minimum tillage	Use earthworks	Stubble retention	Legume rotation
No	4	7	12	9	10	15
Maybe	25	33	32	32	31	47
Yes	95	88	88	86	81	68
Valid	124	128	132	127	122	130
Missing	181	177	173	178	183	175
Total N	305	305	305	305	305	305

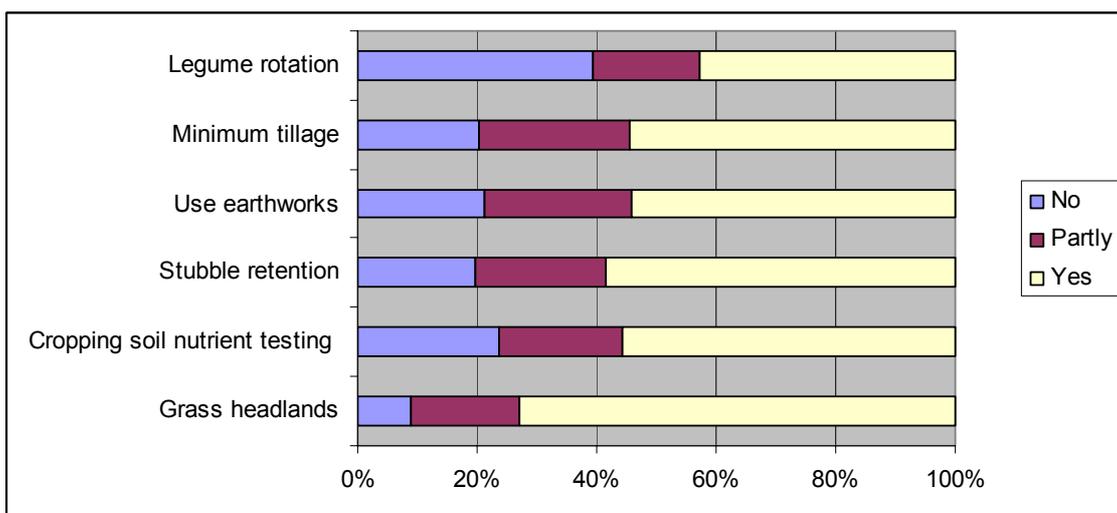


Figure 5: Proportion of landholders with cropping enterprises who are using various recommended practices.

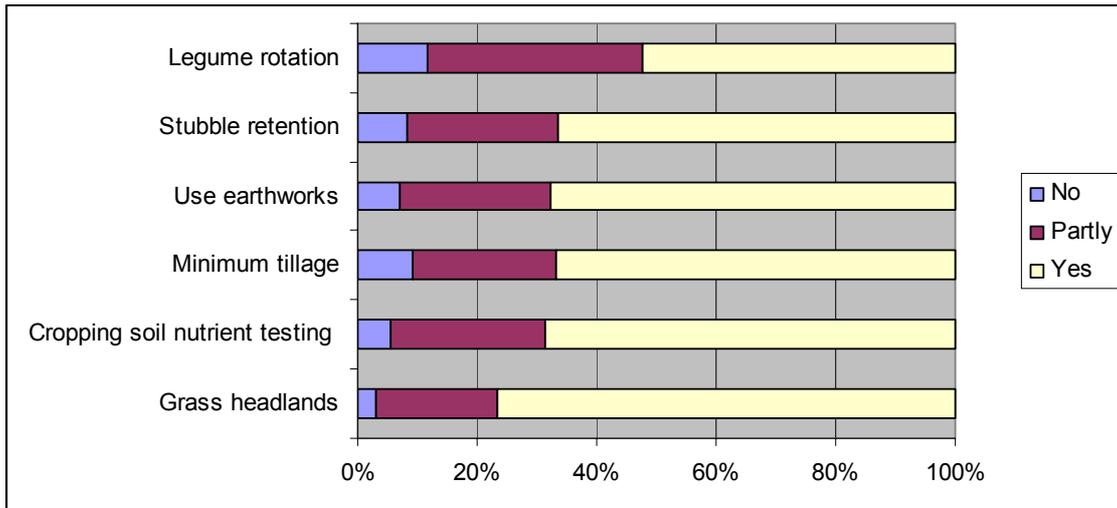


Figure 6: Proportion of landholders with cropping enterprises who intend to use recommended practices in the future.

Table 25: Whether various cropping practices fit with property management goals.

Fits with goals	Grass headlands	Soil nutrient testing	Use earthworks	Stubble retention	Minimum tillage	Legume rotation
No	4	2	8	8	11	12
Maybe	26	36	35	30	38	38
Yes	87	78	75	75	70	60
Valid	6	13	10	11	12	17
Missing	123	129	128	124	131	127
Total N	182	176	177	181	174	178

Table 26: Whether various cropping practices fit with property management resources.

Fits with resources	Grass headlands	Soil nutrient testing	Use earthworks	Stubble retention	Minimum tillage	Legume rotation
No	4	5	9	9	11	18
Maybe	24	24	32	29	38	27
Yes	91	87	79	73	70	66
Valid	3	12	9	10	12	15
Missing	122	128	129	121	131	126
Total N	183	177	176	184	174	179

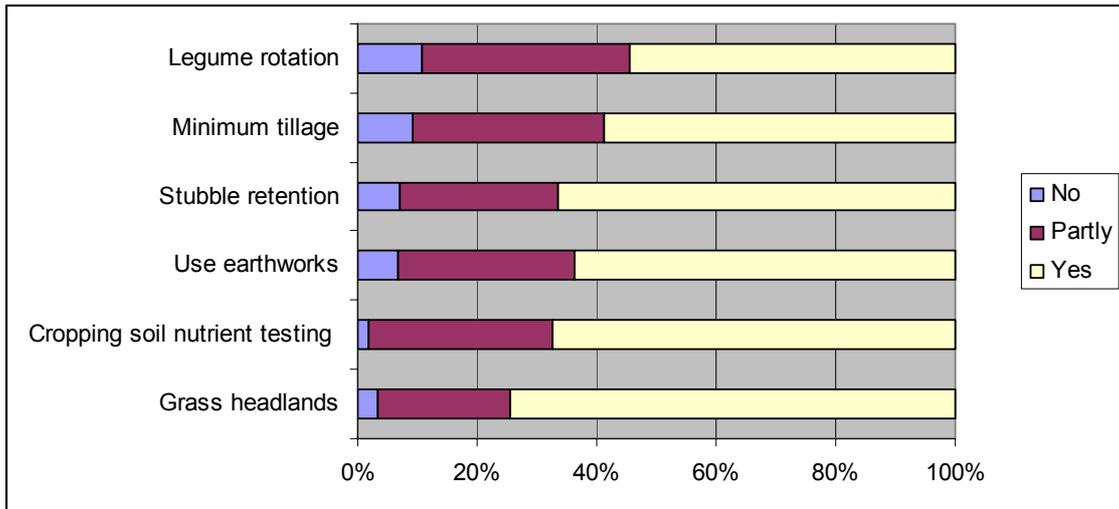


Figure 7: Proportion of cropping enterprise landholders' perceptions of the compatibility of various cropping practices with their property management goals.

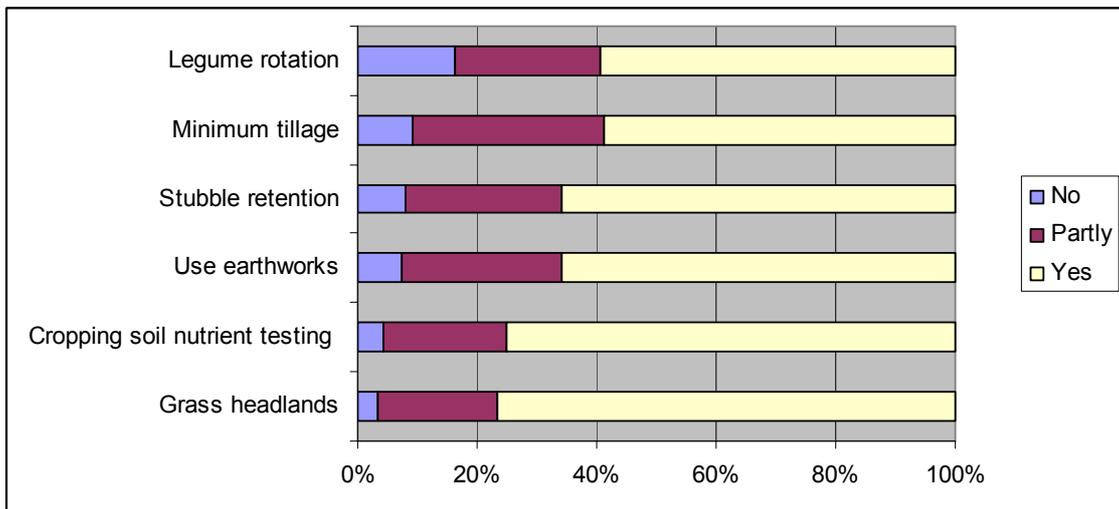


Figure 8: Proportion of cropping enterprise landholders' perceptions of the compatibility of various cropping practices with their resources.

Fertiliser use

Participants were asked to indicate the amounts of macro and micro nutrients they apply to their various crops. A wide range of responses were provided both between and within different crop types (Tables 27 to 29). The average levels of application are similar to those recommended by QDPIF and other research organizations for the various crops.

Recommended rates of nutrients for various crops vary according to the soil and climatic conditions in which the crops are grown and the variety of crop being grown. The code of practice developed by the Cangrowers association lists the recommended rates of nutrients for use on cane crops developed by the BSES organisation (Canegrowers undated). The rates of nitrogen recommended by the BSES vary between fallow and ratoon crops as well, ranging from 80kg per ha for 'dryland' fallow plantings to 250 kg per ha for replanting and ratoon crops in non-dryland plantings. Recommendations for phosphorus range from 20-80

kg per ha, while recommended rates of application of potassium range from 80-120 kg per ha. Recommended rates of nutrient applications for banana crops produced by QDPIF are similarly varied. The QDPIF (2008b) recommends average annual applications are 400 kg of nitrogen, 50 kg of phosphorus, 600 kg of potassium and 2 t/ha of lime/dolomite split over a number of applications.

Table 27: Nutrient use by all crop growers (kg/ha/yr⁻¹).

Statistic	Nitrogen	Phosphorous	Potassium	Other nutrients*
Mean	185	77	204	322
Median	120	30	75	10
Minimum	0	0	0	0
Maximum	3000	1500	6000	6000
Std deviation	397	211	826	1248
Count (valid N)	106	91	96	61

* These include micro-nutrients, lime and sulphur applications.

Table 28: Mean nutrient use by crop type (kg/ha/yr⁻¹).

Crop type	Number of estimates (max.)	Nitrogen	Phosphorous	Potassium	Other nutrients*
Sugar cane	69	147	50	88	230
Banana	6	190	32	384	511
Pawpaw [#]	-	-	-	-	-
Other fruit	8	22	18	20	10
Grasses	9	184	79	49	16
Other	10	112	89	69	39

* These include micro-nutrients, lime and sulphur applications.

[#] There were insufficient responses regarding fertiliser application rates from pawpaw growers to calculate these statistics.

Table 29: Minimum and maximum nutrient applications by crop type (kg/ha/yr⁻¹).

Crop type	Nitrogen			Phosphorous			Potassium			Other		
	Min	Max	N	Min	Max	N	Min	Max	N	Min	Max	N
Sugar cane	7	450	69	0	250	54	2	300	69	1	6000	33
Banana	30	500	6	4	50	6	30	1000	6	0.4	2000	4
Pawpaw*	-	-	-	-	-	-	-	-	-	-	-	-
Other fruit	1	60	8	1	40	7	1	36	8	0.5	20	5
Grasses	60	370	9	10	300	9	8	100	9	0.3	40	7
Other	15	250	9	15	200	10	10	200	9	1	160	7

* There were insufficient responses to calculate these statistics.

Irrigation practices and views

Approximately one third (or 100 respondents) reporting using irrigation on their properties. The most commonly reported type of irrigation used was low pressure irrigation, followed by high pressure, drip and flood irrigation (Table 30, Figure 9). Nearly 40% of irrigators reported using mulch in some paddocks or more to control water loss and approximately 25% reported using an irrigation schedule and or monitoring of soil moisture to aid decisions about the timing and volume of irrigation (Table 31, Figure 10). Approximately 18% reported using their irrigation set-up to apply fertiliser, and less than 10% reported using an automated irrigation control system.

Table 30: Frequency of respondents who use various types of irrigation and practices.

Cropping practice	None	Some paddocks	Most paddocks	All paddocks	Valid	Missing	Total N
Low pressure irrigation (e.g. centre pivot, overhead, fixed, travelling)	65	23	5	6	99	206	305
High pressure (e.g. travelling gun)	79	15	0	2	96	209	305
Drip irrigation	86	9	1	3	99	206	305
Flood irrigation	90	4	0	1	95	210	305
Used mulch to help improve water use efficiency	60	16	8	14	98	207	305
Used an irrigation schedule to determine the timing/volume of water	72	10	5	7	94	211	305
Monitor soil moisture to schedule irrigation	73	12	6	7	98	207	305
Fertilised through irrigation system	81	12	1	5	99	206	305
Have an automated irrigation controller	86	4	2	3	95	210	305

Table 31: Proportion of respondents who use various types of irrigation types and practices.

Cropping practice	None	Some paddocks	Most paddocks	All paddocks
Low pressure irrigation (e.g. centre pivot, overhead, fixed, travelling)	66%	23%	5%	6%
High pressure (e.g. travelling gun)	82%	16%	0%	2%
Drip irrigation	87%	9%	1%	3%
Flood irrigation	95%	4%	0%	1%
Used mulch to help improve water use efficiency	61%	16%	8%	14%
Used an irrigation schedule to determine the timing/volume of water	77%	11%	5%	7%
Monitor soil moisture to schedule irrigation	74%	12%	6%	7%
Fertilised through irrigation system	82%	12%	1%	5%
Have an automated irrigation controller	91%	4%	2%	3%

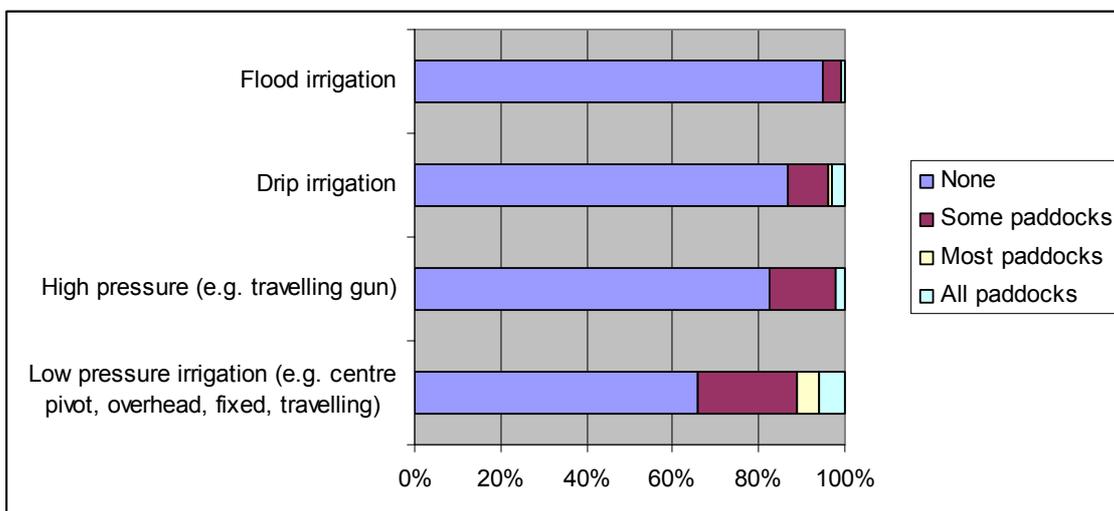


Figure 9: Proportion of crop growers who use various irrigation methods.

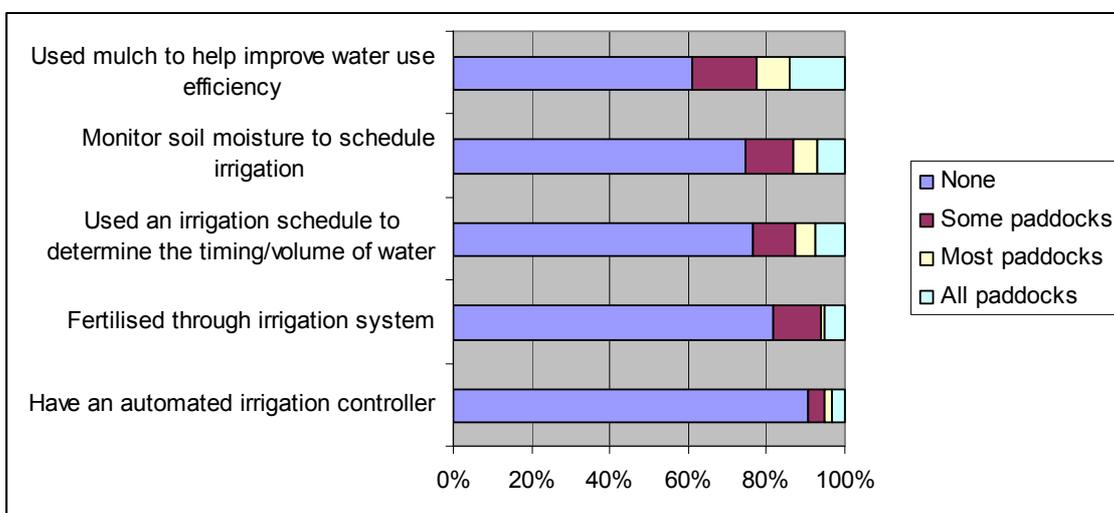


Figure 10: Proportion of crop growers who use various irrigation practices.

Participants were asked to provide their views on a number of statements regarding irrigation practices and related issues. Most agreed that drip or low pressure irrigation and scheduling could help improve water use efficiency and just over half agreed that better practices are needed in this regard. More than half the respondents reported they are neutral on the issue of whether the cost of changing irrigation practices outweighs water savings.

Table 32: Respondents' views on various irrigation practices and issues.

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total valid	Missing	% Agree
Drip or low pressure irrigation and irrigation scheduling improve water use efficiency	-	3	35	42	20	100	205	62%
Better irrigation practices are needed to improve water use efficiency	2	13	33	39	13	100	205	52%
The water savings associated with using mulch outweigh the risk of fungal infection	1	6	43	36	12	98	207	49%
Changing irrigation practices requires major alterations to the layout of my property	5	15	36	28	15	99	206	43%
Drip or low pressure irrigation is not appropriate for all soil types	9	12	43	23	13	100	205	36%
The cost of changing irrigation practices outweighs water savings	2	14	53	21	9	99	206	30%

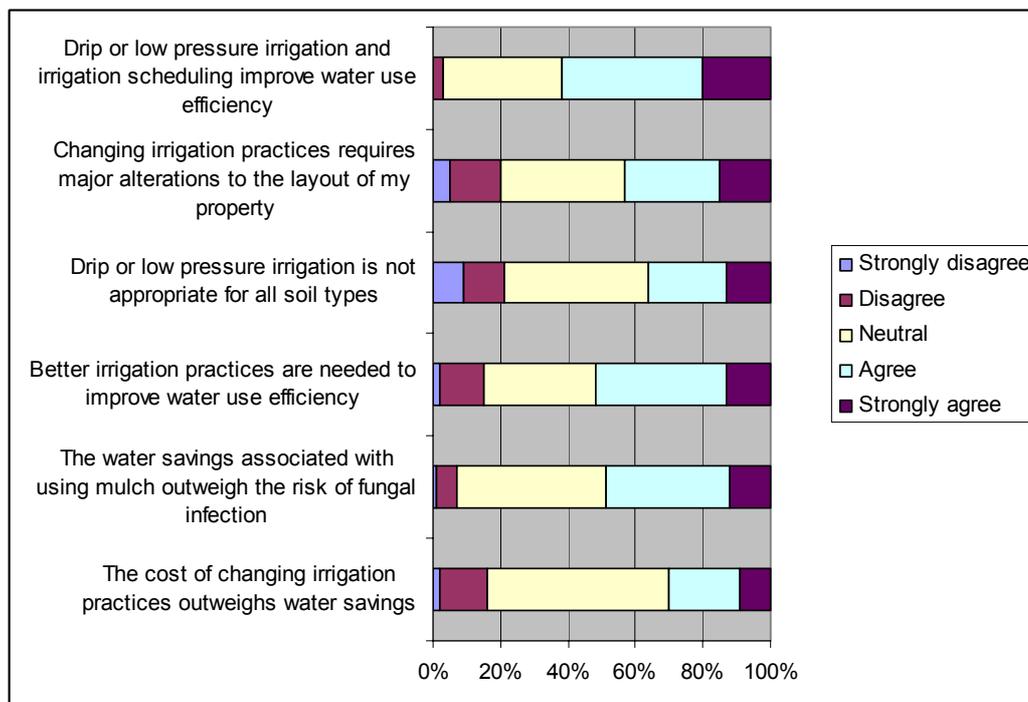


Figure 11: Respondents' views on various irrigation practices and issues.

Grazing and livestock management

Approximately 40% of respondents reported having some grazing lands. More than 149,000 ha (75%) of the total 192,000 ha of non-irrigated grazing lands reported by respondents are managed by two landholders in the Mareeba and Herberton local government areas (Tables 33 and 34). More than half the respondents have less than 50 ha of non-irrigated grazing land.

Table 33: Size classes of total pasture area.

Size class (ha)	Frequency	Percent	Valid Percent	Cumulative Percent
0-1.99	9	3.0	7.6	7.6
2-4.99	16	5.2	13.6	21.2
5-9.99	10	3.3	8.5	29.7
10-19.99	11	3.6	9.3	39.0
20-49.99	19	6.2	16.1	55.1
50-99.99	20	6.6	16.9	72.0
100-199.99	17	5.6	14.4	86.4
200-499.99	7	2.3	5.9	92.4
500-999.99	4	1.3	3.4	95.8
>1000	5	1.6	4.2	100.0
Total	118	38.7	100.0	
Missing	187	61.3		
Total	305	100.0		

Table 34: Number of respondents reporting various areas of non-irrigated pasture.

Non-irrigated pasture area class (ha)	N per size class	Cumul. N	Total area per size class	Cumul. area	Average area per size class
0-4.99	22	22	51	51	2.3
5-9.99	11	33	70	120	6.3
10-19.99	10	43	137	257	13.7
20-49.99	19	62	587	843	30.9
50-99.99	19	81	1,278	2,121	67.3
100-199.99	18	99	2,663	4,784	147.9
200-499.99	5	104	1,609	6,393	321.7
500-999.99	4	108	2,614	9,006	653.5
>1000ha	5	113	183,340	192,346	36,668.0

Approximately 10% of respondents (N = 31) or 25% of those with grazing land reported having some irrigated grazing pastures. The area of irrigated pastures range in size from 1 to 36 ha with a mean area of 13 ha. Seventy five percent of the irrigated grazing pastures reported by respondents are in the 10-19.99 ha and 20-49.99 ha size classes (Table 35).

Eighty percent of those with irrigated grazing land also have non-irrigated grazing land, with only 6 respondents reporting having only irrigated pastures (Table 36). Irrigated pastures make up less than a third of total pasture area for 70% of those with irrigated pastures.

Table 35: Area size class of irrigated grazing land (ha).

Size class (ha)	N	Percent	Valid Percent	Cumulative Percent
0-1.99	1	.3	3.6	3.6
2-4.99	5	1.6	17.9	21.4
5-9.99	1	.3	3.6	25.0
10-19.99	12	3.9	42.9	67.9
20-49.99	9	3.0	32.1	100.0
Total	28	9.2	100.0	
Missing	277	90.8		
Total	305	100.0		

Table 36: Whether respondents have non-irrigated and irrigated grazing land.

If have grazing land, not irrigated	If have grazing land, irrigated		Total
	No	Yes	
No	64%	19%	59%
Yes	36%	81%	41%
Total	100%	100%	100%

Table 37: Number of respondents with various sized irrigated pastures by class of various sized non-irrigated pasture.

Area of grazing land non-irrigated size classes (ha)	Area of grazing land irrigated size class					Total
	0-1.99ha	2-4.99ha	5-9.99 ha	10-19.99 ha	20-49.99 ha	
5-9.99	0	0	0	0	1	1
10-19.99	0	2	0	0	1	3
20-49.99	0	0	0	1	2	3
50-99.99	0	0	0	3	1	4
100-199.99	1	0	1	3	2	7
200-499.99	0	0	0	2	1	3
500-999.99	0	0	0	0	1	1
All classes	1	2	1	9	9	22

The number of stock kept by landholders ranged from 2 to 6,000 head. The median size of dairy herds was 100 head and the median size of beef cattle herds was 57 head (Tables 38 and 39).

Table 38: Descriptive statistics of cattle herds managed by respondents.

Stock type	N	Min	Max	Mean	Std. Deviation	Std. Error	Median	RSE
Dairy cattle	15	2	500	180	172.6	44.57	100	25%
Beef cattle	84	2	6,000	280	856.8	93.49	57	33%

Table 39: Number of beef cattle maintained by landholders in various area class for irrigated and non-irrigated pasture.

Size classes total pasture area (ha)	Count	Mean	Median	Min	Max	Standard error of mean	Relative standard error (%)
0 - 1.99	9	3.00	3.00	2.00	4.00	.58	19
2 - 4.99	16	5.50	4.00	4.00	13.00	1.50	27
5 - 9.99	10	8.57	5.00	2.00	20.00	2.68	31
10 - 19.99	11	18.00	15.00	10.00	30.00	3.39	19
20 - 49.99	19	42.35	40.00	6.00	83.00	5.48	13
50 - 99.99	20	111.40	106.00	15.00	200.00	15.59	14
100 - 199.99	17	191.25	150.00	100.00	500.00	33.95	18
200 - 499.99	7	193.33	190.00	40.00	350.00	89.50	46
500 - 999.99	4	766.67	700.00	600.00	1000.00	120.19	16
>1000	5	2996.00	2000.00	480.00	6000.00	989.96	33

The majority of respondents with beef cattle had pasture areas of between 20 and 200 ha and the majority of those with dairy herds had pasture areas of between 50 and 200 ha (Table 40).

Table 40: Number of dairy cattle maintained by landholders in various area class for all pastures.

Size classes total pasture area (ha)	Count	Mean	Std. Error	Median	Minimum	Maximum
0-1.99	1	7	.	.	.	.
2-4.99	1	2	.	.	.	.
10-19.99	1	2	.	.	.	.
50-99.99	3	82	34.4	55	40	150
100-199.99	7	228	57.8	270	20	390
200-499.99	2	425	75	425	350	500

Livestock management practices

Participants in the survey who have livestock were asked to indicate whether and to what extent they use various currently recommended management practices. Of the practices assessed, the most commonly used practice was the use of controlled grazing to maintain surface cover which was fully adopted by more than 50% of respondents with livestock and partly adopted by a further 30% of respondents (Table 41, Figure 12).

Table 41: Frequency of reported adoption of various livestock management practices.

Livestock management practice	None	Some paddocks	Most paddocks	All paddocks	Valid	Missing
Used controlled grazing to maintain surface cover in stocked paddocks	21	15	19	63	118	187
Used soil testing to determine fertiliser requirements	44	26	15	29	114	191
Fenced waterways to control stock access	41	36	16	22	115	190
Quarantined new stock	71	12	2	19	104	201
Fenced native vegetation to control stock access	54	29	14	18	115	190
Used feedlots in times when paddock cover is too low	85	12	-	17	114	191
Use fire as a management practice	78	19	8	11	116	189
Recycled effluent	97	12	1	4	114	191

Approximately 60% of respondents use some soil testing to determine fertilizer requirements and have fenced off waterways in at least some of their paddocks, and 50% had fenced off some of their areas of native vegetation (Table 42). The other practices had lower rates of adoption.

Table 42: Proportion of reported adoption of various livestock management practices.

Livestock management practice	None	Some paddocks	Most paddocks	All paddocks	Total N
Used controlled grazing to maintain surface cover in stocked paddocks	18%	13%	16%	53%	118
Used soil testing to determine fertiliser requirements	39%	23%	13%	25%	114
Fenced waterways to control stock access	36%	31%	14%	19%	115
Quarantined new stock	68%	12%	2%	18%	104
Fenced native vegetation to control stock access	47%	25%	12%	16%	115
Used feedlots in times when paddock cover is too low	75%	11%	0%	15%	114
Use fire as a management practice	67%	16%	7%	9%	116
Recycled effluent	85%	11%	1%	4%	114

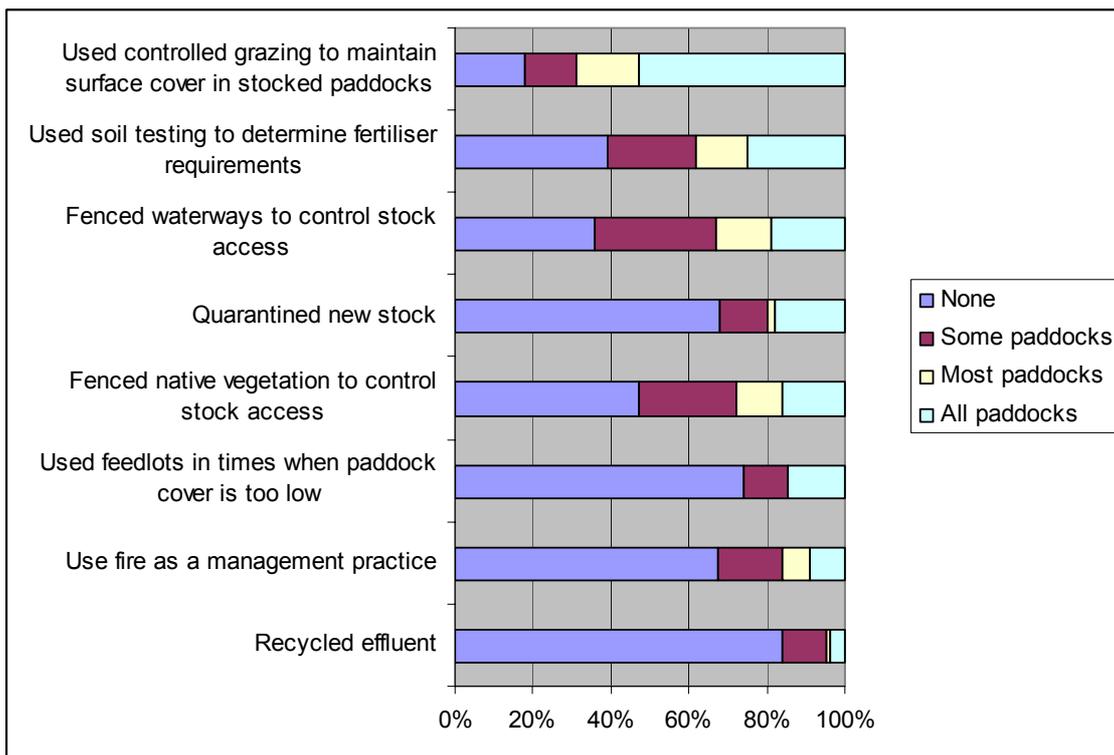


Figure 12: Proportion of livestock producers who have adopted various management practices.

Participants were asked to provide their views regarding a number of statements concerning the adoption of recommended practices and related issues. The relatively high use of controlled grazing is consistent with respondents' high level of agreement with the positive statements and disagreement with negative statements concerning this practice (Table 43).

Table 43: Frequency of perceptions about various livestock management practices and issues.

Livestock management issue	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Valid	Missing
Maintaining good surface cover will improve the long-term productive capacity of the land	0	0	6	49	62	117	188
Controlling stock traffic is critical to improve soil water health	3	3	25	59	24	114	191
Fencing sensitive areas to control stock makes it harder to manage these areas (e.g. fire, flood, weeds, pests)	10	29	35	22	21	117	188
Installing off-stream watering points is not always viable	6	21	16	49	20	112	193
The costs associated with fencing are outweighed by benefits to stock, soil and water conditions	2	11	24	58	19	114	191
Fencing to allow controlled grazing interferes with other operations on my property	16	45	30	17	6	114	191

Approximately 40% of respondents agreed that fencing sensitive areas made them more difficult to manage, and approximately 60% agreed that installing off-stream watering points is not always viable (Table 44, Figure 13).

Table 44: Proportion of respondents with differing perceptions about various livestock management practices and issues.

Livestock management issue	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Valid	Missing
Maintaining good surface cover will improve the long-term productive capacity of the land	0%	0%	5%	42%	53%	117	188
Controlling stock traffic is critical to improve soil water health	3%	3%	22%	52%	21%	114	191
Fencing sensitive areas to control stock makes it harder to manage these areas (e.g. fire, flood, weeds, pests)	9%	25%	30%	19%	18%	117	188
Installing off-stream watering points is not always viable	5%	19%	14%	44%	18%	112	193
The costs associated with fencing are outweighed by benefits to stock, soil and water conditions	2%	10%	21%	51%	17%	114	191
Fencing to allow controlled grazing interferes with other operations on my property	14%	39%	26%	15%	5%	114	191

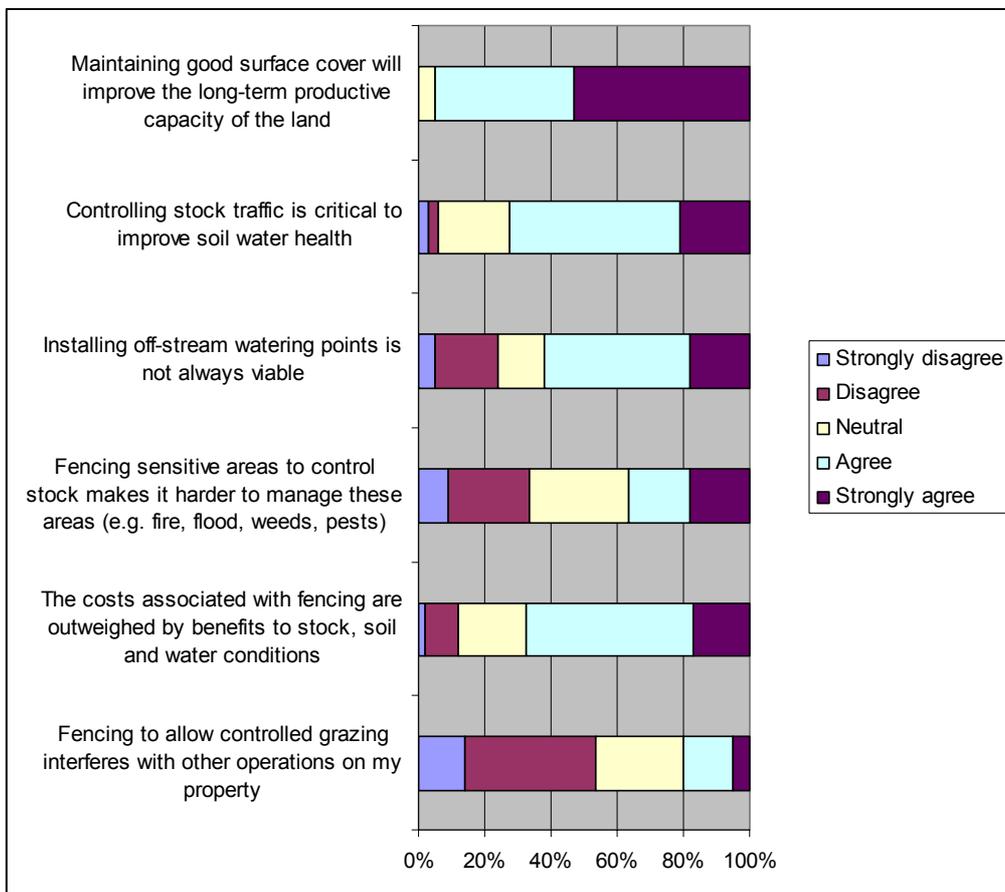


Figure 13: Livestock producers' views on issues related to various management practices.

Sources of income and enterprise profitability

A total of 132 or 43% of respondents reported some level of profit in 2006/2007 from their land-use enterprises (Tables 45 and 46). Those with cropping enterprises were more likely to report making a profit relative to those with grazing enterprises only. Approximately 60% of those with cropping enterprises reported making a profit compared to 40% of those with grazing enterprises (Table 46). Approximately 70% of respondents reported profits of less than \$30,000 and 45% less than \$20,000. There is some evidence of increasing profit levels with increasing landholding size, although there are still many landholders in the larger size classes who reported profit levels of less than \$10,000 (Table 47). Less than 10% of those who reported a profit said that the profit was higher than previous years, with 37% reporting levels are similar and 26% reporting they were lower.

Table 45: Percentage of respondents making profit in 2006/2007 by primary land use of landholding.

If profit made in 2006/2007	Primary purpose for land ownership					Total (%)
	Agriculture (%)	Conservation (%)	Hobby/lifestyle farm (%)	Residential (%)	Other (%)	
No	42.5	85.0	94.7	95.2	85.7	61.6
Yes	57.5	15.0	5.3	4.8	14.3	38.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 46: If made a profit in 2006/2007 by land use types.

If profit made in 2006/2007	Land use types recoded					Total (%)
	Residential only (%)	Grazing (%)	Cropping (%)	Grazing and cropping (%)	Other (%)	
No	95.1	56.6	36.0	40.9	88.7	62.7
Yes	4.9	43.4	64.0	59.1	11.3	37.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 47: Frequency of reported profit level by various landholding sizes.

Area of total landholding classes (ha)	Profit Level for 2006/2007								Total
	\$0-10,000	\$10,001-20,000	\$20,001-30,000	\$30,001-40,000	\$40,001-50,000	\$50,001-60,000	\$60,001-100,000	> \$100,000	
2-4.99	7	0	2	0	1	0	0	0	10
5-9.99	4	0	0	0	0	0	0	1	5
10-19.99	1	1	0	0	0	0	0	0	2
20-49.99	6	2	3	0	1	1	0	0	13
50-99.99	10	9	9	2	3	0	1	0	34
100-199.99	4	6	11	3	4	4	1	2	35
200-499.99	2	3	2	5	4	2	3	2	23
500-999.99	1	0	1	2	0	0	0	0	4
>1000	3	0	1	1	0	0	0	1	6
All area classes	38	21	29	13	13	7	5	6	132

There were no significant differences in the reported level of equity held in the landholding by respondents with various reported primary purposes for land ownership (Table 48). Between 50 and 80% of respondents from the various classes reported having 80-100% equity in their property while the proportion of respondents in lowest class (0-20% equity) ranged between 5 and 10%.

Table 48: Reported equity level by primary purpose for land ownership.

Level of Equity (%)	Primary purpose for land ownership					Total (%)
	Agriculture (%)	Conservation (%)	Hobby/lifestyle farm (%)	Residential (%)	Other (%)	
0-20	4.8		8.6	10.0		5.6
21-40	6.6			5.0		4.9
41-60	13.9	5.3	17.1	5.0	50.0	13.2
61-80	12.7	15.8	8.6	12.5		12.0
81-100	62.0	78.9	65.7	67.5	50.0	64.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Approximately 75% of the respondents reported receiving income from sources other than their property enterprises (Table 49). Most (60%) of the respondents reported working off farm, a quarter of them full-time. Other landholders that received income from non-farm sources who did not work relied on investments or pensions. Approximately 20% of respondents work off-farm full-time, another 20% part-time with 10% employed off-farm on a casual basis (Table 50).

Table 49: Frequency of respondents who have off-farm income.

If have off-farm income	Frequency	Percent	Valid Percent	Cumulative Percent
No	60	19.7	21.4	21.4
Yes	220	72.1	78.6	100.0
Total	280	91.8	100.0	
Missing	25	8.2		
Total	305	100.0		

Table 50: Level of involvement in employment off the landholding.

Level of off-farm employment	Frequency	Percent	Valid Percent	Cumulative Percent
None	96	31.5	39.3	39.3
Casual	32	10.5	13.1	52.5
Part-time	54	17.7	22.1	74.6
Full-time	62	20.3	25.4	100.0
Total	244	80.0	100.0	
Missing	61	20.0		
Total	305	100.0		

Those who reported agricultural production as the primary reason for land ownership were less likely to have a source of off-farm income than respondents with other reasons for land ownership (Tables 51 to 54).

Table 51: Frequency of whether respondents have non-landholding source of income by primary purpose for land ownership.

If have income from off-farm	Primary purpose for land ownership					Total
	Agriculture	Conservation	Hobby/lifestyle farm	Residential	Other	
No	50	2	2	4	1	59
Yes	123	19	34	37	7	220
Total	173	21	36	41	8	279

Table 52: Proportion of respondents who have non-landholding source of income by primary purpose for land ownership.

If have income from off-farm	Primary purpose for land ownership					All categories (%)
	Agriculture (%)	Conservation (%)	Hobby/ lifestyle farm (%)	Residential (%)	Other (%)	
No	28.9	9.5	5.6	9.8	12.5	21.1
Yes	71.1	90.5	94.4	90.2	87.5	78.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 53: Frequency of landholders who have an off-landholding source of income.

If have income from off-farm	Land use types recoded*					Total
	Residential only	Grazing	Cropping	Grazing and cropping	Other	
No	4	18	19	9	7	57
Yes	36	35	68	13	64	216
Total	40	53	87	22	71	273

* See Tables 14 and 15 for explanation of the classification system used.

Table 54: Proportion of landholders who have an off-landholding source of income.

If have income from off-farm	Land use types recoded					Total (%)
	Residential only (%)	Grazing (%)	Cropping (%)	Grazing and cropping (%)	Other (%)	
No	10.0	34.0	21.8	40.9	9.9	20.9
Yes	90.0	66.0	78.2	59.1	90.1	79.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

The proportion of landholders who have an off-farm source of income varied between landholders with differing primary reasons for property ownership (Table 54). Ninety percent of those landholders whose primary reason for property ownership was for 'residential' or 'other' uses had off-farm income sources compared to 60 to 80 percent of those with agricultural enterprises. Those without agricultural enterprises had a greater level of involvement in off-farm employment (Tables 55 and 56).

Table 55: Frequency of level of involvement in off-farm employment by primary purpose for property ownership.

Involvement in off-farm work	Primary purpose for land ownership					Total
	Agriculture	Conservation	Hobby/lifestyle farm	Residential	Other	
None	62	3	11	16	3	95
Casual	18	5	4	5	0	32
Part-time	31	6	10	3	4	54
Full-time	32	5	12	13	0	62
Total	143	19	37	37	7	243

Table 56: Proportion of respondents' level of involvement in off-farm employment by primary purpose for property ownership.

Involvement in off-farm work	Primary purpose for land ownership					Total (%)
	Agriculture (%)	Conservation (%)	Hobby/ lifestyle farm (%)	Residential (%)	Other (%)	
None	43.4	15.8	29.7	43.2	42.9	39.1
Casual	12.6	26.3	10.8	13.5		13.2
Part-time	21.7	31.6	27.0	8.1	57.1	22.2
Full-time	22.4	26.3	32.4	35.1		25.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Participants were asked to specify their main occupation. About 43% of respondents indicated their main occupation is as a farmer (including graziers, cane farmers and station managers). A further 13% of respondents listed 'retiree' as their main occupation. Other respondents listed a wide range of occupations, from teachers, police and public servants to business owners, labourers, tradespeople, nurses and psychiatrists (Table 57).

Table 57: Main occupations listed by respondents.

Occupation	Frequency	Occupation	Frequency
Farmer	108	Engineer	1
Retiree	40	Engineman	1
None given	30	Environmental consultant	1
Accountant	7	Farm consultant	1
Grazier	6	Fashion designer	1
Sugar cane farmer	6	Financial controller	1
Teacher	6	Fitter and turner / farmer	1
Dairy farmer	4	Forester – failed retiree	1
Nurse	4	Geologist	1
Boilermaker	3	Haulage contractor	1
Cane farmer	3	Home duties	1
Mother	3	Horticulturist	1
Public servant	3	Human resources manager	1
Writer	3	Sugar mill worker	1
Disability pensioner	2	Hydrographer	1
Manager	2	Investor	1
Owner driver transport industry	2	Labourer	1
Police	2	Landscaper	1
Property developer	2	Maintenance supervisor	1
Administrator	1	Marketing officer	1
Agriculture Assistant - High School	1	Mine shutdown maintenance, former sugar farmer	1
Apprentice plumber	1	Office administration	1
Architect	1	Plant nursery owner	1
Bank officer	1	Plant operator	1
Biologist	1	Project manager	1
Boat skipper	1	Ranger	1
Builder	1	Respite worker	1
Bus driver	1	Retail worker	1
Business consultant	1	Roofing plumber	1
Business owner	1	Rural merchandise manager	1
Carpenter	1	Safety manager	1
Cattle station manager	1	Sales – animal nutrition	1
Cleaner	1	School bus operator	1
Computer engineer	1	Scientist	1
Concreter	1	Self employed mechanic	1
Consultant	1	Self employed tradesman	1
Consultant psychiatrist	1	Shop assistant	1
Corrections officer	1	Shopkeeper farmer	1
Dentist	1	Small business owner	1
Department manager, s'market	1	Solicitor	1
Director chicken farm	1	Station manager	1
Disability pensioner	1	Tour guide	1
Doctor	1	Unemployed	1
Emergency services	1		

Property management objectives

Participants were asked to indicate the level of priority they gave to a series of possible goals for managing their property using a five point Likert scale from 'not a priority' to 'very high priority'. Pursuit of lifestyle objectives and general environmental health of the region were rated slightly higher than financial goals. Approximately 70% of respondents stated that maintaining their lifestyle and being able to live in an attractive rural environment are very high priorities in terms of their management goals and objectives (Figure 14). Many of the possible goals were rated as high or very high priority by respondents. Further analyses are needed to interpret patterns of relationships between the responses. The potential goals that were on average given lower ratings of priority included providing habitat for native animals, providing an opportunity to be innovative or creative, being part of a close knit community and maintaining family traditions.

Management and property succession intentions

Participants in the survey were asked to indicate the likelihood of various possible management activities and strategies to improve understanding of landholders' property management and succession plans. More than 60% of respondents indicated they are likely or very likely to continue to live on a rural property in the region, and a similar proportion indicated that the property would be passed on to family members (Figure 15). Approximately 30% of respondents indicated that all or part of the property would be sold or alternatively that they would intensify or diversify current enterprises. Less than 20% of respondents plan to live on an excised block, place a covenant on their property or lease all or part of their property in the future.

There were some differences in the management intentions of landholders with varying types of enterprises. Landholders with grazing enterprises reported they are more likely to be considering expanding their operations by purchasing or leasing more land than landholders with cropping enterprises only (Pearsons Chi square $P < 0.000$) (Figure 16, Table 58). The relationship between these intentions and other factors including the age of the landholder will be further explored in subsequent analyses. A similar pattern is evident in the respondents' intentions to scale-back operations in future. In this case a greater proportion of respondents with grazing and cropping enterprises reported they are very likely to scale-back operations (Table 59, Figure 17). Again there is evidence of varying intentions between respondents within each enterprise type which need to be explored using further analyses.

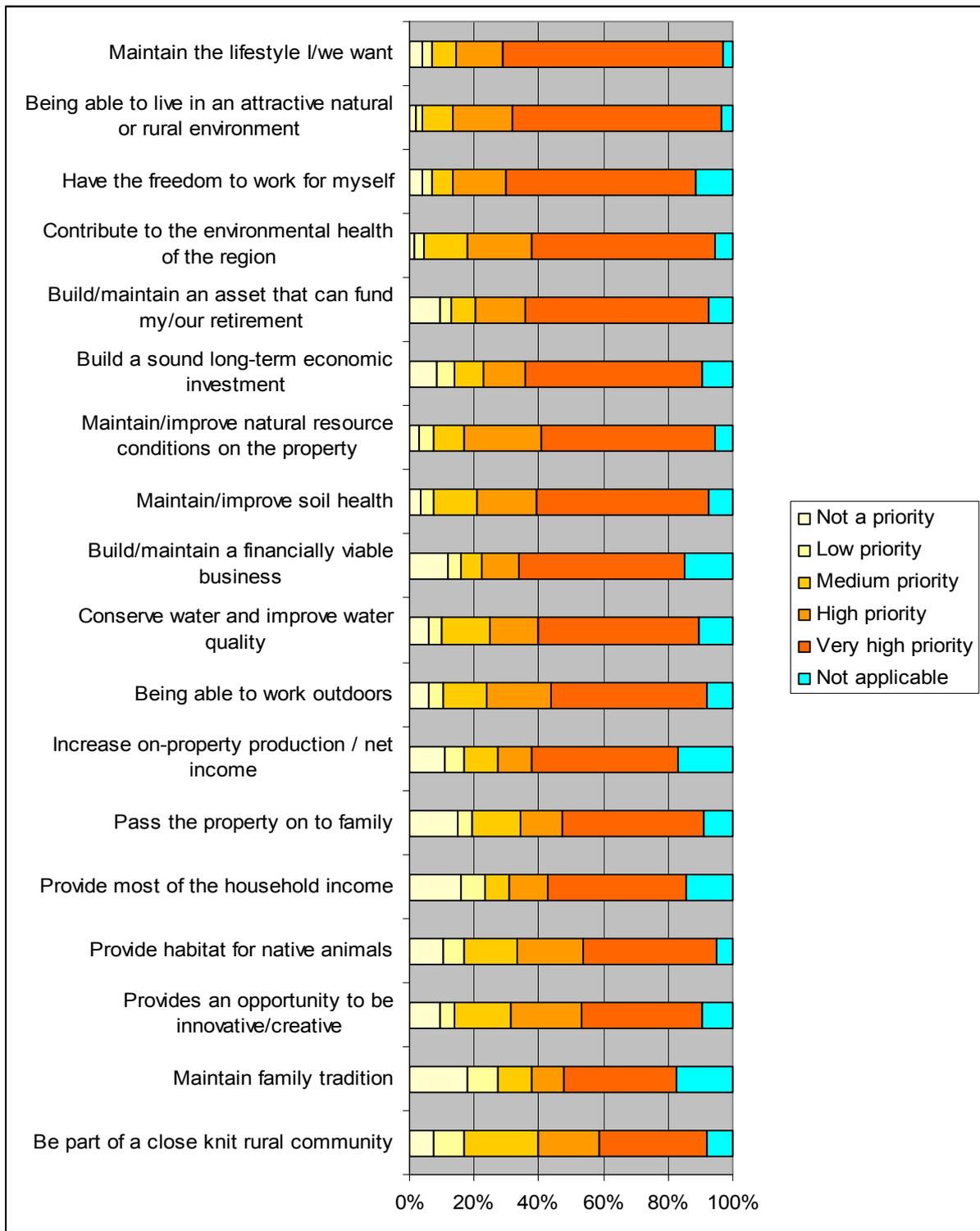


Figure 14: Ratings of priority for various potential property management goals.

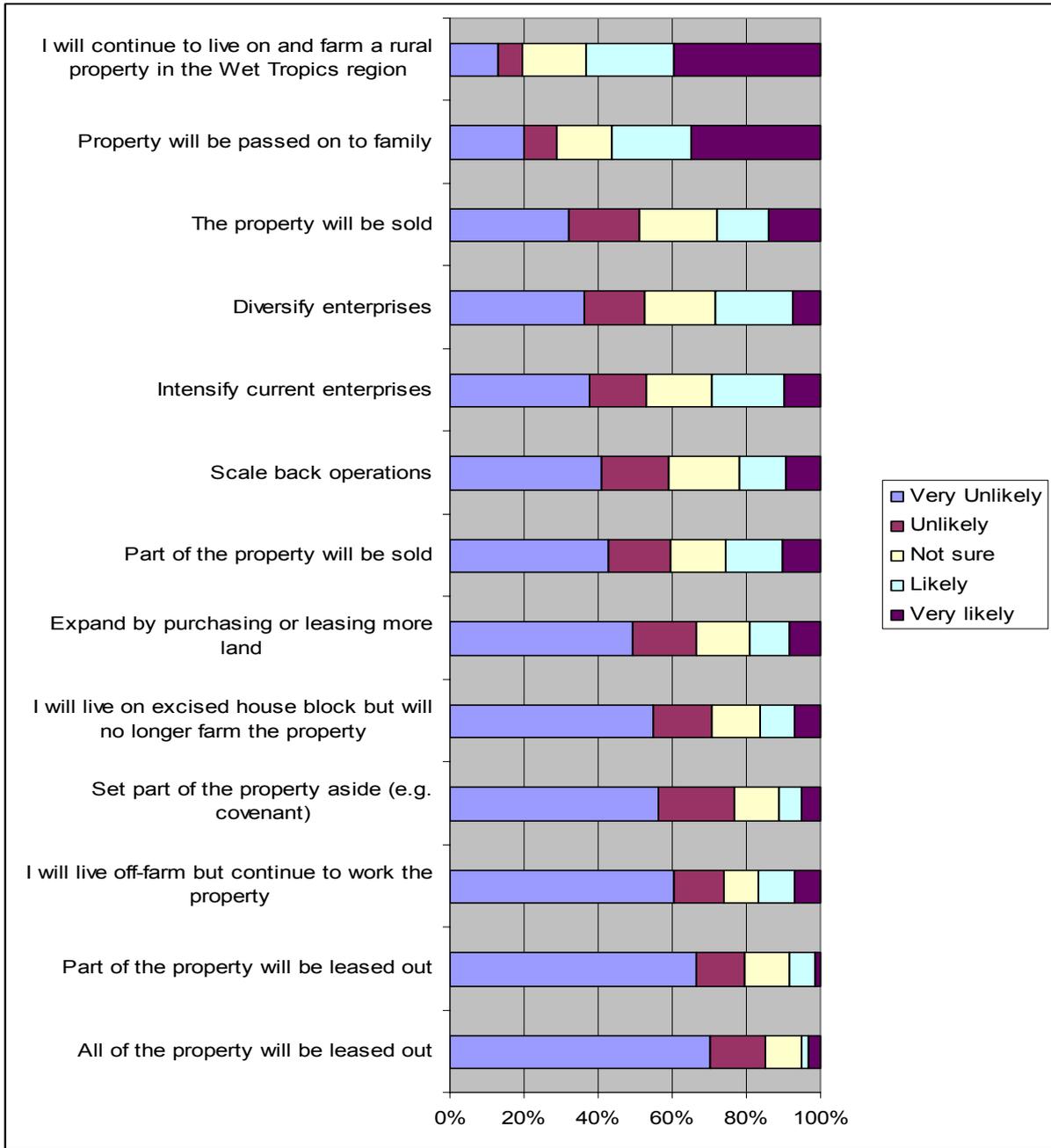


Figure 15: Ratings of the likelihood of potential management actions.

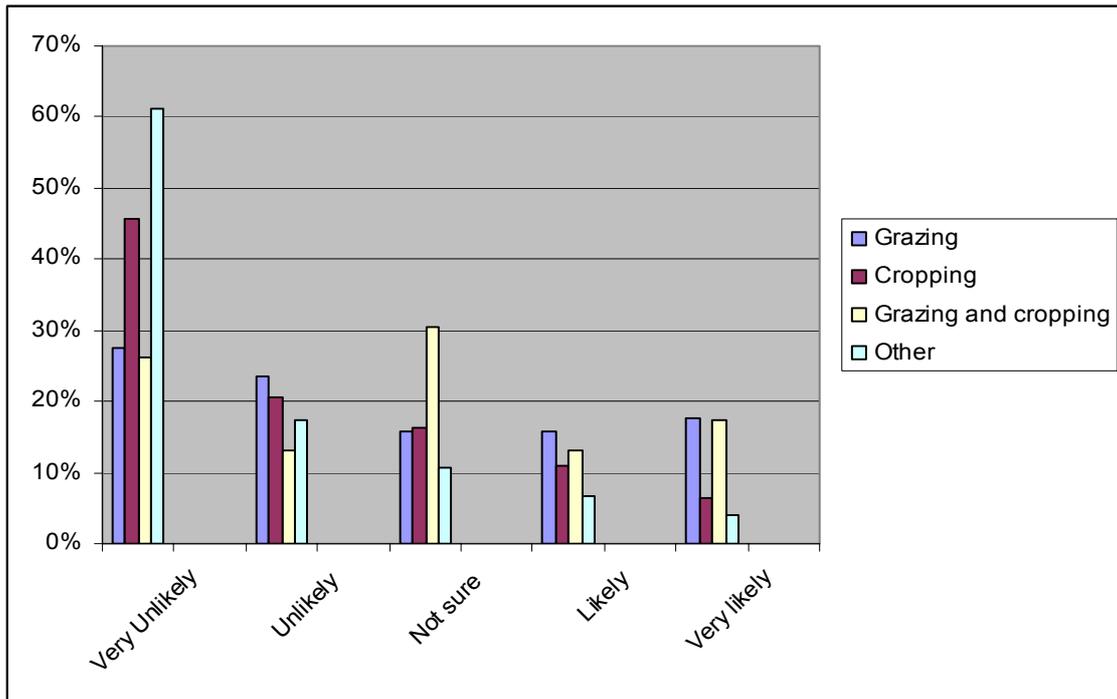


Figure 16: Likelihood that non-residential respondents will expand by purchasing or leasing more land in the future.

Table 58: Likelihood that respondents will expand by purchasing or leasing more land in the future.

Expand by purchasing or leasing more land	Land use types recoded					All land use types (%)
	Residential only (%)	Grazing (%)	Cropping (%)	Grazing and cropping (%)	Other (%)	
Very unlikely	82.9	27.5	45.7	26.1	61.3	50.4
Unlikely	4.9	23.5	20.7	13.0	17.3	17.4
Not sure	4.9	15.7	16.3	30.4	10.7	14.2
Likely	4.9	15.7	10.9	13.0	6.7	9.9
Very likely	2.4	17.6	6.5	17.4	4.0	8.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 59: Likelihood that respondents will scale-back their operations.

Expand by purchasing or leasing more land	Land use types recoded					All land use types (%)
	Residential only (%)	Grazing (%)	Cropping (%)	Grazing and cropping (%)	Other (%)	
Very unlikely	67.6	34.7	33.7	22.7	47.9	41.4
Unlikely	2.7	28.6	18.0	31.8	12.7	17.5
Not sure	13.5	16.3	21.3	13.6	21.1	18.7
Likely	8.1	14.3	19.1	4.5	8.5	12.7
Very likely	8.1	6.1	7.9	27.3	9.9	9.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

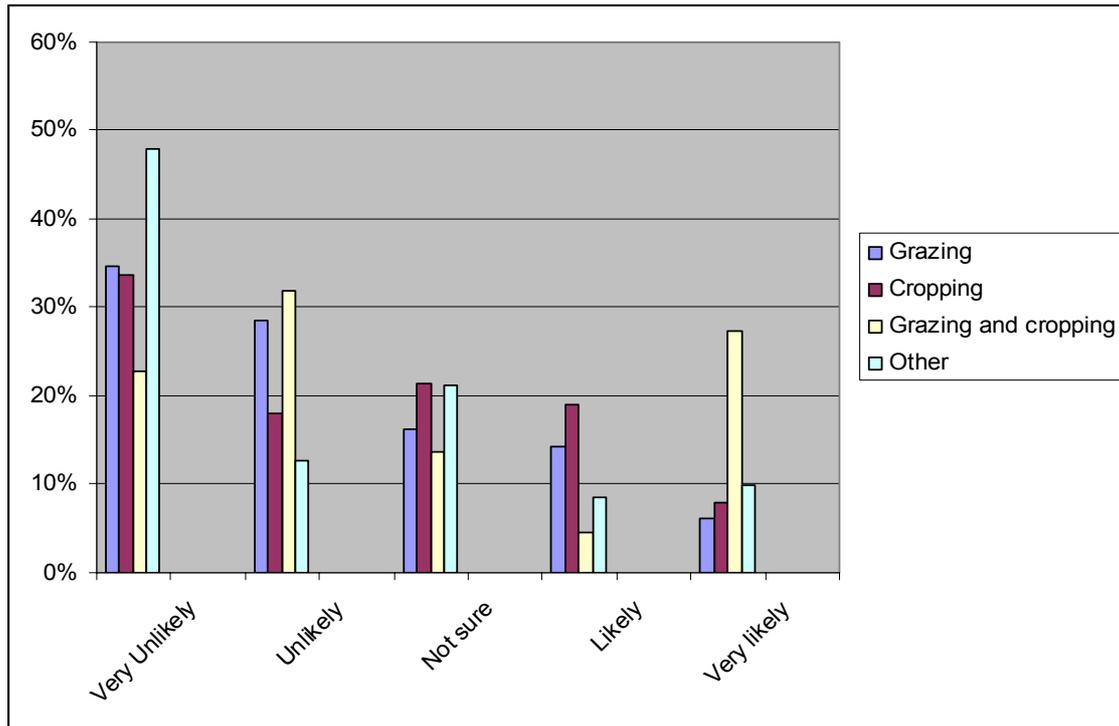


Figure 17: Likelihood that non-residential respondents will scale-back their operations.

NRM issues on landholdings

Respondents were asked to indicate their perception of the importance of various potential NRM issues on their own land and appear to be relatively unconcerned by NRM issues on their own properties in general. Few problems were rated as important, the most common concerns being weed management, followed by pest management and soil management issues (Table 60). Issues related to acid sulphate soils, wind erosion, water quality and vegetation quality were viewed as the least important problems.

Rural development issues in the region

Respondents were asked to indicate how important they think various potential rural development issues are in the local government area in which they live. The issues of greatest concern all related to the viability of agricultural enterprises, with the NRM issue of control of weeds and pests ranked fourth by all respondents (Table 61 and Figure 19). As for the concerns of respondents about issues on their own properties, issues relating to the quality and quantity of water, native vegetation and native animals were of the least concern.

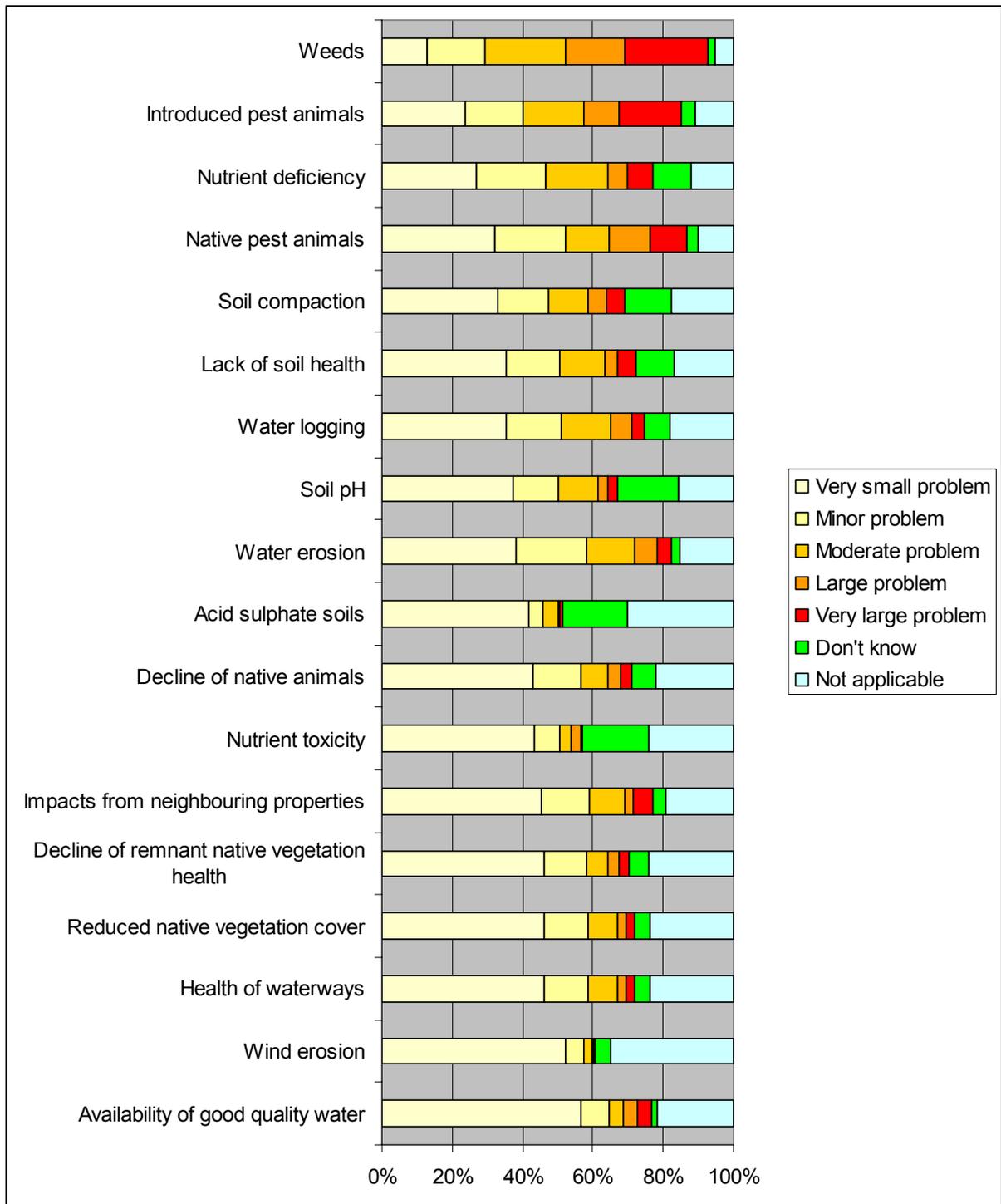


Figure 18: Frequency of responses of landholders' perceptions of the importance of various on-farm NRM problems.

Table 60: Ratings of importance of potential NRM issues on respondents' properties*.

Issue on own property	N	Mean	Std Error	RSE (%)
Weeds	288	3.05	0.089	3
Introduced pests	280	2.48	0.098	4
Native pest animals	277	2.18	0.091	4
Nutrient deficiency	258	2.00	0.088	4
Water erosion	284	1.71	0.078	5
Soil health	252	1.64	0.086	5
Water logging	270	1.64	0.081	5
Soil compaction	268	1.53	0.086	6
Impact of neighbours	276	1.49	0.081	5
Soil pH issues	257	1.42	0.078	5
Reduced health native animals	270	1.35	0.075	6
Health waterways	280	1.28	0.069	5
Reduction of native vegetation	275	1.25	0.069	6
Reduced health native vegetation	275	1.24	0.071	6
Available water	282	1.21	0.071	6
Nutrient toxicity	228	0.98	0.065	7
Acid sulphate soils	236	0.86	0.059	7
Wind erosion	294	0.73	0.046	6

* Responses ranged from 'very small problem' (score of 1) to 'very large problem' (score of 5) on a five-point Likert scale. Answers of 'not applicable' were scored 0, while answers of 'don't know' were treated as missing units.

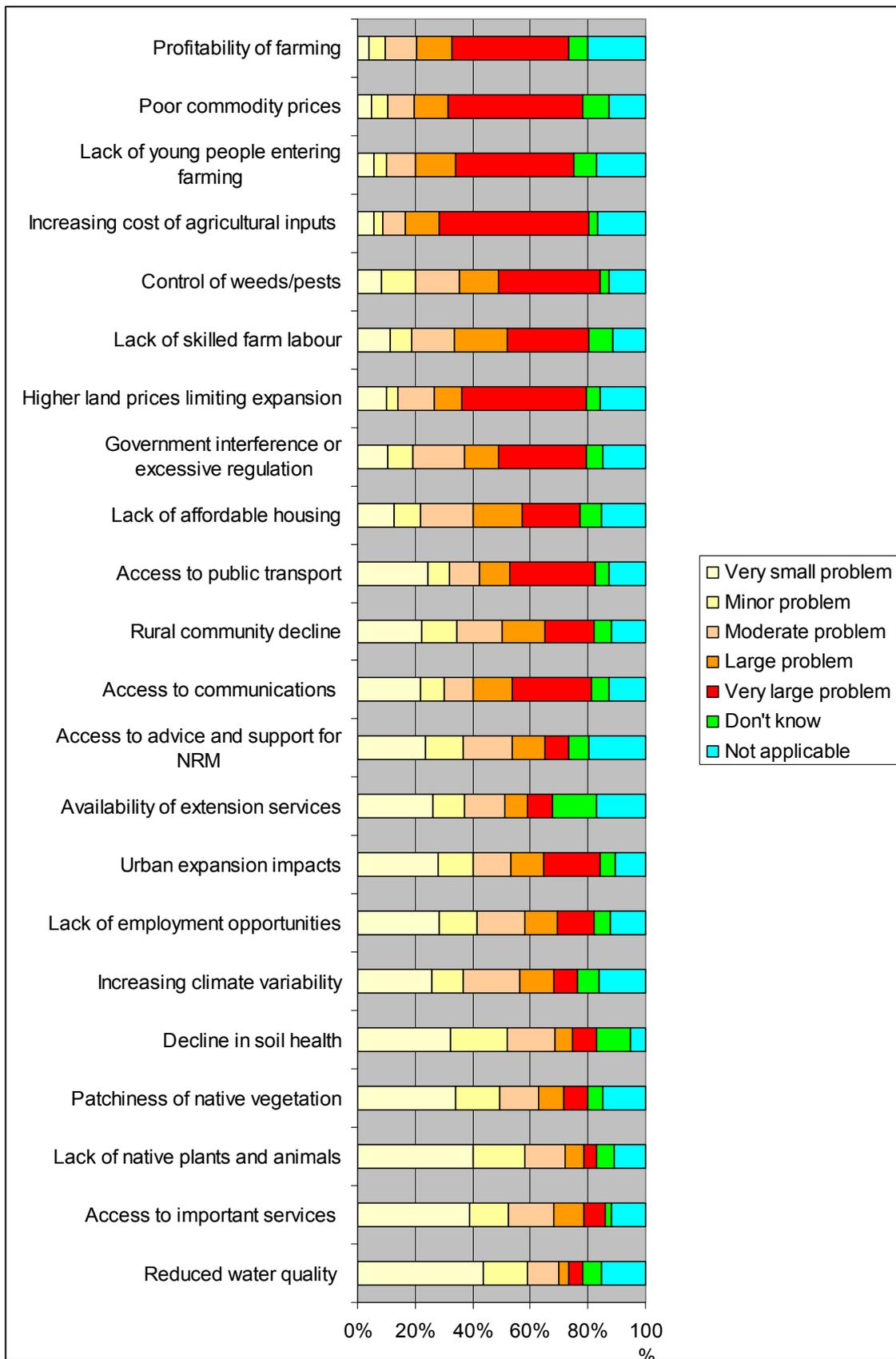


Figure 19: Perception of the importance of rural development issues in the region.

Table 61: Ratings of importance of potential rural development issues in the region*.

Rural development issue	N	Mean	Std Error	RSE (%)
Cost of agriculture inputs	289	3.85	0.101	3%
Poor prices for ag. commodities	269	3.71	0.108	3%
Declining profitability of farming	281	3.54	0.109	3%
Control of weeds and pests	290	3.53	0.091	3%
High prices for land	283	3.48	0.108	3%
Lack of young people entering farming	276	3.47	0.113	3%
Excessive government interference	281	3.24	0.103	3%
Lack of skilled labour	275	2.93	0.112	4%
Lack of communications access	275	2.83	0.111	4%
Lack of affordable housing	269	2.72	0.109	4%
Decline of community	276	2.55	0.102	4%
Lack of access to public transport	279	2.49	0.119	5%
Urban expansion	279	2.33	0.106	5%
Lack of NRM advice	271	2.28	0.094	4%
Climate variability	273	2.28	0.093	4%
Lack of employment opportunities	277	2.18	0.099	5%
Lack of extension services	251	2.00	0.099	5%
Lack of access to services	287	1.95	0.087	4%
Lack of soil health	257	1.93	0.092	5%
Patchiness of native vegetation	272	1.85	0.091	5%
Lack of native plants and animals	272	1.65	0.082	5%
Reduced water quality	270	1.46	0.079	5%

* Responses ranged from 'very small problem' (score of 1) to 'very large problem' (score of 5) on a five-point Likert scale. Answers of 'not applicable' were scored 0, while answers of 'don't know' were treated as missing units.

Landholders' views on sustainability issues

Landholders have strong opinions with respect to sustainability issues on their properties. Ninety percent of respondents reported strong agreement with the statement 'I am very attached to my property' (Figure 20). There was also a high level of agreement for statements including:

- 'Landholders should receive payments for providing environmental services';
- 'Current activities will not affect the use of the property by future generations';
- 'People should consider the impacts of their actions on their neighbours'; and
- 'The property is well suited to achieving their goals'.

Respondents' opinions were more divided on some topics, even though more than 50% agreed with them. These include the questions of whether reduced production in the short term can be justified by long-term improvement for the environment, whether neighbours consider the impacts of their actions, and whether landholders in the region would use practices that benefit the environment but not the landholders themselves.

Native vegetation management

Approximately 60% of respondents reported having some remnant native vegetation on their landholding. The mean area of native vegetation is 48 ha and the median area is 7 ha. For those respondents with native vegetation, on average the vegetation covers 43% of their property with a median value of 36% (Table 62).

More than 50% of remnant vegetation areas are less than 7 ha in size (Table 63). There were three reports of areas of remnant vegetation of greater than 500 ha on landholdings in differing Local Government Areas (LGAs) that result in the data being highly positively skewed. In all LGAs other than Cairns the median area of native vegetation are substantially smaller than the mean figure (Table 64).

The proportion of the landholding under native vegetation varied between LGAs and between landholdings whose owners have differing primary purposes for owning their land (Tables 64 and 65). The LGAs with the largest mean areas of native vegetation include Atherton, Hinchinbrook and Cardwell. The data has a large degree of variation, however, and the median values indicate that respondents from the Cairns LGA have the largest areas of remnant vegetation on average. Measures of the proportion of landholdings under native vegetation reveal that respondents from Douglas, Herberton and Mareeba have the highest proportion of their properties under native vegetation and Hinchinbrook respondents have the smallest.

As expected those respondents whose primary reasons for property ownership is agricultural production have, on average, the largest areas of native vegetation on their properties (Table 65). This is primarily due to the fact that these landholders have the largest property areas, as these respondents also have the lowest proportion of their landholdings under native vegetation.

Overall just 17% of respondents had a map of their remnant vegetation areas, comprising 25% of those with native vegetation areas (Table 66).

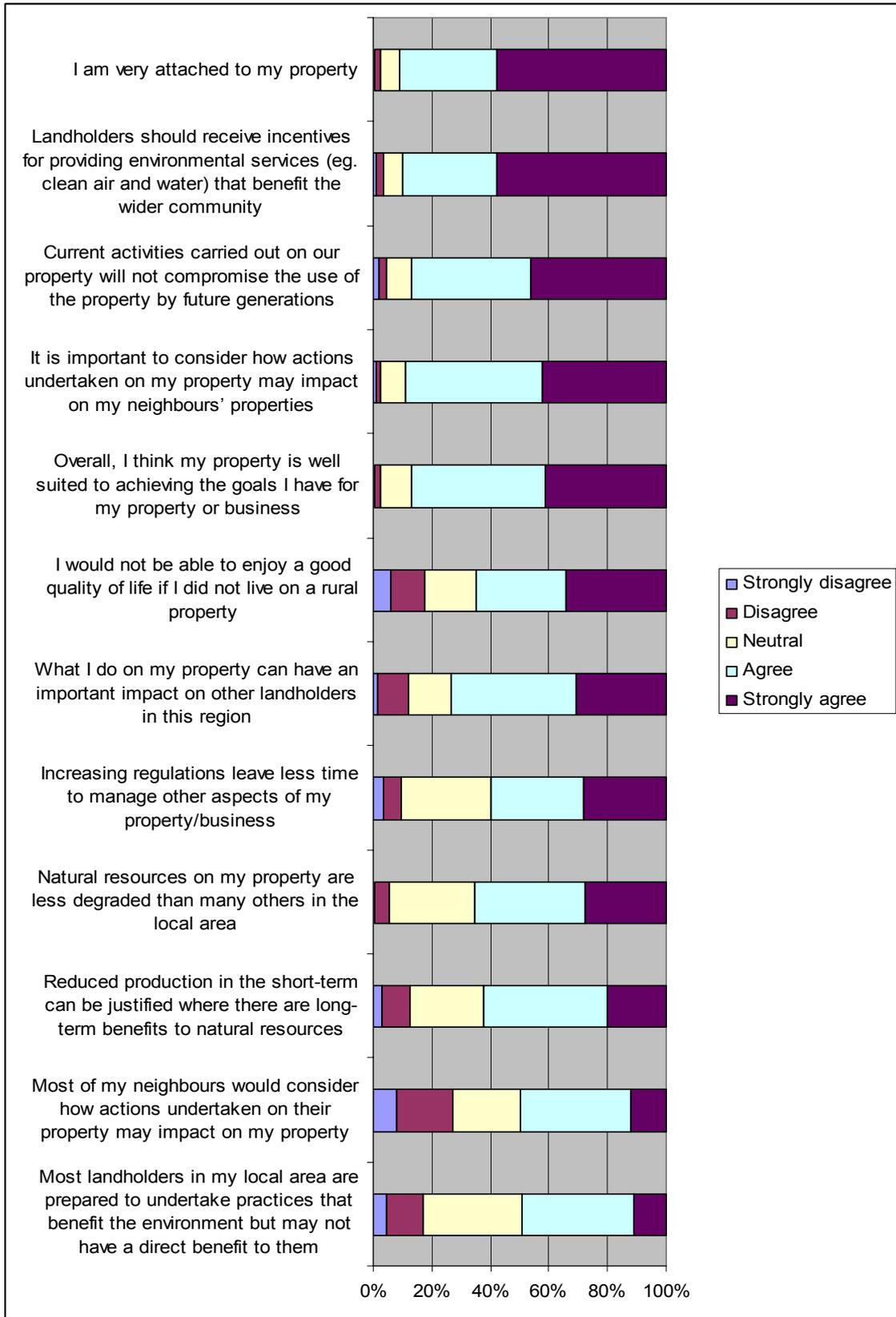


Figure 20: Landholders' views on sustainability issues.

Table 62: Mean and median areas and proportions of native vegetation on respondents' handholdings.

Statistic	Mean	Std. Error	Median	RSE (%)
Area native vegetation (ha)	48.4	12.88	7	27
Proportion of landholding under native vegetation (%)	43	0.03	36	7

Table 63: Number and proportion of respondents with various sized areas of native vegetation.

Size class (ha)	Frequency	Percent	Valid Percent	Cumulative Percent
0-1.99	23	7.5	14.4	14.4
2-4.99	41	13.4	25.6	40.0
5-9.99	21	6.9	13.1	53.1
10-19.99	19	6.2	11.9	65.0
20-49.99	29	9.5	18.1	83.1
50-99.99	13	4.3	8.1	91.3
100-199.99	8	2.6	5.0	96.3
200-499.99	3	1.0	1.9	98.1
500-999.99	1	0.3	0.6	98.8
>1000	2	0.7	1.3	100
Total valid	160	52.5	100	
Missing System	145	47.5		
Total	305	100		

Table 64: Mean and median areas and proportions of landholding of native vegetation in various Local Government Areas.

LGA	Area of landholding with native vegetation (ha)				Proportion of landholding with native vegetation (%)		
	N	Mean (ha)	RSE area (%)	Median (ha)	N	Mean (%)	RSE proportion (%)
Atherton	18	98.2	69	5	18	42	17
Cairns	13	51.0	26	50	12	30	33
Cardwell	17	88.1	79	18	16	45	20
Douglas	10	24.9	62	4	10	70	13
Eacham	26	26.8	25	13	26	33	18
Herberton	16	16.0	29	7	16	70	11
Hinchinbrook	18	97.1	57	11	18	20	30
Johnstone	22	25.8	64	5	22	32	19
Mareeba	19	7.1	40	2	19	65	9

Table 65: Mean and median areas and proportions of landholding of native vegetation on properties where owners have various primary reasons for property ownership.

Primary purpose of property	Area of landholding with native vegetation (ha)				Proportion of landholding with native vegetation (%)			
	N	Mean (ha)	RSE (%)	Median (ha)	N	Mean (%)	RSE (%)	Median (%)
Agriculture	83	78.0	30	18.3	82	24	13	15
Conservation	16	35.7	32	16.0	16	64	11	64
Hobby/lifestyle farm	21	9.2	30	3.2	21	54	11	50
Residential	33	5.4	24	2.0	32	68	7	70
Other	6	37.6	53	27.2	6	70	23	82

Table 66: Whether respondents have a map of the remnant vegetation types on their land.

If have map of remnant vegetation	Relative frequency	Percent	Valid Percent	Cumulative Percent
No	152	49.8	74.9	74.9
Yes	51	16.7	25.1	100.0
Total	203	66.6	100.0	
Missing	102	33.4		
Total	305	100.0		

Views about native vegetation management

Participants were asked to provide their assessment of a number of statements about native vegetation management practices and issues relating to these. The majority of respondents appreciate the aesthetic values of native forests, with more than 80% of respondents agreed with the statement 'native forest areas improve the look of my property' while only 20% agreed that 'native forest decreases the value of my property' (Figure 21). Personal interest is important as more than 70% of respondents agreed with the statement 'I have a personal interest in native forests'. On average across all respondents the factors of excessive government regulation and a lack of finances were viewed as the greatest constraints to management activities. Approximately 25% of respondents believe that their forest areas are suitable for harvesting timber and that this could be a profitable enterprise in the future. There was also some frustration about government regulation of vegetation management evident. Just over 30% of respondents agreed with the statement that it is better to clear forest regrowth where possible so the government does not prevent use of that land for agriculture in the future.

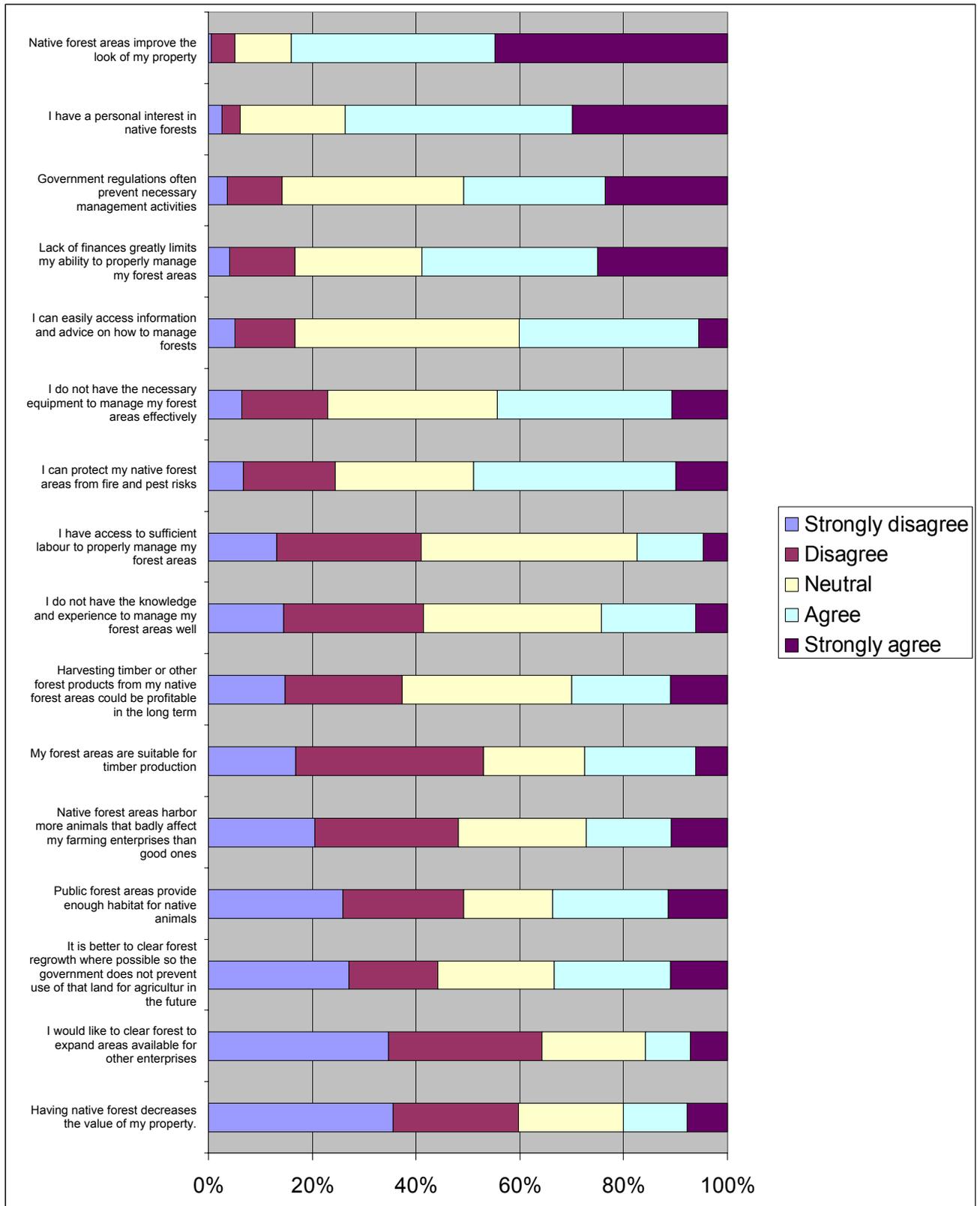


Figure 21: Respondents' perceptions of various reasons for and constraints to management their areas of remnant native vegetation.

Management and recreation in native vegetation areas

The most commonly reported management activity by approximately 50% of those with native vegetation areas was road maintenance and use of the area for various recreation activities (Tables 67 and 68). Approximately 30% of respondents allowed others to access their native forest areas with 12% of these people receiving some payment for this. Maintenance of tracks and pruning were practiced by 25% of forest owners, with less than 20% thinning, gathering non-timber forest products (NTFPs) or harvesting timber. 'Other' maintenance reported was predominantly weed control (4 respondents) and fence and fire break maintenance (three respondents) (Figure 22).

Just less than half the respondents who have areas of native forest reported using these areas for some type of recreation activity such as walking, cycling, fishing, hunting or other activities. Respondents reported a range of half an hour to 100 person hours per month spent undertaking these activities with an average of 18 person hours per month (Table 69). Twenty eight percent of respondents with native forest areas allow others to access these areas for recreation use. Of these people, approximately 10% receive some payment for access.

Participants were asked to indicate whether or not they had applied various management activities on their properties. Approximately 60% of respondents indicated they had encouraged the growth of native vegetation on their land and nearly 20% had established fencing around some of their forest areas (Table 70).

About 17% of respondents reported thinning some areas of native vegetation, and 15% reported activity to improve pastures in these areas (Tables 71 and 72). Extreme values for the area of forest thinned and area of improved pastures established are evident which result in highly skewed mean values for these activities. There are differences in the proportion of landholders who have undertaken forest management activities between landholders with varying primary purposes for owning their land. Not surprisingly those landholders with grazing enterprises are more likely to have thinned regrowth vegetation and establish improved pastures than other landholders. These landholders are also more likely to have established fencing around areas of native vegetation.

Table 67: Reported frequency of various management practices and activities in native forest areas.

Native vegetation management activities	No	Yes	Valid	Missing	Total N
Road maintenance	92	102	195	110	305
Use of native forest areas for recreation	109	93	202	103	305
Pruning	144	47	191	114	305
Track maintenance	143	47	190	115	305
Allowing others access to forest areas for recreation	114	45	160	146	305
Thinning	155	36	191	114	305
Use of native forest area to gather NTFPs	168	34	202	103	305
Use of forest for timber production	168	26	194	111	305
Other maintenance	12	13	25	280	305
Receipt of income for access to forest areas	43	6	49	256	305

Table 68: Proportion of native forest owners undertaking various management practices and activities in native forest areas.

Native vegetation management activities	No (%)	Yes (%)	Frequency Yes
Road maintenance	47	52	102
Use of native forest areas for recreation	54	46	93
Pruning	75	25	47
Track maintenance	75	25	47
Allowing others access to forest areas for recreation	71	28	45
Thinning	81	19	36
Use of native forest area to gather NTFPs	83	17	34
Use of forest for timber production	87	13	26
Other maintenance	48	52	13
Receipt of income for access to forest areas	88	12	6

Table 69: Time spent on recreation activities in native forest areas.

Description	N	Min.	Max.	Mean	Std. Error	Median	RSE (%)
Time spent on native forest recreation (person hours per month)	81	0.5	100	18.9	2.36	10.0	12
Others recreation time spent (person hours per month)	19	1	200	32.7	14.01	8.0	43

Table 70: Frequency of use of various forest management activities.

Management activity	No	Yes	Total	Missing N	Proportion Yes (%)
Encouraged regrowth of native vegetation	122	173	295	10	59
Thinned regrowth of native vegetation	237	48	285	20	17
Established improved pasture in forest areas	242	44	286	19	15
Established fencing around remnant vegetation areas	236	52	288	17	18

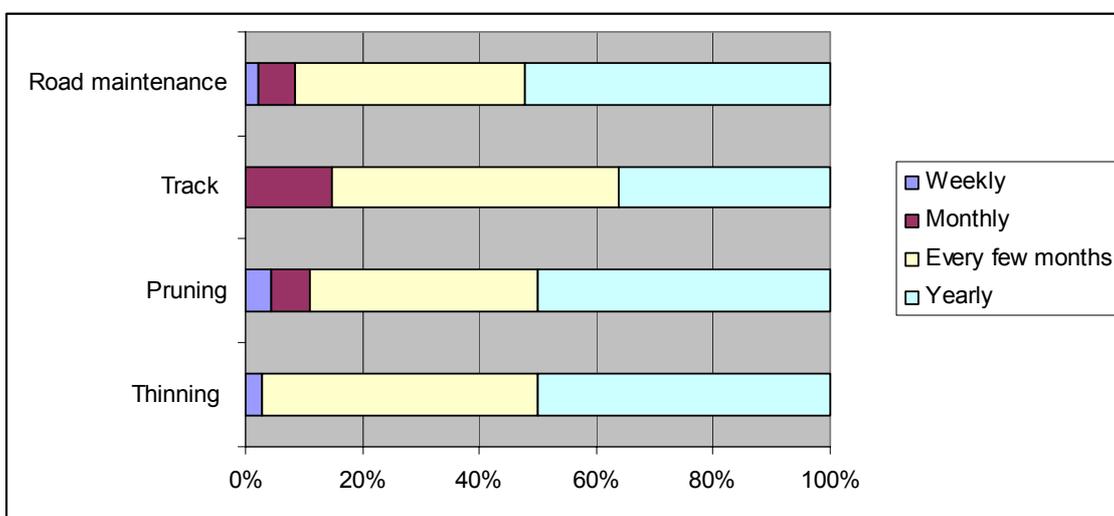


Figure 22: Reported timing of various native forest management activities.

Table 71: Level of activity of various forest management practices.

Management practice	N	Min	Max	Mean	Std. Error	Median	RSE (%)
Encouraged regrowth of native vegetation (Ha)	139	0.10	132.60	9.7	1.56	3.0	16
Thinned regrowth of native vegetation (Ha)	34	0.30	10,000.00	337.4	322.16	4.0	95
Established improved pasture in forest areas (Ha)	27	1.00	20,000.00	1,022.8	815.37	10.0	80
Established fencing around remnant vegetation areas (Ha)	42	0.20	1,200.00	38.2	29.10	4.5	76

Table 72: Proportion of landholders with different primary land use types undertaking various native forest management activities.

Management practice	Residential only (%)	Grazing (%)	Cropping (%)	Grazing and cropping (%)	Other (%)	Total (%)	Chi Test Prob.
Encouraged regrowth of native vegetation	66	48	52	58	69	58	0.076
Thinned regrowth of native vegetation	18	27	6	32	20	17	0.004
Established improved pasture in forest areas	9	25	8	33	16	16	0.007
Established fencing around remnant vegetation areas	14	27	4	30	29	19	0.000

Collection of non-timber forest products

Participants were asked to describe what types of non-timber forest products (NTFPs) they gathered. According to the 17% of forest owners that reported this activity, the most commonly collected NTFP was seeds, followed by flowers, leaves and fruit (Table 73).

Table 73: Frequency of collection of various non-timber forest products from native forest areas.

Type of non-timber product	Frequency
Seeds	15
Fruit, flowers or leaves	12
Live plants	5
Wood (fire and decorative)	3

Timber harvesting in native forests

Of the people with native forest areas, 5% had used these areas for timber production (Table 74). The areas of forest last logged ranged from 0.03 ha to 40 ha at an average of 9.3ha (Table 75). Seven of the nine reports of areas last logged are 10ha or less (Table 76). Those who sold timber from harvests tend to have harvested larger areas of forest. Less than half those who have logged their native forest areas have sold the timber (Table 77).

Table 74: Whether respondents use their forest for timber production.

If use for timber production	Frequency	Percent	Valid Percent	Cumulative Percent
No	181	59.3	92.8	92.8
Yes	14	4.6	7.2	100.0
Total	195	63.9	100.0	
Missing	110	36.1		
Total	305	100.0		

Table 75: Descriptive statistics for the area of forest last logged (ha) by respondents.

Statistic	N	Min	Max	Mean	Std. Deviation
Area production forest (ha)	12	0.50	180	31.7	49.17
Area of forest last logged (ha)	9	0.03	40	9.3	13.11

Table 76: Area of forest last logged (ha).

Area of forest last logged	Frequency	Percent	Valid Percent	Cumulative Percent
.03	1	0.3	11.1	11.1
.50	1	0.3	11.1	22.2
1.50	1	0.3	11.1	33.3
2.00	1	0.3	11.1	44.4
4.00	1	0.3	11.1	55.6
6.00	1	0.3	11.1	66.7
10.00	1	0.3	11.1	77.8
20.00	1	0.3	11.1	88.9
40.00	1	0.3	11.1	100.0
Total	9	3.0	100.0	
Missing	296	97.0		
Total	305	100.0		

Table 77: Frequency of whether last timber harvest was sold.

If sold timber from last harvest	Frequency	Percent	Valid Percent	Cumulative Percent
No	11	3.6	68.8	68.8
Yes	5	1.6	31.3	100.0
Total	16	5.2	100.0	
Missing	289	94.8		
Total	305	100.0		

Timber plantations on private rural land

Approximately 7% of respondents indicated they have a timber plantation on their landholding (Table 78). The plantations carried in size from 0.2 to 24 ha with an average size of 6 ha (Table 79).

Table 78: Frequency and proportion of respondents who have a timber plantation on their property.

If have a timber plantation	Frequency	Percent	Valid Percent	Cumulative Percent
No	243	79.7	92.4	92.4
Yes	20	6.6	7.6	100.0
Total	263	86.2	100.0	
Missing	42	13.8		
Total	305	100.0		

Table 79: Descriptive statistics for timber plantations managed by respondents.

Statistic	N	Min	Max	Mean	Std. Deviation
Area timber plantation	18	.20	24.00	5.94	7.197

Weed and pest management

Participants in the survey were asked to indicate whether they had undertaken non-crop pest or weed control, and if so, the amount of time and money spent on these activities in 2007. More respondents reported undertaking weed control (72% of respondents) compared to pest control (44% of respondents) (Tables 80 and 81). The efforts on weed control in both time and money exceeded that for pest control on average, although the median values for both activities are similar (Tables 82 and 83).

Table 80: Whether undertook pest control in 2007.

Whether undertook pest control	Frequency	Percent	Valid Percent	Cumulative Percent
No	107	35.1	44.4	44.4
Yes	134	43.9	55.6	100.0
Total	241	79.0	100.0	
Missing	64	21.0		
Total	305	100.0		

Table 81: Average and median time and money spent on pest control 2007.

Time / Money	Mean	RSE (%)	Std. Error	Median
Time spent on pest control (person days per year)	26.33	20	5.33	10
Money spent on pest control (\$ per year)	2892.41	34	975.08	1000

Table 82: Whether undertook weed control in 2007.

Whether undertook weed control	Frequency	Percent	Valid Percent	Cumulative Percent
No	26	8.5	10.6	10.6
Yes	220	72.1	89.4	100.0
Total	246	80.7	100.0	
Missing	59	19.3		
Total	305	100.0		

Table 83: Average and median time and money spent on weed control in 2007.

Time / Money	Mean	RSE (%)	Std. Error	Median
Time spend on weed control (person days per year)	28.5	12	3.44	12
Money spent on weed control (\$ per year)	4246.0	20	866.24	1000

Information sources

Participants were asked to rate the usefulness of a variety of potential sources of information used to assist property management decisions. On average the highest ratings of usefulness were given to books and magazines, followed by other farmers, family and field days (Table 84 and 85, Figure 23). Agribusiness agents and private consultants were rated as the least useful possible sources of information, partly as they had never been used by approximately half the respondents which affected the calculation of the mean ratings shown in Table 84.

While the mean ratings of usefulness of various information sources provides some indication of the way these sources are viewed by landholders, some of these sources are targeted to particular audiences and so would not be expected to get high ratings from every respondent. Another means of judging the usefulness of these sources is to assess the proportion of the actual users of the information source who rated the source as usually or always useful (shown in the fourth column of Table 84). Using this criterion it can be seen that Landcare groups, industry associations and groups, best practice groups and agribusiness agents were fairly well respected by those that use these sources.

Table 84: Average ratings of usefulness for various information sources used to assist property management decisions.

Information source	Mean*	Std. Deviation	Proportion of users who rated the source usually or always useful (%)
Books and magazines	3.4	1.56	64
Other farmers	3.3	1.69	66
Family	3.2	1.76	57
Field days and workshops	3.2	1.85	64
Brochures	3.0	1.69	51
Accountant	2.8	1.93	56
Government agencies	2.8	1.76	46
Internet	2.6	1.92	51
Market trends	2.6	1.92	52
Training	2.4	1.92	49
Mass media	2.4	1.67	31
Landcare	2.3	1.88	47
Banks	2.3	1.78	35
Industry associations	2.3	2.04	55
Industry groups	2.1	1.94	48
Environment groups	2.1	1.69	29
NRM groups	2.0	1.78	32
Local government	2.0	1.61	22
Best practice groups	1.9	1.91	45
Wholesalers	1.8	1.84	38
Agri Agents	1.8	1.90	43
Private Consultants	1.4	1.71	30

* Responses were scored with a range from 'not useful' (score of 1) to 'always useful' (score of 5) on a five-point Likert scale. Answers of 'never used' were scored as 0 to calculate these means.

Table 85: Frequency of ratings of usefulness for various potential sources of information to aid property management decisions.

Information source	Not useful	Sometimes useful	Often useful	Usually useful	Always useful	Never used	Valid N	Missing
Private agricultural consultants	45	19	40	21	24	145	294	11
Local government	60	55	55	17	32	69	288	17
Environmental groups	42	48	62	30	33	80	295	10
Wholesalers / purchasers / customers	50	23	41	31	38	107	290	15
Catchment / natural resource management groups	29	42	62	25	38	101	297	8
Agri-business agents	41	13	41	31	40	124	290	15
Benchmark or best practice groups (e.g. Future Cane program, Grazing Land Management Group)	36	18	44	40	41	116	295	10
Mass media (e.g. newspapers, radio, TV)	39	40	83	29	44	58	293	12
Local Landcare group	29	25	56	48	49	86	293	12
AgForce, Growcom, Queensland Farmers Federation or Industry groups	36	20	45	41	51	101	294	11
Banks / financial institutions	51	44	53	27	54	65	294	11
Training courses	20	23	61	43	58	88	293	12
Government Agencies (QDPIF, QDNRW, etc.)	26	31	72	46	65	54	294	11
Market trends	30	28	47	44	68	73	290	15
Industry associations (e.g. cane and banana farmers' associations)	35	20	31	38	68	101	293	12
Internet	22	23	60	37	71	74	287	18
Brochures / leaflets / newsletters	18	28	78	53	77	43	297	8
Accountant	30	28	44	41	87	63	293	12
Books / magazines	10	23	63	80	89	30	295	10
Family	29	22	57	50	95	37	290	15
Other farmers	15	21	51	72	96	37	292	13
Field days, workshops and agricultural shows	13	18	56	53	99	54	293	12

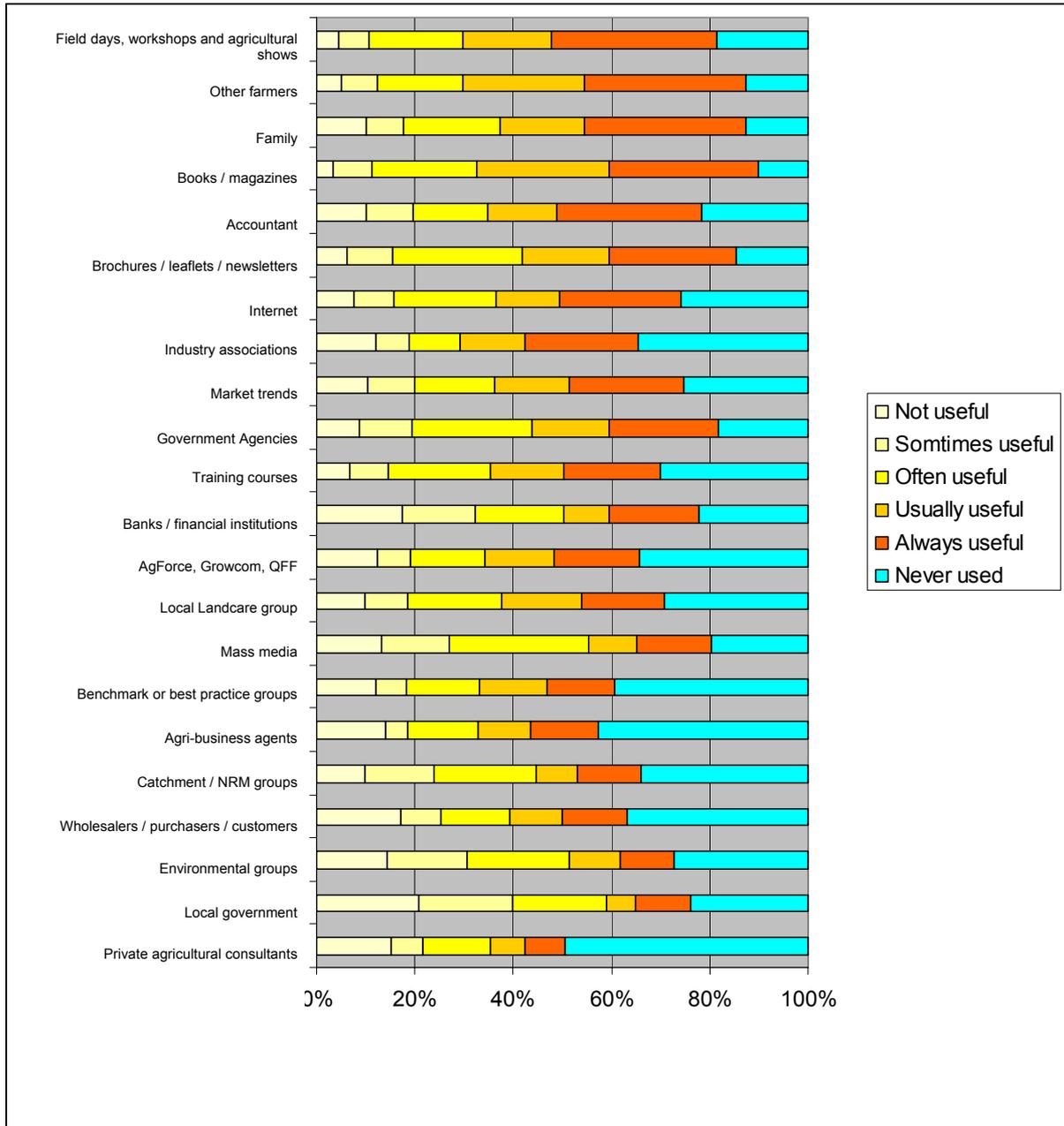


Figure 23: Proportion of respondents with differing ratings of importance for various potential sources of information to assist property management decisions.

Training courses attended by respondents

Approximately 60% of respondents reported completing at least one short course related to property management over the past five years (Table 86).

As expected, substantial variation was found in the proportion of landholders who had attended training courses between landholder groups with varying land-use types (Table 87). Only 10% of landholders whose properties are used for only for residential purposes, hobby farmers and those who listed their properties land use as conservation have attended courses. Approximately 30% of those with livestock enterprises and more than 60% of those involved in cropping enterprises have attended a course.

Courses on chemical handling comprise 50% of all courses listed by respondents (Table 88). Crop management courses were the next most frequently mentioned, followed by nutrient management, pest and weed management and stock breeding and management. Institutions and individuals running the training courses range from government agencies to specialised training companies, individuals and agribusiness corporations. The Bureau of Sugar Research Stations (BSES) ran one-third or 54 of the 153 courses mentioned by respondents including many of the chemical handling (ChemCert) and other cane management courses. Other commonly mentioned course providers were QDPI and Canegrowers with their Compass, FutureCane and Six Easy Steps programs.

Participants were asked to suggest potential future course topics. A range of topics were mentioned however most related to topics already covered in previously held courses, including chemical handling, pest management and nutrient management. Suggested topics not yet covered in training courses are listed in Table 89.

Table 86: Frequency and proportion of respondents who have attended short courses related to property management.

If attended short course	Frequency	Percent	Valid Percent	Cumulative Percent
No	186	61.0	64.8	64.8
Yes	101	33.1	35.2	100.0
Total	287	94.1	100.0	
Missing	18	5.9		
Total	305	100.0		

Table 87: If attended short courses by various land use types.

If attended short course	Land use types					Total
	Residential only	Grazing	Cropping	Grazing and cropping	Other	
No	90.7%	71.2%	38.2%	37.5%	88.9%	65.4%
Yes	9.3%	28.8%	61.8%	62.5%	11.1%	34.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 88: Property management training courses completed by respondents over the past five years.

Type of course	Frequency
Chemical handling	77
Crop management	18
Nutrient management	7
Pest and weed management	6
Stock management and breeding	6
Work safety	5
Property planning	4
Conservation management	3
Alternative agriculture	3
Succession planning	2
Veg management	2
Other	14

Table 89: List of preferred topics for future short courses*.

Preferred topic	Preferred topic
Chain saw handling	Pest management
Chemical free farming practices	Poisons/chemical handling,
Computer	Precision Ag.
Dangers of GMO farming	Profits on level playing field
Economics of growing sugar cane whilst managing resources	Property planning
Fertiliser application	Property rights on freehold farms
Finance topics,	Soil conservation
Futures trading	Soil health
Horticulture	Succession planning
How to retire from farm	Stock nutrition
Impact of climate change and global warming	Surviving low profitability
In paddock milling	Value adding
Money making	Vegetation control
New chemicals (cost-effective to present)	Water conservation
Nutrient retention in the Wet Tropics	Water and flood management
Organics, biodynamics	Weed eradication

* Each topic was mentioned once.

Trust in other people and institutions

Participants were asked to indicate whether they knew of various agencies and groups operating in their region and the degree of trust they have in these groups and agencies. The groups that respondents had the most trust in were their neighbours and other landholders in the region (Figure 24). The lowest levels of trust were for the QEPA, environmental groups, the federal and local governments, and locally based state government extension officers.

Respondents involved in cane growing cropping activities gave high trust ratings to agencies involved in sugar industry research and extension including the BSES and the productivity board. Landcare groups and the DPIF both received ratings of 'moderate' levels of trust by more than half the respondents, as did local governments, although local governments were also rated as 'low trust' by nearly 40% of respondents (Table 90). The agencies with the lowest ratings of trust include the Federal government and the QEPA.

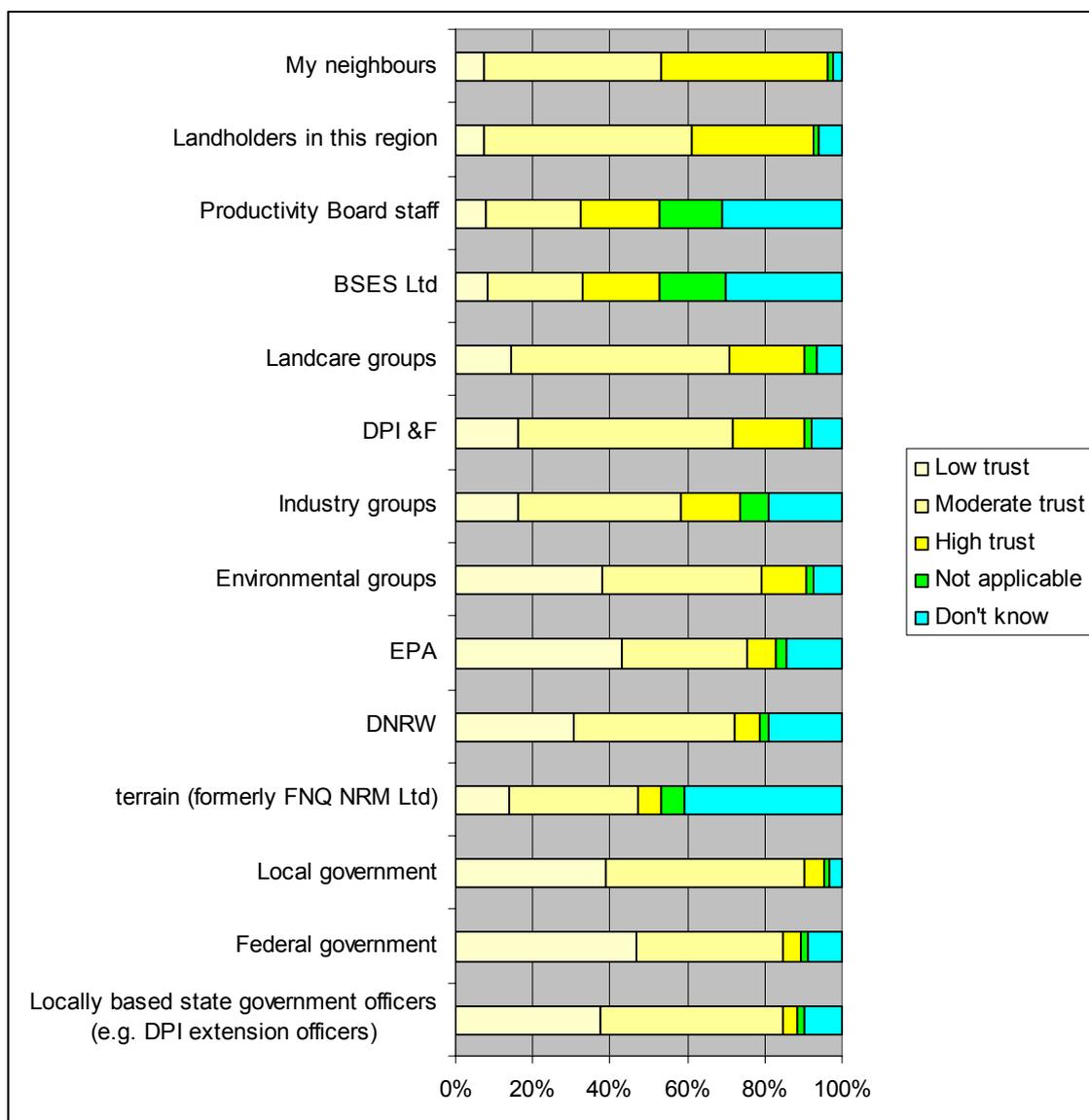


Figure 24: Degree of awareness of and trust for various agencies and groups.

Table 90: Proportion of respondents with differing levels of trust for various groups and agencies.

Group or agency	Low trust	Moderate trust	High trust	Not applicable	Don't know	Total N
Respondents' neighbours	7%	46%	43%	1%	2%	298
Landholders in this region	7%	54%	31%	1%	6%	292
Productivity Board staff	8%	24%	21%	16%	31%	296
Landcare groups	14%	56%	20%	3%	6%	293
BSES Ltd	8%	25%	20%	17%	30%	295
QDPIF	16%	55%	19%	2%	8%	296
Industry groups	16%	42%	15%	7%	19%	297
Environmental groups	38%	41%	11%	2%	7%	296
QEPA	43%	32%	7%	3%	14%	297
Terrain Pty Ltd	14%	34%	6%	6%	41%	292
DNRW	30%	42%	6%	3%	19%	293
Local government	39%	51%	5%	1%	3%	297
Locally based state government officers (e.g. DPI extension officers)	38%	47%	4%	2%	9%	295
Federal government	47%	38%	4%	2%	9%	298

Participation in social activities

Participants were asked to indicate whether they participate in a range of social groups and if so, how often. The most common social group mentioned by 45% of respondents was sporting groups or clubs, followed by school groups and emergency services (Table 91).

Table 91: Respondents' participation in social groups.

Social group	None	Once a year or less	A few times a year	Every month or two	Weekly	Total	Missing	
Sporting groups/clubs	55%	9%	10%	7%	18%	282	23	305
School committee (e.g. P&C)	60%	5%	18%	14%	4%	276	29	305
Emergency services (e.g. Bush Fire Brigade, SES)	65%	14%	14%	4%	4%	280	25	305
Civic groups (e.g. Rotary, Lions)	66%	6%	14%	9%	5%	277	28	305
Catchment / sub-regional NRM group	70%	4%	11%	9%	7%	278	27	305
Local Landcare group	74%	11%	9%	4%	1%	282	23	305
Neighbourhood/rural watch	75%	4%	4%	5%	13%	271	34	305
Special interest group	79%	6%	5%	7%	3%	279	26	305
Political / lobby group	82%	6%	6%	4%	3%	280	25	305
Industry group	82%	5%	5%	3%	6%	280	25	305
Church group	85%	7%	5%	2%	2%	279	26	305
Recreation group	86%	7%	4%	3%	0%	280	25	305
Country Women's Association	95%	1%	1%	2%	1%	271	34	305

Environmental management systems

A total of 42 respondents (approximately 15%) reported that they use an environmental management system. Of these a number (5) reported their system as their own, 'don't know' or 'the government' with no explanations and these responses were discarded as misleading answers (Table 92). While 16 of the remaining 'systems' reported by could be considered as covering multiple aspects of their property management such as the Compass program or biodynamic systems (i.e. soil, water and nutrient management), other systems appear to only cover selected aspects of property management (e.g. the use of green trash blankets).

Table 92: Types and frequency of mention of environmental management systems used by respondents.

Management system	Frequency
Compass	6
Other (unspecified)	6
Green trash blanket	4
Organic or biodynamic	4
Other cane farming systems	4
BSES best practices	3
Nature refuge	3
Dairy management	2
Water management	2
Livestock producers accreditation	1

Property planning

Approximately 25% of respondents reported having a written property or business plan and a further 9% reported that they are in the the process of developing a plan (Table 93). Of those who already have a plan or have a plan in progress, approximately 60% reported that they 'always' or 'often' refer to this plan when making decisions about the property while approximately 10% reported their plan 'rarely' or 'never' influences decisions (Table 94).

Those participants who did not have a plan developed were asked to indicate whether they would be interested in developing one if there was assistance available. Approximately 10% reported they would be interested in developing a plan with a further 25% stating they may be intested (Table 95).

Table 93: Whether respondents have prepared a written property plan or a business plan.

If a property or business plan has been prepared	Frequency	Percent	Valid Percent	Cumulative Percent
No	186	61.0	64.4	64.4
In progress	27	8.9	9.3	73.7
Yes	76	24.9	26.3	100.0
Total	289	94.8	100.0	
Missing	16	5.2		
Total	305	100.0		

Table 94: Responses to ‘How often does this property or business plan influence the decisions made about your property or business?’

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Never	4	1.3	4.9	4.9
Rarely	3	1.0	3.7	8.5
Sometimes	22	7.2	26.8	35.4
Often	27	8.9	32.9	68.3
Always	26	8.5	31.7	100.0
Total	82	26.9	100.0	
Missing	223	73.1		
Total	305	100.0		

Table 95: Whether respondents without a property plan are interested in developing one.

If interested in developing a property plan	Frequency	Percent	Valid Percent	Cumulative Percent
No	83	27.2	44.4	44.4
Maybe	82	26.9	43.9	88.2
Yes	22	7.2	11.8	100.0
Total	187	61.3	100.0	
Missing	118	38.7		
Total	305	100.0		

Involvement in government NRM groups

Just less than 20% of respondents indicated that they had been involved in a government NRM program over the past five years (Table 96). Participants were not asked to name the program however a number of respondents indicated they had been involved in the FarmClear program which ran in the area for approximately one year after Cyclone *Larry*.

Table 96: If involved in government NRM programs within the last five years.

If involved in NRM programs	Frequency	Percent	Valid Percent	Cumulative Percent
No	235	77.0	81.9	81.9
Yes	52	17.0	18.1	100.0
Total	287	94.1	100.0	
Missing	18	5.9		
Total	305	100.0		

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