

# ***Farmers and Regional NRM Delivery***

***Survey results from three regions***

**Volume 1: Report**

A report for the Cooperative Venture for Capacity Building in Rural Industries prepared under RIRDC project no. UNE 91-A *Nesting community-based NRM for regional accountability and grassroots cooperation*

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All errors and omissions remain the responsibility of the author.

## Abbreviations

BBG	Blackwood Basin Group
CHRRUP	Central Highlands Regional Resources Use Planning Cooperative
CMA	Catchment Management Authority
FBA	Fitzroy Basin Association
LCDC	Land Conservation District Committee
MW2	Mann-Whitney Test (two-tailed)
n	Sample size from which statistic was calculated
n.a.	Not applicable
NAP	National Action Plans for Salinity and Water Quality
NHT	Natural Heritage Trust
NRM	Natural resource management
WSR2	Wilcoxon Signed Ranks Test (two-tailed)
SWCC	South West Catchments Council
WA	Western Australia

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# Executive Summary

Since the 1980s, community-based natural resource management (NRM) in rural areas of Australia has evolved from its origins with small groups of farmers to the present situation, under the ‘regional delivery model’, where regional bodies are expected to foster community ownership and voluntary cooperation from the large and diverse populations inhabiting their regions. This scaling up of expectations regarding community-based approaches has brought with it substantial challenges.

The project ‘Nesting community-based NRM for regional accountability and grassroots cooperation’ was undertaken to add to the limited knowledge available for addressing these challenges. The case-study methodology of the project employed both qualitative techniques and quantitative techniques in a complementary manner. The quantitative research involved collection of data through mail-out surveys of farmers in each of the three cases studied. The three NRM subregions used as case studies were: the Blackwood Basin, located within the South West Catchments NRM Region (in Western Australia); the Central Highlands, located within the Fitzroy Basin NRM Region (in Queensland); and dryland areas of the Mallee NRM Region (in Victoria).

The surveys were concerned primarily with providing quantitative evidence on farmers’ awareness of, and perceptions regarding, the regional delivery model for NRM, and also on factors potentially associated with their decisions to adopt the kinds of on-farm conservation practices promoted to them under this model. This survey report documents results from the statistical analyses that were not included in the final project report (Marshall under review). In this report, the focus is on descriptive analysis of the survey data, together with statistical analyses of how farmers’ responses varied across related but different questionnaire items within each case, and also across different cases for the same questionnaire item.

The mail-out surveys involved posting questionnaires to a sample of farmers in each case-study subregion. For the Blackwood Basin case, 333 full questionnaires were completed and returned, yielding a 29.3 per cent response rate. For the Central Highlands case, 170 full questionnaires were completed and returned, yielding a response rate of 19.6 per cent. For the Mallee Region dryland case, 318 full questionnaires were completed and returned, yielding a 40.2 per cent response rate. The questionnaires were returned between September 2006 and February 2007.

A wide range of results are presented and discussed in this survey report. Some key results for the three cases are tabulated below. Patterns in these results suggest the following findings:

- the vast majority of respondents in each case placed either a high or very high priority on the goal of maintaining or enhancing the condition of their natural resources and environment;
- in each of the three cases, smaller proportions of respondents rated natural resource issues as at least a moderate threat to their farm business than rated government regulation, commodity prices and drought as at least a moderate threat;

### Key results across the three cases

Measure	Case		
	Blackwood Basin	Central Highlands	Mallee Region dryland
% of respondents who placed high or very high priority on the goal of maintaining/ enhancing the condition of their natural resources and environment	77.5	91.3	70.0
% of respondents who placed high or very high priority on the goal of maintaining/ enhancing the profitability of their farm business	86.3	90.6	93.3
% of respondents who rated natural resource issues as at least a moderate threat to their farm business	From 53.4% (soil-acidity/acid sulphate soils) to 25.1% (loss of native vegetation)	From 69.5% (pest plants and animals) to 11.9% (salinity)	From 58.3% (pest animals) to 19.0% (fragmentation of habitat)
% of respondents who rated 'government regulation', 'commodity prices' and 'drought' as at least a moderate threat to their farm business	From 95.4% (commodity prices) to 69.9% (drought)	From 96.5% (drought) to 88.6% (government regulation)	From 98.4% (commodity prices) to 86.9% (government regulation)
% of respondents who strongly agreed they felt a bond with their NRM region	4.9	6.2	28.1
% of respondents who strongly agreed they felt a bond with their NRM subregion	7.5	37.3	34.3
% of respondents who strongly agreed they felt a bond with their district	39.1	43.9	44.2
% of answering respondents (i.e., excluding 'don't know' responses) who agreed or strongly agreed that 'NRM at the scale of (their NRM region) is so remote that it discourages us from getting involved'	60.7	46.0	60.0
% of respondents <i>not</i> aware that 'much of the responsibility for deciding what on-ground activities to fund now lies with regional bodies'	39.1	31.9	29.3
% of respondents <i>not</i> aware of their regional NRM body	36.1	11.6	11.0
% of respondents <i>not</i> aware that the board of their regional body consists mostly of community representatives	45.7	32.7	23.1
% of answering respondents who agreed or strongly agreed that 'the regional approach is an improvement on previous approaches'	66.1	71.9	68.2

### **Key results across the three cases (continued)**

Measure	Case		
	Blackwood Basin	Central Highlands	Mallee Region dryland
% of answering respondents who agreed or strongly agreed that 'Federal Government is serious about empowering our community to solve our own NRM problems'	50.4	50.0	62.0
% of answering respondents who agreed or strongly agreed that '(their state) Government is serious about empowering our community to solve our own NRM problems'	38.5	34.6	48.5
% of answering respondents who agreed or strongly agreed that '(their regional NRM body) is serious about helping our community to solve our own NRM problems'	72.8	76.1	84.0
% of answering respondents who agreed or strongly agreed that '(their subregional NRM body) is serious about helping our community to solve our own NRM problems'	83.3	78.3	n.a.
% of answering respondents who agreed or strongly agreed that 'the regional approach is a way for governments to 'pass the buck' on difficult issues'	69.5	71.3	82.4
% of answering respondents who agreed or strongly agreed that 'the regional approach is part of a strategy to increase government regulation of rural land-use'	73.0	77.8	73.1
% of answering respondents who agreed or strongly agreed that '(their regional NRM body) is just a 'rubber stamp' for decisions made by (their state government)'	54.0	49.0	56.8
% of answering respondents who agreed or strongly agreed that '(their subregional NRM body) is just a 'rubber stamp' for decisions made by (their state government)'	33.9	44.7	n.a.
% of answering respondents who agreed or strongly agreed that their subregional NRM body 'is just a 'rubber stamp' for their regional NRM body'	39.3	47.0	n.a.
% of respondents who indicated involvement over the previous few years with at least one local NRM-related group	41.9	35.0	58.8
% of respondents indicating recent involvement with a local NRM-related group who were most involved with a landcare- or catchment- type group	66.2	24.0	71.1
% of respondents indicating recent involvement with a local NRM-related group who were most involved with a production group	19.4	62.5	20.3
% of respondents indicating recent involvement with a local NRM-related group who agreed or strongly agreed that 'the work of (their regional NRM body) has helped make this group more effective'	35.5	55.8	68.3
% of respondents indicating recent involvement with a local NRM-related group who agreed or strongly agreed that 'the work of (their subregional NRM body) has helped make this group more effective'	62.1	80.5	n.a.

- there was a consistent trend across the three cases for respondents to be more likely to strongly agree they felt a bond with their district than with their NRM subregion, and more likely to strongly agree they felt a bond with their NRM subregion than with their NRM region;
- upwards of around half the respondents in each case who answered the question ('answering respondents') agreed or strongly agreed that NRM at the scale of their region 'is so remote that it discourages us from getting involved';
- a substantial proportion of respondents in each case (upwards of 29 per cent) were unaware that regional bodies had been decentralised considerable responsibility for deciding how funds for on-ground NRM activities should be allocated within their region.
- non-trivial proportions of respondents in the Central Highlands and Mallee dryland cases (around 11 per cent in each case) were unaware of their respective regional NRM bodies, while the corresponding proportion for the Blackwood Basin case was appreciably higher (36.1 per cent);
- a sizeable proportion of respondents in each case (from 23.1 per cent to 45.7 per cent) were unaware that the board of their regional body consists mostly of community representatives;
- around two-thirds of answering respondents in each case perceived the regional model of NRM delivery as an improvement on previous approaches;
- at least half the answering respondents in each case perceived the Federal Government to be serious about empowering their community to solve its own NRM problems;
- answering respondents in each case were appreciably less likely to perceive their state government, compared with the Federal Government, as serious about empowering their community to solve its own NRM problems;
- over 70 per cent of answering respondents in each case perceived their regional body to be serious about empowering their community to solve its own NRM problems;
- answering respondents in each of the two relevant cases (given the absence of a subregional body in the Mallee dryland case) were more likely to perceive their subregional body, compared with their regional body, as serious about empowering their community to solve its own NRM problems;
- answering respondents for these two relevant cases were more than twice as likely to perceive their subregional body, compared with their state government, as serious about empowering their community to solve its own NRM problems;
- upwards of 69.5 per cent of answering respondents in each of the three cases tended to perceive the regional delivery model as 'a way for governments to 'pass the buck' on difficult issues';

- upwards of 73.0 per cent of answering respondents in each of the three cases tended to perceive the regional delivery model as ‘part of a strategy to increase government regulation of rural land-use’;
- given this prevalent scepticism of governmental motives for introducing the regional delivery model, and the clear majority of respondents who rated the model as an improvement on previous approaches (see above), the implication seems to be that the regional delivery model is perceived by farmers less sceptically than was the case with previous NRM models;
- around half the answering respondents in each case tended to perceive their regional NRM body as just a ‘rubber stamp’ for decisions made by their state government;
- answering respondents in each of the two relevant cases were more likely to perceive their subregional body as a ‘rubber stamp’ for their regional body than to perceive it as a ‘rubber stamp’ for their state government;
- proportions of respondents in the three cases involved with a local NRM-related group over the previous few years (‘locally-involved respondents’) ranged from 58.8 per cent in the Mallee dryland case, to 41.9 per cent in the Blackwood Basin case, and to 35.0 per cent in the Central Highlands case;
- in the Blackwood Basin and Mallee dryland cases, around two-thirds of locally-involved respondents had been most involved with a landcare- or catchment- type group, while in the Central Highlands case about one-quarter of locally-involved respondents had been most involved with such a group;
- almost two-thirds of locally-involved respondents in the Central Highlands case had been most involved with a production-type group (e.g., sustainable cropping group), while in the Blackwood Basin and Mallee dryland cases around one-fifth of locally-involved respondents had been most involved with such a group;
- the proportion of locally-involved respondents perceiving their regional body to have increased the effectiveness of their highest-involvement local group ranged from 68.3 per cent in the Mallee dryland case, to 55.8 per cent in the Central Highlands case, to 35.5 per cent in the Blackwood Basin case; and
- locally-involved respondents were considerably more likely to perceive the effectiveness of their highest-involvement local group had been boosted by the work of their subregional body (except in the Mallee dryland case which lacks such a group) than by the work of their regional body.

These findings confirm that pursuit of community-based NRM at the scale of large regions is no simple matter. Barriers to this pursuit that were identified include lack of awareness of the regional delivery model and its community-based elements, scepticism of government motives

for introducing the model, and perceptions that regional and subregional NRM bodies are merely ‘rubber stamps’ for decisions made by higher-level authorities.

Although these findings reveal some important commonalities across the cases, they also highlight some important differences. They serve as a useful reminder that each setting where community-based NRM is attempted is likely to have unique characteristics, and that institutional arrangements for community-based NRM that work in one setting may require significant adaptation to work in another setting. Hence, local participation in designing and revising institutional arrangements for community-based NRM is vital if the benefits sought from this approach (particularly in promoting voluntary adoption of conservation practices) are to be realised from one region to the next.



# 1. Introduction

Since the 1980s, community-based natural resource management (NRM) in rural areas of Australia has evolved from its origins with small groups of farmers to the present situation, under the 'regional delivery model', where regional bodies are expected to foster community ownership and voluntary cooperation from the large and diverse populations inhabiting their regions. This scaling up of expectations regarding community-based approaches has brought with it substantial challenges.

The project *Nesting community-based NRM for regional accountability and grassroots cooperation* was undertaken to add to the limited knowledge available for addressing these challenges. The practical outcome sought from the project was to enhance the capacity of the Australian NRM policy community, at all levels, to establish successful community-based arrangements under the regional delivery model. The study was informed by the author's related research on: economics of integrated catchment management (Marshall et al. 1996); irrigator's adoption of conservation practices under a community-based program of watertable management in the southern Murray-Darling Basin (Marshall 2002; 2004a; 2004b); economics of collaborative environmental management (Marshall 2005); and factors affecting rural landholders' adoption of conservation practices (Pannell et al. 2006).

The case-study methodology of the project employed both qualitative techniques and quantitative techniques in a complementary manner. The quantitative research, comprising steps nine and ten of the project schedule, involved collection of data through mail-out surveys of farmers in each of the three cases studied. This report documents results from the quantitative analysis that were not included in the final report for the project (Marshall under review). The quantitative results focused on in the final report are those from multiple regression analyses the primary purpose of which was to identify whether, and how, farmers' plans to voluntarily adopt conservation practices promoted under the regional delivery model are associated with their trust in that model. In this report, the focus is on descriptive analysis of the survey data, together with statistical analyses of how farmers' responses varied across related but different questionnaire items within each case, and also across different cases for the same questionnaire item.

This document constitutes volume 1 of the overall survey report. The appendices referred to in this volume comprise volume 2. The method of the survey, including questionnaire development, sampling and survey administration, is explained in Chapter 2 of this volume. Background to the three case-study settings is also provided in that chapter. Survey results from the Blackwood Basin, Central Highlands and Mallee Region dryland cases are presented and discussed in Chapters 3, 4 and 5, respectively. Results from the three cases are compared in Chapter 6, and patterns identified from these comparisons are presented as key findings. Finally in this volume, a summary of this report and its key findings is presented in Chapter 7.

## **2. Survey Method and Background to Case Studies**

Details of the survey method are discussed in section 2.2 of this chapter. First, however, details of the three cases surveyed are provided in section 2.1. Closing remarks are presented in section 2.3.

### **2.1 The three cases surveyed**

The three regions used as cases were the South West Catchments Region in Western Australia, the Fitzroy Basin Region in Queensland, and the Mallee Region in Victoria. Each of these regions was one of the priority regions included under the National Action Plan for Salinity and Water Quality (NAP). While regional bodies in Western Australia and Queensland are constituted on a non-statutory basis, in Victoria they are statutory authorities.

Given the research interest in nested community-based governance, the focus in two of the case-study regions was on parts of those regions where key elements of the regional delivery model had been devolved closer to a subregional level where farmers might be expected to feel a more tangible sense of community than at the regional level. The first of these regions was the South West Catchments Region, where the subregional focus was on the Blackwood Basin for which the South West Catchments Council had devolved various NRM governance responsibilities to the Blackwood Basin Group. The second of these regions was the Fitzroy Basin Region, where the subregional focus was on the Central Highlands for which the Fitzroy Basin Association has devolved various NRM governance responsibilities to the Central Highlands Regional Resources Use Planning Cooperative. The third case-study region, Victoria's Mallee NRM Region, offered an additional contrast to the other two (i.e., aside from the status of its regional body, the Mallee Catchment Management Authority, as a statutory authority) since it had decided against establishing subregional arrangements with similar stature as in the other two cases. To maintain reasonable comparability across the three cases, our focus in the Mallee Region was on dryland farming districts of that region, since agricultural activity in the other two subregions is predominantly dryland-based.

Further details of these cases are presented in the next three subsections.

#### **2.1.1 The Blackwood Basin case**

##### **2.1.1.1 The South-West Catchments Council and its region**

The South-West Catchments Council (SWCC) was formed in 1999, as a federation of NRM groups that had already formed at the catchment scale:

- Blackwood Basin Group (BBG);
- Cape to Cape Catchments Group;
- Geographe Catchment Council (GeoCatch);
- Leschenault Catchment Council;
- Peel-Harvey Catchment Council; and
- Warren Catchments NRM Group.

The South West Regional Strategy for Natural Resource Management was accredited by governments in 2004. It states that ‘the Strategy seeks to increase the proportion of people, businesses and organisations in the south west that are active in landcare and sustainable resource management and use more generally’. It emphasise there must be an environment in which community engagement can occur. The first investment plan approved under the Strategy was for the 2005-06 financial year, and represented a total investment of \$15.4 million. The most recent investment plan covers 2006-07 and 2007-08 and represents an average investment of \$20.1 million per year.

The South West Region is one of six NRM regions in Western Australia. The Region encompasses an area of 51,657 km<sup>2</sup> and a population of about 193,000 people. Approximately 13 per cent of employment in the Region is in agriculture, fisheries and forestry. There are about 5,000 farm businesses operating in the region, and more than 15,000 small land holdings. The Region includes 33 local government areas.

#### 2.1.1.2 The Blackwood Basin Group and its subregion

The origins of the Blackwood Basin Group (BBG) can be traced to 1989 when environmental groups and the Bridgetown-Greenbushes Shire recognised that a coordinated effort was needed to reverse degradation of the Blackwood River. The Blackwood Catchment Coordinating Group (BCCG) was established in 1992. The BCCG comprised 12 members representing 18 shires, Land Conservation District Committees (LCDCs), conservationists, farmers and the community, plus government agency representatives. The Group was incorporated in 1993, becoming formally recognised by government agencies and coming under the responsibility of the WA Minister for the Environment.

The BCCG obtained a \$20,000 grant from the WA Government in 1993, and in 1994 it employed a coordinator to manage its activities. The Group obtained a \$50,000 grant from the Land and Water Resources Research and Development Corporation in 1994. In 1995, the Group received \$2.5 million from the National Landcare Program to undertake a program of eight projects from 1995 to 1999. In 1997, the Group distributed \$205,000 to 48 on-ground landcare projects that addressed the causes of salinity and waterlogging.

In 1998, the Group renamed itself as the Blackwood Basin Group. The BBG adopted a ‘zone action planning (ZAP) strategy’ in 1998 to ensure efficient distribution of Landcare funding. This strategy was the basis for a regional initiative funded over 1999-2003 with \$5.3 million from NHT1.

The advantages of the ZAP concept were outlined by Ecker et al. (2000) as follows:

Zone Action Planning is a community initiative, and a community group [i.e., the Blackwood Basin Group] provides the framework, funding requirements and support for another funding group [i.e. the zone committee]. Unlike other examples where the initiative is part of a government program, this comes from inside the neighbourhood. ... This example of a local community group working closely with a regional community group, provides opportunities for greater trust building and the resultant, innovative thinking and commitment to carry through.

Of further relevance to the present study, they continued:

We're seeing also that this situation runs the risk of conflict developing when the host group, the Blackwood Basin Group, puts its accountability first before perceived needs of the sub-group, as must happen in the interest of maintaining credibility. Minor issues, like a disagreement between an adequate process for distributing funds can leave the sub-group feeling disempowered and like the community group sponsor is no different from other bodies that they perceive have restricted their control. ... The achievement of a balance between providing adequate guidance and allowing full (local) community ownership is proving a fine art requiring skilled management by the members and staff of the Blackwood Basin Group.

The Blackwood River begins near Dumbleyung in the low rainfall area of the WA wheatbelt and flows 280 kilometres through mostly agricultural land before reaching the coast at Augusta. The Blackwood Basin covers an area of about 23,500 km<sup>2</sup> and a population of around 37,000 people. Currently, 78 per cent of the area of the Basin is used for agriculture. Almost 80 per cent of the Basin is privately owned. Of the Basin's land resources, 10-12 are estimated to be in poor to very poor condition due to clearing, salinity and other land degradation issues. The major threat to land resources is dryland salinity. Other threats to land resources are soil acidification and acid sulphate soils, soil erosion and loss, nutrient loss, and waterlogging.

The BBG was awarded the International Thiess Riverprize in 2001. It is currently implementing a number of large projects under the 2006-08 Investment Plan for the South West Catchments Region with a combined value of \$6 million.

## **2.1.2 The Central Highlands case**

### 2.1.2.1 The Fitzroy Basin Association and its region

The Fitzroy Basin Association (FBA) evolved from the Fitzroy Catchment Coordinating Group, which was established in 1994. The Coordinating Group was renamed the Fitzroy Basin Association, as well as restructured, in 1997. It became a not-for-profit organisation incorporated under the (Queensland) Associations Incorporation Act 1981.

The Fitzroy Basin NRM was identified as a priority region for the NAP. This was attributable to levels of sediment and nutrients in its waterways, which discharge into the Great Barrier Reef lagoon and affect the condition of inshore reefs. As a result, a community-based organisation was required to coordinate the involvement of the Fitzroy Basin Region in the NAP. After an independent review, the FBA was nominated as this organisation. The FBA's role was formalised in 2002 when it signed a Partnership Agreement with the Queensland Government and the Commonwealth Government. Development of a regional NRM for the region, entitled *The Central Queensland Strategy for Sustainability: 2004 and Beyond* – was led by the FBA, and accredited by the Queensland and Commonwealth Governments in 2004.

The FBA sought to develop the *Strategy* 'from the ground up'. Sub-regional groups were integrally involved in the process. It was agreed also that adoption and implementation of the

*Strategy* would ‘be achieved through stakeholders making a voluntary commitment to an agreed course of action. It is not to be enforced through regulation’.

The NRM region for which the FBA is responsible surrounds the Tropic of Capricorn, and includes not only the catchment of the Fitzroy River system (the Fitzroy Basin) but also the catchments of the Boyne and Calliope Rivers (which draining the southern part of the region and enter the ocean at Gladstone) and of smaller streams draining the region’s coast. The Fitzroy Basin comprises the catchments of the Nogoa, Comet, Mackenzie, Isaac, Dawson, and Fitzroy Rivers. All combined, the 156,000 km<sup>2</sup> bounded by the Region covers one-tenth of Queensland’s land area. All catchments in the Region drain into the Great Barrier Reef lagoon. The region encompasses 19 local government areas either wholly or in part.

Rockhampton is the regional capital. The Region has a population of around 200,000 people. It consists of five subregions:

- Boyne-Calliope subregion (without a subregional body, but serviced by FBA field officers in collaboration with local government and community groups);
- Three Rivers: Isaac/Connors and Mackenzie subregion (without a subregional body, but serviced by FBA field officers);
- Fitzroy River and Coastal Catchments subregion (with Fitzroy River and Coastal Catchments Inc. as the subregional body);
- Dawson Catchment subregion (with Dawson Catchment Coordinating Association as the subregional body); and
- Central Highlands subregion (with Central Highland Regional Resources Use Planning Cooperative (CHRRUP) as the subregional body).

#### 2.1.2.2 CHRRUP and its subregion

CHRRUP was established in 1997 as a 3-year resource use planning project led by CSIRO Sustainable Ecosystems, the Queensland Department of Natural Resource and Mines, and the Queensland Department of Primary Industries. It was intended to support regional (now referred to as ‘subregional’) stakeholder groups or ‘sectors’ in planning their response to the pressures they were facing in sustainably managing the region’s natural resources. It represents 13 sectors within the subregion: landcare; local government; Queensland Government; indigenous; pastoral; grains; catchment groups; environment; human services; tertiary/education; economic development; mining; and food and fibre.

The project was based on three principles: (i) building the planning and management capacity of individual sectors; (ii) facilitating understanding of social, economic and biophysical processes; and (iii) developing strong institutional arrangements to facilitate negotiation among the sectors. A Regional Coordination Committee was established to facilitate sharing of information, act as a forum for reaching agreement across the different interests of the region, and act as a conduit for effective communication with the rest of the Central Highlands community. CHRRUP survived beyond the duration of the project and became an Incorporated Co-operative in September 2001.

The Central Highlands subregion is approximately 270 km inland from Rockhampton. It includes five shires, 4.5 million ha, and a population of about 20,000 people. The major population centre

is Emerald. The majority of this subregion comprises the catchments of the Comet and Nogoia Rivers which lie within the Fitzroy Basin NRM Region. Mining makes the greatest contribution to the subregional economy. However, the largest land use in these catchments is agriculture, primarily grazing. The threats to land use and management include hillslope erosion, low amounts of soil surface cover, inappropriate land clearing, high inputs to agricultural systems, drought followed by high-intensity storms, and pest plants and animals. Threats to biodiversity include broadscale tree clearing, inappropriate grazing management, habitat fragmentation, environmental weeds, pest animals, and inappropriate management of all land uses (Central Highland Regional Resources Use Planning Cooperative Limited 2003).

According to the FBA's Annual Report for 2005-06, the FBA and CHRRUP committed NRM funding of \$0.6 million during this period to projects on properties within the Nogoia and Comet catchments. The equivalent report for 2006-07 stated that CHRRUP committed NRM funding of \$0.8 million during this period to projects across 67 properties. Funding for these projects is in accordance with the Investment Plan for the Fitzroy Basin Region.

### **2.1.3 The Mallee Region dryland case**

#### **2.1.3.1 The Mallee Catchment Management Authority (CMA) and its region**

The first Mallee Regional Catchment Strategy (RCS) was released by the then Mallee Catchment and Land Protection (CaLP) Board in June 1997. The CaLP had been established in December 1994, following the enactment of the CaLP Act that year. The Mallee CMA assumed the responsibilities of the CaLP when it was established in 1997. The CMA acts as a statutory body under the CaLP Act. It also plays a more direct role in the management of waterways and in advising on developments within floodplains, under the Water Act 1989.

The CMA has a Board with ten members who are appointed by the Minister for Environment. Selection of these members is based on their collective skills and experience in land protection, water resource management, primary production, environmental conservation, local government and industry. Representatives from the (Victorian) Department of Primary Industries (DPI) and the (Victorian) Department of Sustainability and Environment also attend Board meetings.

The Board is supported by two Implementation Committees (ICs), established originally in July 1998, that are 'the vehicles by which the Authority can ensure community awareness and ownership of the strategies and projects. This will be achieved through the ICs appropriately participating, informing and consulting with the wider community'. The Board appoints community members to the ICs following a call for expressions of interest. IC members are selected on the basis of skills and knowledge representing the range of issues relevant to the geographic area for which the IC has been established. The Mallee Lands Committee takes a leadership role in dryland issues. The Mallee Irrigation and Environment Implementation Committee carries leadership responsibility in issues relevant to irrigation. Unlike the BBG in the first case discussed above, or CHRRUP in the second, the ICs are limited to advisory roles in respect of decisions regarding funding and implementation of on-ground projects. Other key differences are that the ICs are not autonomous in selecting their members, they do not employ or supervise their own field officers, they share the offices of the regional body (i.e., the CMA), and

they maintain a low public profile. Hence, they are not ‘grass roots’ subregional bodies in the same way that the BBG and CHRRUP can be regarded.

The CaLP Act requires each of Victoria’s CMAs to prepare a Regional Catchment Strategy (RCS) for its region and coordinate and monitor its implementation. The second Mallee RCS, for 2003-08, was prepared not only in accordance with Victorian guidelines but also in line with frameworks established in relation to the NAP and NHT2. The new RCS was accredited by the Commonwealth and Victorian Governments in 2003.

In developing the second RCS, nine major processes were identified as threatening natural resources and productive activities in the Region: loss of ecological processes; pest plants and animals; altered flooding regimes; land and water salinisation; water pollution; wind erosion; changing land use; recreational pressures; and altered fire regimes.

The region covered by the CMA (henceforth ‘Mallee NRM Region’) covers approximately 3.9 million hectares – almost one-fifth of Victoria. Of this area, 2.3 million hectares represents privately-owned agricultural land. Irrigated land makes up 1.4 percent of the area of agricultural land in the region, but 36 percent of its total value. Hence, dryland agriculture, on which the case study in this region focuses, accounts for 98.6 per cent of the agricultural land in the region. About three per cent of freehold land in the Region is covered by native vegetation.

There are 27 landcare groups in the Mallee CMA region, mostly in the dryland areas of the region. The CMA leads a regional landcare network (employing seven Landcare coordinators), with help from the Victorian Department of Primary Industries (employing two Landcare coordinators).

A key priority in the RCS was for the CMA to establish a systematic capacity-building program ‘with at least the same rigor and emphasis as is in place for on-ground works’. Given that private land occupies 62 per cent of the area of the Region, it was acknowledged that successful implementation of the RCS would depend on cooperation from private, usually agricultural, landholders. However, the RCS document cautioned there are constraints on the engagement that that could be expected from agricultural landholders, and argued that the success of landcare groups in supporting landholders in this direction would depend on ongoing support to such groups from coordinators. There is no formal relationship between the ICs and the system of landcare groups in the region, other than the fact that they are each administered and supported by the CMA.

## **2.2 Survey method**

Various steps in designing, implementing and analysing the mail-out farmer surveys by which quantitative data for this project were obtained are discussed in this section. Design of the questionnaires is discussed in section 2.2.1, after which administration of the survey is discussed briefly in section 2.2.2. Sampling frames for the three cases are detailed in section 2.2.3, and response rates for the cases are discussed in section 2.2.4. Section 2.2.5 considers the results of tests of how representative the three samples of respondents are of the respective farmer populations from which they were drawn.

## **2.2.1 Questionnaire content**

A separate questionnaire was developed for each case-study subregion. Minor modifications were required, for instance, to account for variation in the applicable state governments and regional and subregional NRM bodies, and for differences in the conservation practices being promoted to farmers. To enable comparability, however, the questionnaires were as uniform as possible across the three cases.

A pilot version of the questionnaire for each case was, in July 2006, posted to 40 farm businesses selected randomly from the sampling frames developed for each of the three case-study regions (see section 2.4.2). Responses to the pilot surveys indicated that farmers had no difficulties understanding the questionnaire items and instructions. However, the response rates were lower than the 30 per cent rate which had been regarded as achievable. The pilot-survey response rates for the Blackwood Basin, Central Highlands and Mallee dryland cases were 20 per cent, 22.5 per cent and 17.5 per cent, respectively. Seeking to achieve higher response rates for the main survey, items in the questionnaire were reordered to make it more engaging from the outset.

## **2.2.2 Survey administration**

Once the sample for a case had been defined, the finalised questionnaire was posted to each farm business in the sample. This stage occurred in September 2006 for the three cases. Businesses not responding within about six weeks were sent a reminder letter together with a replacement copy of the full questionnaire. Those not responding to the reminder after a further six weeks were posted a one-page follow-up questionnaire. This follow-up survey contained a selection of questions from the full questionnaire. This selection included questions about farm characteristics to provide a means of testing for non-response bias and correcting for this if it were identified. The full questionnaire and the one-page follow-up questionnaire for each case are provided in Appendix A, in volume 2 of this report, together with the associated covering letters. Survey responses continued to be received and processed until February 2007.

## **2.2.3 Sampling frames**

### **2.2.3.1 Blackwood Basin case**

The sampling frame used for this survey of farm businesses in the Blackwood Basin was drawn from a database of landholders provided by the Blackwood Basin Group. The database included only landholders recorded with at least 50 ha of land. After editing the database to remove duplicate entries (i.e., sharing the same address) and non-farming entries, the resulting sampling frame comprised 1,950 farm businesses.

With a population of this size, it was calculated that a sample size of 321 would provide an estimate of proportions for that population with a confidence level of  $\pm 5$  per cent at the 95 per cent confidence level. After allowing for the anticipated response rate, it was estimated that the desired final sample of 321 farm businesses would be achieved by posting the questionnaire to 1,340 of the farm businesses in the sampling frame.

### 2.2.3.2 Central Highlands case

Despite various efforts, it was not possible for the main survey of farm businesses in the Central Highlands subregion of the Fitzroy Basin NRM Region to develop a satisfactory sampling frame of such businesses. The Central Highlands Regional Resources Use Planning Cooperative (CHRRUP) had compiled a number of databases of farm businesses operating within the Central Highlands subregion, from which it drew the random sample of 40 farm businesses for the pilot survey. However, the heavy demands at the time on its limited staff resources meant that CHRRUP was unable to update, edit and combine these databases into a form adequate for use as a sampling frame for the main survey.

The best strategy under the circumstances was to post questionnaires for the main survey to all farmers within the Central Highlands subregion through the 'Unaddressed Delivery Service' administered by the Emerald office of Australia Post. Hence, each envelope sent to farmers carried the label 'To the Farmer or Grazier' rather than the actual name and address of the farmer. CHRRUP advised that the following districts covered by that service were located within its subregion: Capella, Comet, Emerald, Gindie, Rolleston, Springsure and Yamala. Australia Post in Emerald advised that 890 farm businesses were covered by that service in those districts, and confirmed that this number comprised virtually all farm businesses in those districts.

With a population of 890 farm businesses, it was calculated that a sample size of 269 would provide an estimate of proportions for that population with a confidence level of  $\pm 5$  per cent at the 95 per cent confidence level. Given that questionnaires for the main were to be sent to all 890 farm businesses, a response rate of 30 per cent would be needed to achieve a sample size of 269. Nevertheless, it was recognised that the impersonal nature of the unaddressed delivery of questionnaires would lower the response rate substantially. To minimise this handicap, the label affixed to each envelope carried a CHRRUP logo (since farmers might be expected to pay more attention to unaddressed mail sent from a known local organisation) as well as the wording below designed to appeal to farmers' goodwill towards their community: 'This survey collects important information which may help government \$ to be invested in the Central Highlands. Your time filling it out is appreciated'. All 890 farm businesses were posted in late September 2006 a copy of the full questionnaire via the unaddressed delivery service.

### 2.2.3.3 Mallee dryland case

The sampling frame used for this survey of farm businesses in dryland zone of the Mallee NRM Region was drawn from a database held by the Victorian Farmers Federation (VFF) of its members. The Mallee Catchment Management Authority advised which VFF local branches were located predominantly within this zone. A list of these branches is provided in Appendix B. The number of VFF members in these branches was 862. For reasons of privacy, the VFF was prepared only to make the resulting database for these 862 farmers available only to its mail-house. Hence, procedures for sampling and survey administration were carried out by the mail-house in accordance with instructions provided by the project. These instructions are provided in Appendix C.

With a population of 862 farm businesses, it was calculated that a sample size of 266 would provide an estimate of proportions for that population with a confidence level of  $\pm 5$  per cent at

the 95 per cent confidence level. After allowing for the anticipated response rate and questionnaires returned to sender, it was estimated that the desired final sample of 266 farm businesses would be achieved by posting the questionnaire to all 862 farm businesses in the sampling frame. All these farm businesses not included in the pilot survey were posted a copy of the full questionnaire during September 2006.

## 2.2.4 Response rates

### 2.2.4.1 Blackwood Basin case

Response rates for Blackwood Basin case, in respect of both the full questionnaire and the one-page follow-up questionnaire, are shown in Table 2.1. The overall response rate of 29.2 per cent for the full questionnaire in this region was almost 50 per cent higher than achieved from the pilot survey.

Table 2.1 Sample size and response rates for the Blackwood Basin case

a. Full questionnaires mailed out (including for pilot survey)	1,340
b. Full questionnaires returned to sender	94
c. Full questionnaires returned 'not applicable'	108
d. Full questionnaires completed	333
e. Full questionnaire response rate ( = $d / (a - b - c)$ )	29.3%
f. Follow-ups completed	84
g. Follow-ups returned to sender	1
h. Follow-ups returned 'not applicable'	25
i. % of non-responders completing follow-up [ = $f / (a - b - c - d - g - h)$ ]	10.8%

### 2.2.4.2 Central Highlands case

Response rates for the Central Highlands case, in respect of both the full questionnaire and the one-page follow-up questionnaire, are shown in Table 2.2. The response rate in this case of 19.6 per cent for the full questionnaire was less than the 22.5 per cent achieved from the pilot survey alone. Nevertheless, this outcome was better than expected since the pilot survey had been addressed personally to farmers whereas the main survey was delivered unaddressed.

Table 2.2: Sample size and response rates for the Central Highlands case

a. Full questionnaires mailed out (including for pilot survey)	890
b. Full questionnaires returned to sender	2
c. Full questionnaires returned 'not applicable'	22
d. Full questionnaires completed	170
e. Full questionnaire response rate ( = $d / (a - b - c)$ )	19.6%
f. Follow-ups completed	96
g. Follow-ups returned to sender	0
h. Follow-ups returned 'not applicable'	18
i. % of non-responders completing follow-up [ = $f / (a - b - c - d - g - h)$ ]	14.2%

### 2.2.4.3 Mallee dryland case

Response rates for the Mallee dryland case, in respect of both the full questionnaire and the one-page follow-up questionnaire, are shown in Table 2.3. The response rate in this case of 40.2 per cent for the full questionnaire was more than twice that achieved from the pilot survey alone.

Table 2.3 Sample size and response rates for the Mallee dryland case

a. Full questionnaires mailed out (including for pilot survey)	862
b. Full questionnaires returned to sender	3
c. Full questionnaires returned 'not applicable'	67
d. Full questionnaires completed	318
e. Full questionnaire response rate ( = $d / (a - b - c)$ )	40.2%
f. Follow-ups completed	74
g. Follow-ups returned to sender	0
h. Follow-ups returned 'not applicable'	13
i. % of non-responders completing follow-up [ = $f / (a - b - c - d - g - h)$ ]	16.1%

## 2.2.5 Testing for non-response bias

Non-response bias results from those who respond to a survey being systematically different in some way from those in the sampling frame who do not respond. As described in section 2.4.2, a one-page follow-up questionnaire was used as a way of identifying non-response bias and, where identified, correcting for it when analysing data from the full questionnaire. Since the follow-up questionnaire did not elicit a response from all non-responders, it was not possible to correct completely for non-response bias. If we assume that non-responders to the full questionnaire who respond to the one-page follow-up share some characteristics with the 'hard core' non-responders, however, then comparing responses to questions that are common to both

questionnaires provides information regarding the extent and nature of any non-response bias that exists.

Given that substantial proportions of full-questionnaire non-responders did respond to the one-page follow-up (Tables 2.1 to 2.3), it can be concluded that non-response bias is likely to be small if no significant statistical difference is found between those who completed the full questionnaire and those who completed the one-page follow-up. Where a significant difference between the two groups is detected, this suggests there is some non-response bias in the data from the full questionnaire. Such bias can be reduced by a weighting procedure that corrects for the over- and under- representation of farm businesses with particular characteristics in the data from the full questionnaire.

The full and one-page questionnaires for each of the three regions contained in common six questionnaire items providing information on the structural characteristics of respondents' farm businesses. The first of these was concerned with the area of a respondent's property. The remaining five items asked them to indicate the percentages of their property's total net income from farming over the previous few years that had come from each of the various enterprise types that were listed for their case.

*T* tests of differences between the mean values for each of these items in the Blackwood Basin case did not identify non-response bias at the 95 per cent significance level. The finding was the same in respect of the Mallee dryland case. However, they did indicate non-response bias in respect of the Central Highlands case in respect of property size. The *t* test results indicated at the 95 per cent significance level that farmers with larger properties had responded to the full questionnaire disproportionately more than farmers with smaller properties. Accordingly, weighting procedures were applied when calculating relative frequency distributions for this case to reduce the influence of non-response bias.

## **2.3 Closing remarks**

In this chapter, an overview of the quantitative method applied in the project was presented. Results from applying this method are presented in the following four chapters. Chapters 3 to 5 present results from the Blackwood Basin, Central Highlands, and Mallee Region dryland cases, respectively. The results from the three cases are compared in Chapter 6.

### 3. Results for the Blackwood Basin Case

Results from descriptive and comparative analysis of survey data from the Blackwood Basin case are presented in this chapter. A summary of key findings from the case is presented in section 3.23.

#### 3.1 Personal characteristics of respondents

Of all respondents to the survey of farmers in the Blackwood Basin, 86 per cent were male (Table 3.1). The mean age of respondents was 55.0 years, with the range extending from 26 to 93 years. Only 8.6 per cent of respondents were younger than 40 years, while more than one-third of respondents were older than 60 years (Table 3.2).

Table 3.1: Gender of Blackwood Basin respondents

Proportion of respondents (%)		n
Female	Male	
13.8	86.2	325

Table 3.2: Age of Blackwood Basin respondents

Proportion of respondents (%)				n
< 40 years	40 - 49 years	50 - 59 years	> 60 years	
8.6	20.3	36.5	34.6	315

Respondents had lived on average for 41.7 years in the district where their property was located. Of all respondents, 95 per cent had lived in the same district as their property for at least 10 years, and 61 per cent for at least 40 years (Table 3.3).

Table 3.3: Blackwood Basin responses to: How long have you lived in the district where your property is located?

Proportion of respondents (%)						n
< 5 years	5 - 9 years	10 - 19 years	20 - 39 years	40 - 59 years	> 60 years	
1.9	3.2	8.3	25.8	46.8	14.0	314

Of all respondents, 56.1 per cent said it was likely or very likely that their property would be passed on to the next generation, compared with 22.5 per cent who said this was unlikely or very

unlikely (Table 3.4). Just over one in ten respondents were unsure about whether their property would be passed on to the next generation.

Table 3.4: Blackwood Basin responses to: How likely will your property be passed on to the next generation?

Proportion of respondents (%)					Mean score*	n
Very likely	Likely	Unsure	Unlikely	Very unlikely		
36.3	29.8	11.4	10.2	12.3	2.33	325

\* Very likely = 1; likely = 2; unsure = 3; unlikely = 4; and very unlikely = 5.

A mean score for each goal is presented in Table 3.4 also, based on scoring ‘very likely’ ratings as one, ‘likely’ ratings as two, ‘unsure’ as three, ‘unlikely’ as four, and ‘very unlikely’ as five. The lower the mean score, therefore, the more the ‘average respondent’ considered it likely that their property would be passed on to the next generation. The mean score of 2.33 indicates that the average respondent rated the likelihood of their property passing to the next generation on the ‘unsure’ side of ‘likely’. To the extent that farmers are motivated to conserve or improving natural resource or environmental condition on their properties for the sake of their descendents, it appears that this motive is fairly weak for the average respondent.

### 3.2 Education and farming experience of respondents

Respondents on average claimed 33.4 years of adult experience in owning, managing or working on an agricultural or grazing property. Only 3.7 per cent claimed less than 10 years of such experience (Table 3.5).

Table 3.5: Blackwood Basin responses to: As an adult (since turning 18), how many years practical experience do you have in owning, managing or working on an agricultural or grazing property?

Proportion of respondents (%)						n
< 5 yrs	5 - 9 yrs	10 - 19 yrs	20 - 29 yrs	30 - 39 yrs	> 40 yrs	
0.6	3.1	10.7	18.9	31.1	35.5	318

‘All of secondary school’ was nominated by 27.6 per cent of respondents as their highest level of formal education. The equivalent proportions for trade/technical certificate and diploma/associate diploma were 12.3 per cent and 12.6 per cent, respectively. Twelve per cent nominated a university degree as the highest level of formal education they had completed (Table 3.6).

Table 3.6: Highest level of formal education completed by Blackwood Basin respondents

Proportion of respondents (%)							n
Degree	Diploma / Associate Diploma	Trade / Technical certificate	All secondary school	Part secondary school	Primary school	Other	
12.0	12.6	12.3	27.6	28.8	3.1	3.7	326

### 3.3 Property characteristics

The mean area of land in the Blackwood Basin owned or managed by respondents and their immediate families was 1,116.5 ha. The median area was 840 ha, and the range extended from 18 to 6,416 ha. For 56.2 per cent of all respondents, the area owned or managed by themselves or their immediate families was less than 1,000 ha. For only 1.0 per cent did the area exceed 5,000 ha (Table 3.7). When asked about the kind of tenure under which their property was mainly held, 96.7 per cent of respondents nominated freehold tenure (Table 3.8).

Table 3.7: Blackwood Basin responses to: What is the total area of land owned or managed by you or your immediate family in the Blackwood Basin?

Proportion of respondents (%)					n
< 100 ha	100 - 999 ha	1,000 - 1,999 ha	2,000 - 4,999 ha	> 5,000 ha	
9.0	47.2	25.9	16.9	1.0	413

Table 3.8: Blackwood Basin responses to: Under what tenure is your property mainly held?

Proportion of respondents (%)				n
Freehold	Crown leasehold	Leased, agisted or sharefarmed from another farmer	Other tenure	
96.7	0.6	1.8	0.9	330

### 3.4 Financial characteristics

Respondents were asked: “Approximately, what is your current level of equity in your property?”. The frequency distribution of responses is presented in Table 3.9.

Table 3.9: Frequency distribution of Blackwood Basin respondents' current equity ratios

Proportion of respondents (%)				n
>90% equity	70-89% equity	50-69% equity	<50% equity	
55.6	31.6	11.6	1.3	320

The median respondent reported a current equity ratio of at least 90 per cent. Over half the respondents were in this category. A further 32 per cent reported a current equity ratio in the range 70-89 per cent, leaving 12.9 per cent respondents with a reported equity ratio of less than 70 per cent.

A further question asked of respondents was: "How profitable has your property been over the last few years?". The frequency distribution of responses is presented in Table 3.10.

Table 3.10: Frequency distribution of Blackwood Basin respondents' recent profitability

Proportion of respondents (%)					n
Very profitable	Profitable	Breaking even	Unprofitable	Very unprofitable	
5.6	44.3	38.7	8.7	2.8	323

The reported recent profitability of the median respondent over recent years was 'breaking even'. Almost two-fifths of respondents reported this level of profitability. While 49.9 per cent reported a better result than this ('very profitable' or 'profitable'), 11.5 per cent reported a result worse than breaking even ('unprofitable' or 'very unprofitable').

Respondents were also asked: "In the last few years, about what proportion of your household's total net income came from farming activities on your property?". The frequency distribution of responses is presented in Table 3.11.

Table 3.11: Frequency distribution of Blackwood Basin respondents' proportion of household net income over recent years obtained from farming their properties

Proportion of respondents (%)					n
> 90% of net income	70 - 89% of net income	50 - 69% of net income	20 - 49% of net income	< 20% of net income	
52.8	14.2	13.0	8.6	11.4	324

The median respondent reported at least 90 per cent of their household net income over recent years coming from farming activities on their property. Over half of the respondents were in this category, and two-thirds reported deriving at least 70 per cent of their household net income from farming their property. One-fifth of respondents reported that less than half their household net income came from farming their properties.

Respondents were asked to estimate the percentages of their properties' net income (revenue minus expenses) from farming over the previous few years that came from different enterprise types. The mean percentages coming from grazing and broadacre cropping enterprises were 61.0 per cent and 25.8 per cent, respectively. Dairy, horticulture / viticulture and 'other' enterprises accounted for the remaining 13.2 per cent (Table 3.12). The median percentages of property net income derived from grazing and broadacre cropping enterprises were 65 per cent and 20 per cent, respectively. The median percentages for each of the other enterprise categories were equal to zero.

Table 3.12: Percentage of net farm income derived from various enterprise types: mean and median values for the Blackwood Basin

Enterprise type	Mean % contribution to net farm income	Median % contribution to net farm income	n
Broadacre cropping	25.8	20.0	409
Grazing	61.0	65.0	409
Dairy	2.7	0.0	409
Horticulture / viticulture	3.0	0.0	409
Other farming enterprises	7.5	0.0	409

Only 8.6 per cent of respondents answered that zero net income had been derived from grazing enterprises, whereas 39.6 per cent indicated they had obtained no net income from broadacre cropping enterprises (Table 3.13). Whereas 41.6 of respondents answered that they had derived more than 75 per cent of their net farm income from grazing enterprises, only 5.1 per cent answered equivalently in respect of broadacre cropping enterprises.

Table 3.13: Percentage of net farm income derived from various enterprise types: frequency distributions for the Blackwood Basin

	Proportion of respondents (%)						n
	0% of net income	1 - 9% of net income	10 - 24% of net income	25 - 49% of net income	50 - 74% of net income	> 75% of net income	
Broadacre cropping	39.6	2.0	13.2	17.8	22.2	5.1	409
Grazing	8.6	2.4	3.4	19.6	24.4	41.6	409
Dairy	96.6	0.0	0.0	0.2	0.7	2.4	409
Horticulture / viticulture	93.6	1.0	1.2	0.2	2.4	1.5	409
Other farming enterprises	85.1	2.0	4.2	1.2	2.4	5.1	409

### 3.5 Goals in farming

Respondents were asked to rate how much priority they give to eight different 'goals they are aiming for in farming'. Frequency distributions of the ratings for the different goals are shown in

Table 3.14. A mean score for each goal is included also, based on scoring ‘very high priority’ ratings as one, ‘high priority’ ratings as two, and so on until ‘very low priority’ were scored as five. The lower the mean score for a goal, therefore, the more the ‘average respondent’ considered it a high priority.

Table 3.14: Frequency distributions for Blackwood Basin responses to: People have many different goals they are aiming for in farming, depending on their own situation. Please indicate the priority you give to each goal listed below.

Goal: To main or enhance ...	Proportion of respondents (%)					Mean score*	n
	Very high priority	High priority	Moderate priority	Low priority	Very low priority		
Profitability of our farm business	49.0	37.3	11.7	1.5	0.5	1.67	410
Our family's income	44.5	39.0	12.6	3.1	0.9	1.77	326
Productivity of our land and other resources	46.8	42.5	8.6	1.8	0.3	1.66	325
Condition of our natural resources and environment	31.9	45.6	19.9	1.7	1.0	1.94	408
Attractiveness of our property	23.0	41.7	29.4	4.3	1.5	2.20	326
Our way of life	38.0	40.7	16.7	3.1	1.5	1.90	324
Our technical skills and innovation	21.3	49.4	25.3	3.1	0.9	2.13	324
Our standing in the community	11.7	28.1	34.9	19.8	5.6	2.79	324

\* Very high priority = 1, high = 2, moderate = 3, low = 4, and very low priority = 5.

On this basis, the average respondent considered ‘profitability of our farm business’ hereafter ‘profitability’) and ‘productivity of our land and resources’ (‘productivity’) to be the two goals of highest priority, followed by ‘our family’s income’ (‘family income’). The mean scores for each of these three goals indicate the average respondent rated them between ‘high’ and ‘very high’ priority. More than 80 per cent of respondents attributed at least ‘high priority’ to each of these three goals (Table 3.15).

After the ‘productivity’, ‘profitability’ and ‘family income’ goals, the goal of next highest priority for the average respondent was ‘our way of life’, followed by ‘condition of our natural resources and environment’ (hereafter ‘resource condition’). With mean scores near 1.9 for these latter two goals, the average respondent rated them marginally on the ‘very high priority’ side of ‘high priority’.

‘Our technical skills and innovation’ (hereafter ‘skills and innovation’) was the goal of next highest priority for the average respondent, followed by, ‘attractiveness of our property’ (‘property attractiveness’) and, finally, ‘our standing in the community’.

The mean scores for ‘skills and innovation’ and ‘property attractiveness’ were 2.1 and 2.2, respectively, indicating that the average respondent rated them on the ‘moderate priority’ side of ‘high priority’. The mean score of 2.8 for ‘our standing in the community’ suggests that the average respondent rated this goal as close to ‘moderate priority’.

Table 3.15 Cumulative frequency distributions for Blackwood Basin responses to: People have many different goals they are aiming for in farming, depending on their own situation. Please indicate the priority you give to each goal listed below.

Goal: To main or enhance ...	Cumulative proportion of respondents (%)				
	Very high priority	High priority	Moderate priority	Low priority	Very low priority
Profitability of our farm business	49.0	86.3	98.0	99.5	100.0
Our family's income	44.5	83.4	96.0	99.1	100.0
Productivity of our land and other resources	46.8	89.2	97.8	99.7	100.0
Condition of our natural resources and environment	31.9	77.5	97.3	99.0	100.0
Attractiveness of our property	23.0	64.7	94.2	98.5	100.0
Our way of life	38.0	78.7	95.4	98.5	100.0
Our technical skills and innovation	21.3	70.7	96.0	99.1	100.0
Our standing in the community	11.7	39.8	74.7	94.4	100.0

The Wilcoxon Signed Ranks tests (two-tailed) (hereafter ‘WSR2 test’) were applied to evaluate the statistical significance of differences between response distributions for the different issues (Table D.1), and we can conclude as a result with at least 95 per cent confidence that farmers in the Blackwood Basin tended to rate:

- ‘productivity’ a higher priority than each other goal except ‘profitability’;
- ‘profitability’ a higher priority than each other goal except ‘productivity’;
- ‘family income’ a higher priority than each remaining goal except ‘our way of life’;
- ‘way of life’ a higher priority than each remaining goal except ‘resource condition’;
- ‘resource condition’ a higher priority than each remaining goal;
- ‘skills and innovation’ as a higher priority than each remaining goal except ‘attractiveness of our property’ (hereafter ‘property attractiveness’);
- ‘property attractiveness’ a higher priority than ‘standing in the community’; and
- ‘standing in the community’ a lower priority than each of the other goals.

The finding that Blackwood Basin farmers tend to prioritise the profitability and productivity goals more highly than the family income goal suggests they are prepared in some degree to sacrifice family income in the pursuit of farm profitability and productivity (e.g., by foregoing opportunities to divert family labour to off-farm employment that would contribute more to family income). This greater emphasis on profitability and productivity compared with family

income is perhaps associated – to the extent that the way of life valued by Blackwood Basin farmers tends to be focused on-farm – with the finding that ‘way of life’ is the next highest priority. Almost 80 per cent of respondents attributed at least ‘high priority’ to the way of life goal (Table 3.15).

Despite the statistical evidence that Blackwood Basin farmers tended to consider the resource condition goal as less important than the productivity, profitability and family income goals, they did not regard the resource condition goal as unimportant. Of all respondents, 31.9 per cent considered the resource condition goal a ‘very high’ priority, and a further 45.6 per cent considered it a ‘high’ priority (Table 3.14). Only 2.7 per cent rated this goal as a ‘low’ or ‘very low’ priority. This goal’s mean score of 1.9 reveals the average respondent regarded it as more than a ‘high’ priority, albeit further from a ‘very high priority’ than the productivity, profitability and family income goals.

Moreover, the statistical evidence indicates that Blackwood Basin farmers tended to consider the resource condition goal as more important to them than goals relating to skills and innovation, property attractiveness and standing in the community. It is noteworthy that almost twice the proportion of respondents attributed ‘high’ or ‘very high’ priority to the resource condition goal (77.7 per cent) compared with the ‘standing in the community’ goal (39.9 per cent of respondents) (Table 3.15).

### **3.6 Farm business threats**

Respondents were asked to indicate the degree to which eleven different issues posed threats to the future of their farm businesses. Frequency distributions of the ratings for the different threats are shown in Table 3.16. A mean score for each issue is included also, based on scoring ‘very large threat’ ratings as one, ‘large threat’ ratings as two, and so on until ‘no threat’ was scored as five. The lower the mean score for an issue, therefore, the more the average respondent viewed it as a threat to their farm business.

These mean scores indicate that the average respondent rated ‘commodity prices’ as the greatest threat to their farm business, followed by ‘government regulation’, ‘drought’, ‘soil acidity / acid sulphate soils’, ‘water quality decline’, ‘dryland salinity’, ‘waterlogging’, ‘soil structure decline’ (same score as waterlogging), ‘soil erosion’, ‘loss of native vegetation’ (hereafter ‘native vegetation loss’) and, finally, ‘loss and fragmentation of habitat’ (‘habitat loss/fragmentation’). The mean score of 1.84 for ‘commodity prices’ compares with a mean score of 3.33 for ‘soil acidity / acid sulphate soils’ – the resource condition issue posing the greatest threat to the average respondent – and with a mean score of 3.92 for ‘habitat loss/fragmentation’ – the resource condition issue posing the least threat to the average respondent.

Somewhat simplistically (since the scores are measured on ordinal rather than interval scales), these figures might be taken to imply that the average Blackwood Basin respondent rated ‘commodity prices’ as 1.8 times ( $3.33/1.84$ ) more a threat to their farm business than ‘soil acidity / acid sulphate soils’, and 2.1 times ( $3.92/1.84$ ) times more a threat than ‘habitat loss/fragmentation’. On the same basis, we might assess the average respondent as rating ‘soil

Table 3.16 Frequency distributions for Blackwood Basin responses to: How much does each issue below pose a threat to the future of your farm business?

Issue	Proportion of respondents (%)					Mean score*	n
	Very large threat	Large threat	Moderate threat	Minor threat	No threat		
Government regulation	19.3	24.3	33.3	17.4	5.6	2.66	321
Commodity prices	43.8	34.0	17.6	3.7	0.9	1.84	324
Drought	20.5	19.6	29.8	24.8	5.3	2.75	322
Dryland salinity	7.0	13.1	25.2	32.5	22.2	3.50	329
Soil erosion	2.8	4.0	25.2	50.6	17.5	3.76	326
Waterlogging	2.1	11.7	23.3	45.7	17.2	3.64	326
Soil structure decline	2.8	10.2	22.9	48.0	16.1	3.64	323
Loss of native vegetation	2.1	6.1	16.8	48.3	26.6	3.91	327
Water quality decline	6.9	11.2	24.3	41.4	16.2	3.49	321
Loss & fragmentation of habitat	2.5	4.4	19.5	46.2	27.4	3.92	318
Soil acidity / acid sulphate soils	4.0	19.1	30.2	33.3	13.3	3.33	324

\* Very large threat = 1, large threat = 2, moderate threat = 3, minor threat = 4, and no threat = 5.

acidity / acid sulphate soils’ as 1.2 times (3.92/3.33) more a threat than ‘habitat loss/fragmentation’.

The proportion of respondents rating ‘commodity prices’ a very large threat (43.8 per cent) was more than twice the proportions for the ‘government regulation’ and ‘drought’ issues, and more than six times greater than for ‘dryland salinity’ which was the resource condition issue rated most frequently as a very large threat. Of all respondents, 95.4 per cent of respondents rated commodity prices as at least a moderate threat (i.e., as a very large, large or moderate threat), compared with 76.9 per cent and 69.9 per cent for government regulation and drought, respectively (Table 3.17). The resource condition issue rated most frequently (by 53.4 per cent of respondents) as at least a moderate threat was ‘soil acidity / acid sulphate soils’. The resource condition issue rated with the lowest frequency (25.1 per cent of respondents) as at least a moderate threat was ‘native vegetation loss’.

‘Habitat loss/fragmentation’, ‘native vegetation loss’ and ‘dryland salinity’ were the issues most frequently rated by respondents as ‘no threat’ (27.4 per cent, 26.6 per cent and 22.2 per cent, respectively; Table 3.16). The resource condition issue rated least frequently (by 13.3 per cent of respondents) as ‘no threat’ was ‘soil acidity / acid soils’. Only 0.9 per cent regarded ‘commodity prices’ as ‘no threat’.

Hence, there appears to have been a strong tendency among respondents to rate the resource condition issues specified as substantially lesser threats to their farm businesses than the more

Table 3.17 Cumulative frequency distributions for Blackwood Basin responses to: How much does each issue below pose a threat to the future of your farm business?

Issue	Cumulative proportion of respondents (%)				
	Very large threat	Large threat	Moderate threat	Minor threat	No threat
Government regulation	19.3	43.6	76.9	94.4	100.0
Commodity prices	43.8	77.8	95.4	99.1	100.0
Drought	20.5	40.1	69.9	94.7	100.0
Dryland salinity	7.0	20.1	45.3	77.8	100.0
Soil erosion	2.8	6.7	31.9	82.5	100.0
Waterlogging	2.1	13.8	37.1	82.8	100.0
Soil structure decline	2.8	13.0	35.9	83.9	100.0
Loss of native vegetation	2.1	8.3	25.1	73.4	100.0
Water quality decline	6.9	18.1	42.4	83.8	100.0
Loss & fragmentation of habitat	2.5	6.9	26.4	72.6	100.0
Soil acidity / acid sulphate soils	4.0	23.1	53.4	86.7	100.0

generic issues of commodity prices, government regulation and drought. Even so, the discussion suggests some marked differences between the resource condition issues in how Blackwood Basin farmers rated them as threats to their farm businesses.

We can conclude from WSR2 tests (Table D.2) with at least 95 per cent confidence for each pairwise comparison that Blackwood Basin farmers tended to rate:

- ‘commodity prices’ a greater threat than each of the other issues;
- ‘government regulation’ a greater threat than each of the remaining issues except ‘drought’;
- ‘drought’ a greater threat than each of the remaining issues;
- ‘soil acidity / acid sulphate soils’ a greater threat than each of the remaining issues;
- ‘water quality decline’ a greater threat than each of the remaining issues except ‘dryland salinity’;
- ‘dryland salinity’ a greater threat than each of the remaining issues except ‘soil structure decline’;
- ‘soil structure decline’ a greater threat than each of the remaining issues except ‘waterlogging’;

- ‘waterlogging’ a greater threat than each of the remaining issues except ‘soil erosion’;
- ‘soil erosion’ a greater threat than each of the remaining issues;
- ‘loss of native vegetation’ a lesser threat than each of the other issues except ‘loss and fragmentation of habitat’; and
- ‘loss and fragmentation of habitat’ a lesser threat than each of the other issues except ‘loss of native vegetation’.

We are unable to conclude on this basis with 95 per cent confidence that Blackwood Basin farmers tended to rate ‘loss and fragmentation of habitat’ a greater or lesser threat than ‘loss of native vegetation’, or vice versa.

### 3.7 Attachment to place

Various studies have identified individuals’ ‘attachment’ to a place as a key influence on their decisions to adopt behaviours beneficial for that place. In order to account for this influence, respondents were asked to indicate how strongly they agreed or disagreed with four statements concerned with their feelings of attachment to different scales of place (i.e., their property, their district, their subregion, and their whole region). These statements were adapted from items demonstrated by Williams et al. (2003) to provide a measure of place attachment that is generalisable across multiple places. Frequency distributions of responses to each statement are presented in Table 3.18.

Table 3.18: Frequency distributions of Blackwood Basin responses to attitudinal statements concerning attachment to place

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
I feel a bond with our property	60.9	37.5	1.2	0.3	1.41	325
I feel a bond with our district	39.1	55.0	5.3	0.6	1.67	322
I feel a bond with the Blackwood Basin	7.5	47.4	36.9	8.2	2.46	306
I feel a bond with the South West Catchments Region	4.9	30.2	48.9	16.1	2.76	305

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

A mean score for each goal is presented in the table also, based on scoring ‘strongly agree’ ratings as one, ‘agree’ ratings as two, ‘disagree’ as three, and ‘strongly disagree’ as four. Hence, ‘ambivalent’ would be scored as 2.5. The lower the mean score for a statement, therefore, the more strongly the ‘average respondent’ agreed with it. On this basis, the place the average respondent agrees most strongly they feel a bond with is their own property, followed by their district, dryland areas of their NRM region, and, finally, by their whole NRM region.

The mean scores for ‘our property’ and ‘our district’ indicate that the average respondent’s level of agreement that they feel a bond with each lies mid-way between ‘agree and ‘strongly agree’. The mean score in respect of the Blackwood Basin’ indicates that the average respondent feels ambivalent regarding whether they feel a bond with this scale of ‘their place’. Finally, the mean score in respect of the South West Catchment Region indicates that the average respondent’s level of agreement that they feel a bond with this Region lies mid-way between ‘disagree’ and ambivalent.

On the basis of the Wilcoxon Signed Ranks Test (two-tailed) (hereafter ‘WSR2 test’) (Table D.3), we can conclude with at least 99 per cent confidence for each pairwise comparison that the wider population of farmers in the Blackwood Basin tend to agree more strongly that they feel a bond with their:

- own property than with their district;
- district than with their subregion (Blackwood Basin); and
- subregion (Blackwood Basin) than with their whole NRM region (South West Catchments Region).

We can conclude, therefore, that a tendency exists among farmers in the Blackwood Basin for their feelings of attachment to ‘their place’ to weaken as the boundaries of ‘their place’ are drawn further from their own property boundaries.

### **3.8 Farmers’ perceptions of how different NRM practices contribute to their goals**

#### **3.8.1 All respondents**

Respondents were asked to rate how eight different on-farm natural resource management (NRM) practices would help or hurt pursuit of their main farming goals. These NRM practices are listed in Table 3.19. These practices were included on advice from the Blackwood Basin Group that they were reasonably relevant to farmers across its subregion and also included the main kinds of on-farm NRM practices at which its programs were targeted.

Of these practices, ‘groundwater management’ was rated most often (38.7 per cent of respondents) as ‘not applicable’, followed by ‘zero or minimum tillage cropping’ (29.1 per cent), ‘establish perennial vegetation’ (17.9 per cent), and ‘surface water management’ (15.8 per cent) (Table 3.19). ‘Pest and weed control’ was rated *least* often (by 4.6 per cent of respondents) as ‘not applicable’, followed by ‘establish perennial pasture’ (12.2 per cent), ‘soil remediation’ (12.5 per cent) and ‘revegetation and protective fencing’ (13.9 per cent).

Table 3.19: Frequency distributions for Blackwood Basin responses to: How strongly would use of each practice below help or hurt your property’s chances of achieving its main goals?

Practice	Proportion of respondents (%)							n
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly	Not applicable	
Surface water management	39.8	26.7	12.7	1.2	1.2	2.5	15.8	322
Groundwater management	19.8	16.4	18.6	1.9	1.6	3.1	38.7	318
Establish perennial vegetation	22.9	27.9	23.8	2.8	0.9	3.8	17.9	319
Establish perennial pastures	34.8	28.8	21.3	0.6	0.6	1.6	12.2	319
Revegetation and protective fencing	20.9	26.6	28.8	2.8	2.2	4.7	13.9	316
Soil remediation	45.2	23.7	15.3	0.9	0.9	1.6	12.5	321
Zero or minimum tillage cropping	37.5	15.9	12.2	1.9	1.6	1.9	29.1	320
Pest and weed control	49.5	25.4	18.0	0.6	0.3	1.5	4.6	323

‘Pest and weed control’ was the practice that respondents rated most frequently as ‘help greatly’ (49.5 per cent of respondents), followed by ‘soil remediation’ (45.2 per cent), ‘surface water management’ (39.8 per cent), ‘zero or minimum tillage cropping’ (37.5 per cent), and ‘establish perennial pastures’ (34.8 per cent). ‘Groundwater management’ was the practice that respondents rated *least* frequently as ‘help greatly’ (19.8 per cent of respondents), followed by ‘revegetation and protective fencing’ (20.9 per cent) and ‘establish perennial vegetation’ (22.9 per cent) (Table 3.19).

‘Pest and weed control’ was rated also most often (by 92.9 per cent of respondents) as at least ‘help slightly’ (i.e., as ‘help greatly’, ‘help moderately’ or ‘help slightly’), followed by ‘establish perennial pastures’ (85.0 per cent) and ‘soil remediation’ (84.1 per cent) (Table 3.20). The practice rated *least* often (54.7 per cent of respondents) as at least ‘help slightly’ was ‘groundwater management’, followed by ‘zero or minimum tillage cropping’ (65.6 per cent).

Table 3.20: Cumulative frequency distributions for Blackwood Basin responses to: How strongly would use of each practice below help or hurt your property’s chances of achieving its main goals?

	Cumulative proportion of respondents (%)						
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly	Not applic.
Surface water management	39.8	66.5	79.2	80.4	81.7	84.2	100.0
Groundwater management	19.8	36.2	54.7	56.6	58.2	61.3	100.0
Establish perennial vegetation	22.9	50.8	74.6	77.4	78.4	82.1	100.0
Establish perennial pastures	34.8	63.6	85.0	85.6	86.2	87.8	100.0
Revegetation and protective fencing	20.9	47.5	76.3	79.1	81.3	86.1	100.0
Soil remediation	45.2	68.8	84.1	85.0	86.0	87.5	100.0
Zero or minimum tillage cropping	37.5	53.4	65.6	67.5	69.1	70.9	100.0
Pest and weed control	49.5	74.9	92.9	93.5	93.8	95.4	100.0

### 3.8.2 Respondents for whom practices were applicable

Statistical testing for differences between the frequency distributions for the different practices is complicated by the difficulty of assigning a help/hurt score to the ‘not applicable’ (‘na’) responses. This complication was addressed by (i) first testing statistically for differences between practices in terms of proportions of respondents rating them as ‘not applicable’, and then (ii) excluding such respondents from the samples and proceeding to test for differences between frequency distributions in respect of the resulting samples of ‘applicable respondents’.

Step (i) involved WSR2 tests (Table D.4), from which we can conclude with at least 95 per cent confidence for each pairwise comparison that:

- ‘groundwater management’ was rated ‘na’ by a higher proportion of Blackwood Basin farmers than each of the other practices;
- ‘zero and minimum tillage cropping’ was rated ‘na’ by a higher proportion than each of the remaining practices;
- ‘establish perennial vegetation’ was rated ‘na’ by a higher proportion than each of the remaining practices except ‘surface water management’; and
- ‘pest and weed control’ was rated ‘na’ by a lower proportion than each of the other seven practices.

We are unable to conclude on this basis with 95 per cent confidence for each pairwise comparison that different proportions of Blackwood Basin farmers rated ‘na’ for ‘surface water

management’, ‘establish perennial pastures’, ‘revegetation and protective fencing’ and ‘soil remediation’.

The outcomes of step (ii) are shown in Table 3.21, which presents frequency distributions of help/hurt ratings from applicable respondents. The distributions for practices with the largest share of ‘na’ responses – ‘groundwater management’ and ‘zero or minimum tillage cropping’ – logically are affected most by recalculating the distributions without such responses. Whereas ‘zero or minimum tillage cropping’ was ranked fourth for ‘help greatly’ ratings when ‘na’ responses were included (Table 3.19), it became ranked first when these responses were excluded (Table 3.21). While this practice was ranked seventh for ratings of at least ‘help slightly’ (i.e., ‘help greatly’, ‘help moderately’ or help slightly’) when ‘na’ responses were included (Table 3.20), it became ranked fifth when these responses were excluded (Table 3.22).

Similarly, ‘groundwater management’ was ranked eighth (i.e., last) for ‘help greatly’ ratings when ‘na’ responses were included, and became ranked sixth once these responses were excluded. While this practice was ranked eighth for ratings of at least ‘help slightly’ when ‘na’ responses were included, it became ranked seventh when these responses were excluded.

Mean help/hurt scores were assigned in Table 3.21 to each practice, after scoring ‘help greatly’ ratings as one, ‘help moderately’ ratings as two, and so on until ‘hurt greatly’ ratings were scored as six. The lower the mean score for a practice, therefore, the more the ‘average applicable respondent’ considered the practice to be helpful. On this basis, the ‘average applicable respondent’ rated ‘pest and weed control’ as the most helpful practice, followed closely by ‘soil remediation’. On the same basis, ‘revegetation and protective fencing’ is rated as the least helpful practice, and as mid-way between ‘help slightly’ and ‘help moderately’.

Table 3.21: Frequency distributions for responses from applicable Blackwood Basin respondents to:  
How strongly would use of each practice below help or hurt your property’s chances of achieving its main goals?

	Proportion of respondents identifying practice as applicable (%)						Mean score*	n
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly		
Surface water management	47.4	31.6	15.1	1.5	1.5	2.9	1.87	272
Groundwater management	32.3	26.7	30.3	3.1	2.6	5.1	2.32	195
Establish perennial vegetation	27.9	34.0	29.0	3.4	1.1	4.6	2.30	262
Establish perennial pastures	39.6	32.9	24.3	0.7	0.7	1.8	1.95	280
Revegetation and protective fencing	24.3	30.9	33.5	3.3	2.6	5.5	2.46	272
Soil remediation	51.6	27.0	17.4	1.1	1.1	1.8	1.78	280
Zero or minimum tillage cropping	52.9	22.5	17.2	2.6	2.2	2.6	1.87	227
Pest and weed control	51.9	26.6	18.8	0.6	0.3	1.6	1.76	308

\* Help greatly = 1; Help moderately = 2; Help slightly = 3; Hurt slightly = 4; Hurt moderately = 5; and Hurt greatly = 6.

Table 3.22: Cumulative frequency distributions for responses from applicable Blackwood Basin respondents to: How strongly would use of each practice below help or hurt your property’s chances of achieving its main goals?

	Cumulative proportion of respondents identifying practice as applicable (%)					
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly
Surface water management	47.4	79.0	94.1	95.6	97.1	100.0
Groundwater management	32.3	59.0	89.2	92.3	94.9	100.0
Establish perennial vegetation	27.9	61.8	90.8	94.3	95.4	100.0
Establish perennial pastures	39.6	72.5	96.8	97.5	98.2	100.0
Revegetation and protective fencing	24.3	55.1	88.6	91.9	94.5	100.0
Soil remediation	51.6	78.6	96.1	97.2	98.2	100.0
Zero or minimum tillage cropping	52.9	75.3	92.5	95.2	97.4	100.0
Pest and weed control	51.9	78.6	97.4	98.1	98.4	100.0

On the basis of the WSR2 test (Table D.5), we can conclude with at least 95 per cent confidence for each pairwise comparison that ‘applicable Blackwood Basin farmers’<sup>1</sup> tended to rate:

- ‘pest and weed control’ as more helpful than each other practice except ‘surface water management’, ‘soil remediation’ and ‘zero or minimum tillage cropping’;
- ‘soil remediation’ as more helpful than each other practice except ‘pest and weed control’, ‘surface water management’ and ‘zero or minimum tillage cropping’;
- ‘surface water management’ as more helpful than each other practice except ‘pest and weed control’, ‘soil remediation’, ‘zero or minimum tillage cropping’ and ‘establish perennial pastures’;
- ‘zero or minimum tillage cropping’ as more helpful than each other practice except ‘pest and weed control’, ‘soil remediation’, ‘surface water management’ and ‘establish perennial pastures’;
- ‘establish perennial pasture’ as more helpful than each of the remaining practices;
- ‘establish perennial vegetation’ as more helpful than each remaining practice except groundwater management;
- ‘groundwater management’ as more helpful than each remaining practice except ‘establish perennial vegetation’ and ‘revegetation and protective fencing’; and

<sup>1</sup> That is, Blackwood Basin farmers who identified both practices in a comparison as applicable to their properties.

- ‘revegetation and protective fencing’ as less helpful than each other practice.

### 3.9 Current and expected future use of targeted on-farm conservation practices

Applicable respondents were asked to indicate the approximate areas of their properties on which each of the on-farm practices detailed in the previous section were (i) currently being used, and (ii) expected to be used after ten years. Frequency distributions for current areas of use of each practice by applicable respondents are presented in Table 3.23. The proportions of applicable respondents reporting zero current use were substantial for each of the practices, ranging from a minimum of 17.3 per cent for ‘surface water management’ to a maximum of 54.0 per cent for ‘soil remediation’.

The mean and median responses for each practice for both parts of the question are shown in Table 3.24. For each practice, the mean area of use expected by applicable respondents after ten years exceeds their current mean area, and the median expected area exceeds the current median area. For each practice, both currently and after 10 years, the mean area substantially exceeds the median area. For each of ‘groundwater management’, ‘establish perennial pastures’ and ‘soil remediation’, current use by the median applicable respondent was zero hectares. For ‘establish perennial vegetation’, median current use was only five hectares.

WSR2 tests were applied to assess the statistical confidence with which we can conclude that differences in current and expected areas for each practice exist in the wider population of applicable Blackwood Basin farmers<sup>2</sup>. With over 95 per cent confidence for each practice, we can conclude as a result that Blackwood Basin farmers did tend at the time of survey to expect their area of use of each practice to be higher after 10 years than it was currently.

Whereas Tables 3.23 and 3.24 were concerned with current adoption *areas* for each practice, in Table 3.25 the focus shifts to current adoption *rates*. The current adoption rate of a practice by each applicable respondent was calculated by dividing their current area of use by the area of their property, and expressing this rate as a percentage<sup>3</sup>.

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<sup>2</sup> The non-parametric WSR2 test was used instead of the t-test since the distributions for most practices contravened the assumption of normality upon which the accuracy of parametric tests including the t-test depends.

<sup>3</sup> The adoption rate for each practice on any property would ideally be calculated relative to the maximum area of the property on which adoption is relevant (rather than relative to the total area of the property). Respondents were not asked to estimate the areas of their properties relevant to each practice, however, since such data were considered too difficult to obtain reliably through a postal survey. To the extent that the property area relevant for a particular practice (e.g., ‘revegetation and protective fencing’) tends across respondents to be less than total property area, the adoption rate we calculated for that practice is less than the ideally-calculated rate. This should be borne in mind when comparing the reported adoption rates for different practices, especially when we might expect a tendency for one practice (e.g., ‘pest and weed control’) to be relevant for a higher proportion of total property area than another practice (e.g., ‘revegetation and protective fencing’).

Table 3.23: Frequency distributions for responses from applicable Blackwood Basin respondents to:  
Please indicate the approximate areas of your property on which each practice below is  
already in use.

Practice	Proportion of applicable respondents (%)						n
	0 ha	1-49 ha	50-199 ha	200-499 ha	500-1,999 ha	>= 2,000 ha	
Surface water management	17.3	20.0	15.8	18.5	21.9	6.5	260
Groundwater management	50.5	18.4	17.3	6.1	7.7	0.0	196
Establish perennial vegetation	48.6	25.9	18.4	6.7	0.4	0.0	255
Establish perennial pastures	53.2	20.2	15.7	6.0	4.9	0.0	267
Revegetation & protective fencing	26.7	33.5	24.8	10.9	4.1	0.0	266
Soil remediation	54.0	5.7	8.3	10.2	16.6	5.3	265
Zero or minimum tillage cropping	26.8	5.0	14.5	15.5	25.5	12.7	220
Pest and weed control	19.9	9.4	15.0	10.1	31.4	14.3	287

Table 3.24: Mean and median areas of practice use per applicable Blackwood Basin respondent,  
currently and expected after ten years

Practice	Mean area used per applicable respondent (ha)		Median area used per applicable respondent (ha)		p*
	Current	Expected after 10 years	Current	Expected after 10 years	
Surface water management	453.6	506.8	125.5	175.5	0.000
Groundwater management	107.9	182.6	0.0	10.0	0.000
Establish perennial vegetation	41.7	75.0	5.0	15.0	0.000
Establish perennial pastures	75.8	139.8	0.0	40.5	0.000
Revegetation and protective fencing	91.9	118.0	24.3	30.2	0.000
Soil remediation	341.0	411.6	0.0	8.1	0.000
Zero or minimum tillage cropping	681.0	712.5	200.0	300.0	0.000
Pest and weed control	765.7	785.9	300.0	360.0	0.020

\* Wilcoxon Signed Ranks Test, 2-tailed

Table 3.25: Frequency distributions for current adoption rates by applicable Blackwood Basin respondents, calculated from their responses to: *Please indicate the approximate areas of your property on which each practice below is already in use.*

Practice	Proportion (%) of applicable respondents with adoption rate:							n
	0%	1-9%	10-29%	30-49%	50-69%	70-89%	90% & over	
Surface water management	17.3	26.5	14.6	12.7	10.8	8.5	9.6	260
Groundwater management	50.5	30.1	11.7	1.0	3.1	0.5	3.1	196
Establish perennial vegetation	48.6	36.9	10.2	1.6	1.2	1.2	0.4	255
Establish perennial pastures	53.2	23.3	11.2	2.6	2.6	4.5	2.6	267
Revegetation and protective fencing	26.7	48.5	21.1	1.1	1.9	0.0	0.8	266
Soil remediation	54.0	7.9	4.2	3.0	7.9	10.2	12.8	265
Zero or minimum tillage cropping	26.8	5.0	20.9	14.5	8.2	8.2	16.4	220
Pest and weed control	19.9	8.7	5.6	5.9	6.6	13.2	40.1	287

‘Establish perennial vegetation’ was the practice with the highest proportion of applicable respondents (85.5 per cent) indicating a current adoption rate of less than 10 per cent, followed by ‘groundwater management’ (80.6 per cent), ‘establish perennial pastures’ (76.5 per cent), ‘revegetation and protective fencing’ (75.2 per cent), and ‘soil remediation’ (61.9 per cent). ‘Pest and weed control’ had the lowest proportion (27.6 per cent) indicating a current adoption rate of less than 10 per cent, followed by ‘zero or minimum tillage cropping’ (31.8 per cent) and ‘surface water management’ (43.8 per cent).

‘Pest and weed control’ had the highest proportion of applicable respondents (40.1 per cent) indicating a current adoption rate of at least 90 per cent, followed by ‘zero or minimum tillage cropping’ (16.4 per cent), ‘soil remediation’ (12.8 per cent) and ‘surface water management’ (9.6 per cent). ‘Establish perennial vegetation’ had the lowest proportion (0.4 per cent) indicating a current adoption rate of 90 per cent or better, followed by ‘revegetation and protective fencing’ (0.8 per cent), ‘establish perennial pastures’ (2.6 per cent) and ‘groundwater management’ (3.1 per cent).

Next we turn our attention to *future* adoption rates (i.e., expected by applicable respondents 10 years after survey). These rates were calculated similarly as for current adoption rates. Frequency distributions of future adoption rates by applicable respondents for each practice are presented in Table 3.26.

Table 3.26: Frequency distributions for expected adoption rates after 10 years by applicable Blackwood Basin respondents calculated from their responses to: *Please indicate the approximate areas of your property on which you expect each practice to be used in 10 years time.*

Practice	Proportion (%) of applicable respondents with adoption rate:							n
	0%	1-9%	10-29%	30-49%	50-69%	70-89%	90% & over	
Surface water management	15.0	23.8	16.5	7.7	11.2	9.2	16.5	260
Groundwater management	41.3	29.1	16.8	2.6	3.1	1.5	5.6	196
Establish perennial vegetation	38.4	38.8	15.3	2.4	2.4	1.6	1.2	255
Establish perennial pastures	31.0	30.2	19.0	8.2	3.7	4.5	3.4	268
Revegetation and protective fencing	22.6	46.6	25.6	1.9	2.3	0.0	1.1	266
Soil remediation	49.1	7.2	5.7	3.8	8.3	10.9	15.1	265
Zero or minimum tillage cropping	18.6	5.9	24.1	16.4	7.7	9.1	18.2	220
Pest and weed control	17.1	8.4	6.3	5.6	7.3	12.9	42.5	287

The summary statistics – mean and median values – presented in Table 3.27 assist us to compare the current and future frequency distributions of adoption rates for each practice. For each practice, the mean adoption rate expected by applicable respondents after ten years exceeds the mean current adoption rate, and the median expected adoption rate exceeds the median current adoption rate. On the basis of the WSR2 test, we can conclude with over 95 per cent confidence for each practice that Blackwood Basin farmers tended at the time of survey to expect their adoption rate to increase over the ensuing 10 years.

Observe that of all practices ‘pest and weed control’ ranks easily the highest in respect of median adoption rate by applicable respondents, both now and expected after 10 years. ‘Zero or minimum tillage cropping’ ranks a distant second by this criterion. The only other practice for which current and expected median adoption rates each exceed five per cent is ‘surface water management’.

Table 3.27: Mean and median adoption rate by applicable Blackwood Basin respondents for each practice, currently and as expected after ten years

Practice	Mean adoption rate per applicable respondent (% of property area)		Median adoption rate per applicable respondent (% of property area)		p*
	Current	Expected after 10 years	Current	Expected after 10 years	
Surface water management	31.9	37.3	17.0	19.9	0.000
Groundwater management	8.5	13.4	0.0	1.7	0.000
Establish perennial vegetation	5.5	8.5	0.4	2.0	0.000
Establish perennial pastures	11.7	17.1	0.0	5.3	0.000
Revegetation and protective fencing	7.6	9.5	3.4	5.0	0.000
Soil remediation	27.9	31.3	0.0	2.3	0.000
Zero or minimum tillage cropping	37.4	41.0	26.7	30.8	0.000
Pest and weed control	58.5	60.9	76.9	80.5	0.015

\* Wilcoxon Signed Ranks Test, 2-tailed

Finally in this section, we examine the expectations of applicable respondents in respect of whether, and by how much, their use of each practice will have changed 10 years after the survey<sup>4</sup>. Table 3.28 presents frequency distributions for these expectations. For all practices, we see that the proportion of applicable respondents expecting no change in practice use over the ensuing 10 years exceeds 50 per cent. This proportion is least for ‘establish perennial pastures’ (51.5 per cent) and greatest for ‘pest and weed control’ (83.6 per cent).

Table 3.28: Frequency distributions for differences in practice use expected by applicable Blackwood Basin respondents between the survey date and ten years afterwards

Practice	Proportion (%) of applicable respondents expecting to change their use of practice by:							n
	<= -500 ha	-500 to -100 ha	-99 to -1 ha	0 ha	1 to 99 ha	100 to 499 ha	>= 500 ha	
Surface water management	2.7	2.3	3.1	53.1	15.4	16.9	6.5	260
Groundwater management	0.0	0.5	2.6	63.3	17.3	11.7	4.6	196
Establish perennial vegetation	0.0	1.2	2.7	57.3	29.4	7.5	2.0	255
Establish perennial pastures	0.7	0.0	2.2	51.5	25.0	17.5	3.0	268
Revegetation & protective fencing	0.0	1.5	3.8	56.4	28.6	8.3	1.5	266
Soil remediation	0.4	1.1	1.1	79.6	5.7	5.7	6.4	265
Zero or minimum tillage cropping	1.4	2.7	0.9	70.0	10.0	11.4	3.6	220
Pest and weed control	1.4	1.7	1.7	83.6	4.2	4.5	2.8	287

<sup>4</sup> For each practice, expected change in use was calculated for each applicable respondent by subtracting their current area of use from their expected area of use after 10 years.

Across all practices, the proportion of applicable respondents anticipating reduced use ranges from a minimum of 2.2 per cent for ‘establish perennial pastures’ to a maximum of 8.1 per cent for ‘surface water management’. The practice for which the largest proportion of applicable respondents anticipated increased use was ‘establish perennial pastures’ (45.5 per cent), followed by ‘establish perennial vegetation’ (38.9 per cent), ‘surface water management’ (38.8 per cent), ‘revegetation and protective fencing’ (38.4 per cent), ‘groundwater management’ (33.6 per cent), ‘zero or minimum tillage cropping’ (25.0 per cent), ‘soil remediation’ (17.8 per cent) and, finally, ‘pest and weed control’ (11.5 per cent).

The relatively low proportion of applicable respondents expecting to increase their use of ‘pest and weed control’ may follow from this practice’s current adoption rates being typically much higher than for the other practices. As mentioned previously, 53.3 per cent of applicable respondents already use ‘pest and weed control’ on at least 70 per cent of the area of their properties.

### **3.10 Perceptions regarding other farmers’ current use of targeted on-farm practices**

Applicable respondents<sup>5</sup> were asked: “From what you have seen and heard, how widely is each practice below already used in your district?”. Frequency distributions of the responses for each practice are shown in Table 3.29. Mean scores were assigned in this table to each practice, after scoring ‘wide use’ ratings as one, ‘moderate use’ ratings as two, ‘limited use’ ratings as three, and ‘zero or minimal use’ ratings as four. The lower the mean score for a practice, therefore, the more the ‘average applicable respondent’ considered the practice to be used widely within their district. On this basis, the average applicable respondent perceives ‘zero or minimum tillage cropping’ as used most widely in their district – about mid-way between ‘moderate use’ and ‘wide use’.

On the same basis, the average applicable respondent perceives ‘pest and weed control’ to be the practice adopted next most widely in their district – also between ‘moderate’ and ‘wide’ use – followed by ‘surface water management’, ‘revegetation and protective fencing’, ‘soil remediation’, ‘establish perennial vegetation’, ‘establish perennial pastures’ and, finally, ‘groundwater management’. The mean scores for ‘surface water management’ and the five practices just listed after it indicate that the average applicable respondent perceives the use of each of these practices within their district to lie between ‘limited’ and ‘moderate’.

With what statistical confidence can we conclude that this ranking of practices for the average applicable respondent on a scale of wide / limited use applies to the broader population of applicable Blackwood Basin farmers? Results from the WSR2 test (Table D.6) indicate we can be confident that the ranking for the average applicable respondent does apply to the broader population, except that in the broader population the results indicate that ‘establish perennial vegetation’ ranks equally with ‘establish perennial pastures’. The test results indicate we can

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<sup>5</sup> Respondents were asked to answer this question only for practices they indicated were applicable to their own properties.

Table 3.29: Frequency distributions of responses from applicable Blackwood Basin respondents to: From what you have seen and heard, how widely is each practice below already used in your district?

Practice	Proportion of applicable respondents (%)				Mean score*	n
	Wide use	Moderate use	Limited use	Zero / minimal use		
Surface water management	22.5	42.4	30.9	4.2	2.17	262
Groundwater management	3.6	20.6	55.2	20.6	2.93	194
Establish perennial vegetation	5.7	32.1	50.8	11.4	2.68	246
Establish perennial pastures	10.0	24.7	51.7	13.7	2.69	271
Revegetation & protective fencing	10.4	47.0	37.7	4.9	2.37	268
Soil remediation	13.5	34.3	39.0	13.1	2.52	251
Zero or minimum tillage cropping	55.8	31.3	9.4	3.6	1.61	224
Pest and weed control	40.1	42.2	16.3	1.4	1.79	289

\* Wide use = 1; moderate use = 2; limited use = 3; and zero / minimal use = 4.

conclude with at least 95 per cent confidence for each pairwise comparison that applicable Blackwood Basin farmers tended to rate:

- ‘zero or minimum tillage cropping’ as used more widely in their district than each other practice;
- ‘pest and weed control’ as used more widely in their district than each remaining practice;
- ‘surface water management’ as used more widely in their district than each remaining practice;
- ‘revegetation and protective fencing’ as used more widely in their district than each remaining practice;
- ‘soil remediation’ as used more widely in their district than each remaining practice;
- ‘establish perennial vegetation’ as used more widely in their district than ‘groundwater management’; and
- ‘establish perennial pastures’ as used more widely in their district than ‘groundwater management’.

We are unable to conclude on this basis that Blackwood Basin farmers tended to rate ‘establish perennial vegetation’ as used more or less widely in their district than ‘establish perennial pastures’, or vice versa.

### 3.11 Perceptions regarding other farmers' *eventual* use of targeted on-farm practices

Following on from the survey question just covered, applicable respondents<sup>6</sup> were asked: “How widely do you expect each practice will *eventually* be used in your district?”. Frequency distributions of the responses for each practice are presented in Table 3.30. Similarly as for Table 3.29, mean scores were assigned in this table to each practice. The lower the mean score for a practice, therefore, the more the ‘average applicable respondent’ expects the practice to eventually be used widely within their district.

Table 3.30: Frequency distributions of responses from applicable Blackwood Basin respondents to: *How widely do you expect each practice (below) will eventually be used in your district?*

Practice	Proportion of applicable respondents (%)				Mean score*	Mean score ratio	n
	Wide use	Moderate use	Limited use	Zero / minimal use			
Surface water management	34.2	49.2	14.6	1.9	1.84	1.18	260
Groundwater management	20.8	49.7	22.8	6.6	2.15	1.36	197
Establish perennial vegetation	11.9	50.8	33.7	3.6	2.29	1.17	252
Establish perennial pastures	22.0	46.6	29.1	2.2	2.12	1.27	268
Revegetation & protective fencing	20.5	47.0	29.9	2.6	2.15	1.10	268
Soil remediation	26.4	47.6	21.3	4.7	2.04	1.24	254
Zero or minimum tillage cropping	70.0	26.0	2.7	1.3	1.35	1.19	223
Pest and weed control	52.6	35.5	10.8	1.0	1.60	1.12	287

\* Wide use = 1; moderate use = 2; limited use = 3; and zero / minimal use = 4.

Comparison of Tables 3.29 and 3.30 reveals, for each practice, that the mean score for perceived current district use exceeds the mean score for perceived eventual district use; i.e., the average applicable respondent expects eventual district use of each practice to exceed current district use. On the basis of the WSR2 test, we can conclude with over 99 per cent confidence for each practice that this pattern in the survey data generalises to the broader population of applicable Blackwood Basin farmers; i.e., that this broader population does tend to expect eventual district use of each practice to exceed current district use.

Figures in the ‘mean score ratio’ column of Table 3.30 indicate the proportionate degree to which the average applicable respondent expects eventual use of each practice in their district to exceed current use. The ratio for each practice was calculated by dividing the relevant mean score in Table 3.29 by the relevant mean score in Table 3.30. For ‘surface water management’, accordingly, the ratio was calculated as  $2.17/1.84 = 1.18$ .

<sup>6</sup> Respondents were asked to answer this question only for practices they indicated were applicable to their own properties.

On this basis (rough-and-ready, since current and eventual district use are each measured on ordinal scales), we might conclude that the average applicable respondent expects ‘groundwater management’ to be the practice for which district use will eventually increase by the highest proportion, followed by ‘establish perennial pasture’, ‘soil remediation’, ‘zero or minimum tillage cropping’ and ‘surface water management. We might conclude similarly that the average applicable respondent expects ‘revegetation and protective fencing’ to be the practice for which district use will eventually increase by the *lowest* proportion, followed by ‘pest and weed control’ and ‘establish perennial vegetation’.

### 3.12 Perceptions of how the effectiveness of each practice depends on its use by other landholders

Applicable respondents<sup>7</sup> were asked: “Sometimes, if a practice is going to work on one place, it needs also to be used by other landholders in the same district. In your view, how much does the effectiveness on your property of each practice below depend on what others in your district are doing?”. Frequency distributions of responses for each practice are presented in Table 3.31.

Table 3.31: Frequency distributions of responses from applicable Blackwood Basin respondents to: How much does the effectiveness on your property of each practice below depend on what others in your district are doing?

Practice	Proportion of applicable respondents (%)			Mean score*	n
	Certainly depends on others	Possibly depends on others	Doesn't depend on others		
Surface water management	37.1	29.0	33.8	1.97	272
Groundwater management	48.5	32.2	19.3	1.71	202
Establish perennial vegetation	7.7	29.1	63.2	2.56	261
Establish perennial pastures	5.8	23.3	70.9	2.65	275
Revegetation & protective fencing	10.6	34.4	54.9	2.44	273
Soil remediation	6.0	28.1	65.9	2.60	267
Zero or minimum tillage cropping	6.2	21.6	72.2	2.66	227
Pest and weed control	46.3	32.9	20.8	1.74	298

\* Certainly depends = 1; possibly depends = 2; and doesn't depend =3.

Mean scores were assigned in this table to each practice, after scoring ‘certainly depends on others’ responses as one, ‘possibly depends on others’ responses as two, and ‘doesn’t depend on others’ responses as three. The lower the mean score for a practice, therefore, the more the ‘average applicable respondent’ considered the effectiveness of the practice on their property to depend on its use by others in the same district. On this basis, the average applicable respondent

<sup>7</sup> Respondents were asked to answer this question only for practices they indicated were applicable to their own properties.

perceived 'groundwater management' as the practice depending most for its effectiveness on use by other landholders, followed by 'pest and weed control' and 'surface water management'. The mean scores for each of these three practices are below two, indicating that the average applicable respondent perceives them as more than 'possibly' (towards 'certainly') depending for their effectiveness on use by others in the same district.

The practice perceived by the average applicable respondent as next most dependent on use by others was 'revegetation and protective fencing', followed by 'establish perennial vegetation', 'soil remediation', 'establish perennial pastures' and, finally, 'zero or minimum tillage cropping'. The mean scores for each of these five practices are well above two, indicating that the average applicable respondent perceives them as less than 'possibly' depending (and substantially towards not depending) for their effectiveness on use by others.

### **3.13 Perceived likelihood of other landholders using practices identified as dependent on others' use**

Following on from the question covered in the preceding section, a further question was asked of respondents who answered that the effectiveness of a practice on their own property depended 'certainly' or 'possibly' on its use by other landholders. The follow-up question for this narrower set of applicable respondents was: "This question is concerned only with those practices for which you marked 'possibly / certainly depends on others'. For each of these practices, how likely is it that other landholders in your district will use the practice sufficiently for it to work properly on your place?". Frequency distributions of responses for each practice are presented in Table 3.32.

Mean scores were assigned in this table to each practice, after scoring 'highly likely' responses as one, 'likely' responses as two, and so on until 'highly unlikely' responses were scored as five. The lower the mean score for a practice, therefore, the more the average applicable respondent thought it likely that other landholders would use that practice sufficiently for it to work properly on their own property. On this basis, the average applicable respondent perceived 'zero or minimum tillage cropping' as the practice other landholders were most likely to use sufficiently for it to work effectively on their own property, followed by 'pest and weed control', 'surface water management', 'establish perennial pastures', 'revegetation and protective fencing', 'soil remediation', 'groundwater management' and, finally, 'establish perennial vegetation'.

With mean scores for all practices less than three, the average applicable respondent is more optimistic than pessimistic that other landholders will use each practice sufficiently to make its use effective on their own property. With the mean scores for 'establish perennial vegetation', 'groundwater management', 'soil remediation', 'revegetation and protective fencing' and 'establish perennial pastures' closer to three than two, however, the average applicable respondent's assessment of the likelihood of sufficient use of these practices by other landholders is more 'neither likely or unlikely' than 'likely'. 'Zero or minimum tillage cropping' is the only practice with a mean score less than two; i.e., the only practice for which the average applicable

Table 3.32: Frequency distributions of responses from applicable Blackwood Basin respondents to: How likely is it that other landholders in your district will use [each practice below] sufficiently for it to work properly on your place?\*

Practice	Proportion of applicable respondents (%)					Mean score*	n
	Highly likely	Likely	Neither likely or unlikely	Unlikely	Highly unlikely		
Surface water management	11.3	50.0	22.6	10.7	5.4	2.49	168
Groundwater management	12.0	37.3	26.0	19.3	5.3	2.69	150
Establish perennial vegetation	3.4	47.1	29.9	14.9	4.6	2.70	87
Establish perennial pastures	4.3	52.9	28.6	12.9	1.4	2.54	70
Revegetation & protective fencing	10.1	45.0	28.4	12.8	3.7	2.55	109
Soil remediation	7.6	41.8	32.9	13.9	3.8	2.65	79
Zero or minimum tillage cropping	40.7	37.0	11.1	11.1	0.0	1.93	54
Pest and weed control	18.9	45.8	22.6	9.9	2.8	2.32	212

\* Highly likely = 1; likely = 2; neither likely or unlikely = 3; unlikely = 4; and highly unlikely = 5.

respondent assesses the likelihood of sufficient use by other landholders as beyond ‘likely’ towards ‘highly likely’.

### 3.14 Awareness of the regional model for NRM delivery

Respondents were provided with six statements describing the regional model for NRM delivery as it applies to them, and asked to indicate their degree of awareness of the information contained in each statement. Frequency distributions of responses for each statement are presented in Table 3.33.

Mean scores were assigned in this table to each practice, after scoring ‘yes, I’ve heard about it’ responses as one, ‘possibly I heard about it’ responses as two, and ‘haven’t heard about it’ responses as three. The lower the mean score for a statement, therefore, the more the average respondent was aware of the information contained in that statement. On this basis, the average respondent was most aware that the BBG is the NRM body for their subregion. The mean score of 1.37 for this statement placed it reasonably close to ‘yes, I’ve heard about it’. The average respondent was least aware of that the board of SWCC consists mostly of community representatives. The mean score of 2.18 for this statement placed it between ‘possibly I heard about it’ and ‘haven’t heard about it’.

On the basis of the WSR2 test (Table D.7), we can conclude with at least 95 per cent confidence for each pairwise comparison that Blackwood Basin farmers tended to be:

- more aware that the BBG is their subregional NRM body than in respect of any other statement;

Table 3.33: Frequency distributions of responses from Blackwood Basin respondents to: Please indicate whether or not you have heard about the following (statements regarding the regional approach to natural resource management).

Statement	Proportion of respondents (%)			Mean score*	n
	Heard about it	Possibly heard about it	Haven't heard about it		
Much of the responsibility for deciding what on-ground NRM activities to fund now lies with regional bodies	38.3	22.6	39.1	2.01	363
The regional body for the region where your property is located is the South West Catchments Council (SWCC)	42.7	21.2	36.1	1.93	368
The board of SWCC consists mostly of community representatives	28.1	26.2	45.7	2.18	267
The part of this region where your property lies has its own NRM body called the Blackwood Basin Group (BBG)	73.9	15.5	10.7	1.37	375
The BBG committee consists mostly of community representatives	51.6	24.5	23.8	1.72	277
The BBG advises SWCC on NRM funding decisions concerned with the Blackwood Basin	37.3	23.6	39.1	2.02	284

\* Yes, I've heard about it = 1; possibly I heard about it = 2; and haven't heard about it = 3.

- more aware that 'the BBG committee consists mostly of community representatives' than in respect of any remaining statements;
- more aware that their regional NRM body is SWCC than in respect of each remaining statement except 'much of the responsibility for deciding what on-ground activities to fund now lies with regional bodies' and 'the BBG advises SWCC on NRM funding decisions concerned with the Blackwood Basin';
- more aware that 'much of the responsibility for deciding what on-ground activities to fund now lies with regional bodies' than in respect of each remaining statement except 'the BBG advises SWCC on NRM funding decisions concerned with the Blackwood Basin'; and
- more aware that 'the BBG advises SWCC on NRM funding decisions concerned with the Blackwood Basin' than 'the board of SWCC consists mostly of community representatives'.

Accordingly, we can be at least 95 per cent confident for each pairwise comparison that Blackwood Basin farmers tended to be:

- more aware that their subregional NRM body is the BBG than aware that their regional NRM body is SWCC;

- more aware that the BBG committee consists mostly of community representatives than aware that the board of SWCC consists mostly of community representatives; and
- more aware that SWCC is their regional NRM body than aware that regional NRM bodies have assumed much of the responsibility for deciding what on-ground NRM activities to fund.

### 3.15 Personal contact with SWCC and the BBG

Respondents were asked: “In the last few years, how much have you or others on your property had personal contact with the South West Catchments Council and the Blackwood Basin Group?”. Frequency distributions of responses for each entity are presented in Table 3.34.

Table 3.34: Frequency distributions of responses from Blackwood Basin respondents to: In the last few years, how much have you or others on your property had personal contact with the South West Catchments Council and the Blackwood Basin Group?

	Proportion of respondents (%)				Mean score*	n
	Frequent	Fairly frequent	Occasional	None		
South West Catchments Council (SWCC)	2.6	2.0	14.0	81.4	3.74	307
Blackwood Basin Group (BBG)	7.5	6.9	31.1	54.4	3.32	318

\* Frequent = 1; fairly frequent = 2; occasional = 3; and none = 4.

Mean scores were assigned in this table to each entity, after scoring ‘frequent’ responses as one, ‘fairly frequent’ responses as two, ‘occasional’ responses as three, and ‘none’ responses as four. The lower the mean score for an entity, therefore, the more frequent the average respondent’s personal contact with that entity.

On this basis, the average respondent’s personal contact with the BBG over the previous few years was more frequent than with SWCC. The mean score in each case lie between three and four, indicating that the average respondent rated their frequency of personal contact with each entity between ‘occasional’ and ‘none’. According to the WSR2 test, we can conclude with more than 99 per cent confidence that Blackwood Basin farmers tended over the previous few years to have more frequent personal contact with the BBG than with SWCC.

### 3.16 Attitudes regarding the regional delivery model generally

Respondents were provided with seven attitudinal statements in respect of the regional delivery model as it applies to them generally, and asked to indicate their level of agreement or disagreement with each of those statements. Frequency distributions of responses for each statement are presented in Table 3.35.

Table 3.35: Frequency distributions of responses from Blackwood Basin respondents to: How strongly do you agree or disagree with each of the following statements about the regional approach to natural resource management?

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
The regional approach is an improvement on previous approaches	4.6	61.5	24.8	9.2	2.39	218
The regional approach has reduced the 'red tape' for landholders seeking NRM funds for on-ground activities	8.5	40.2	33.3	17.9	2.61	234
Federal Government is serious about empowering our community to solve our own NRM problems	5.0	45.4	37.9	11.7	2.56	240
The Western Australian (WA) Government is serious about empowering our community to solve our own NRM problems	4.9	33.6	42.2	19.3	2.76	244
The regional approach is a way for governments to 'pass the buck' on difficult issues	23.7	45.8	27.5	3.0	2.10	236
The regional approach is part of a strategy to increase government regulation of rural land-use	24.1	48.9	22.4	4.6	2.08	237
The regional approach is a way to transfer NRM costs onto volunteers	15.9	55.1	29.1	0.0	2.13	227

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

Mean scores were assigned in this table to each statement, after scoring 'strongly agree' responses as one, 'agree' responses as two, 'disagree' responses as three, and 'strongly disagree' responses as four. Hence, the score for 'ambivalent' (or 'neither agree or disagree') would be 2.5. The lower the mean score for a statement, therefore, the more strongly the average respondent agreed with that statement. On this basis, the statement the average respondent agreed with most strongly was 'the regional approach is part of a strategy to increase government regulation of rural land-use'. The mean score for this statement was 2.08, indicating that the average respondent's view on this statement was close to, but slightly short of, 'agree'.

The statement the average respondent agreed with next most strongly was:

- 'the regional approach is a way for governments to 'pass the buck' on difficult issues', followed by
- 'the regional approach is a way to transfer NRM costs onto volunteers';
- 'the regional approach is an improvement on previous approaches';
- 'Federal Government is serious about empowering our community to solve our own NRM problems';

- ‘the regional approach has reduced the ‘red tape’ for landholders seeking NRM funds for on-ground activities’; and, finally,
- ‘the Western Australian (WA) Government is serious about empowering our community to solve our own NRM problems’.

Aside from the last three of these statements, the mean scores for the remaining statements lie between two and 2.5, indicating that the average respondent’s views on each of these statements were closer to ‘agree’ than ‘disagree’ (although short of ‘agree’ in each case). The mean scores of 2.10 and 2.13, respectively, for ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’ and ‘the regional approach is a way to transfer NRM costs onto volunteers’ indicate that the average respondent’s views on these statements fell only slightly short of ‘agree’. On the other hand, the mean score of 2.39 for ‘the regional approach is an improvement on previous approaches’ indicates that the average respondent’s view on this statement was rather ambivalent – only marginally closer to ‘agree’ than ‘disagree’.

The mean scores for the last three statements lie between 2.5 and three. Hence, the average respondent was more likely to disagree than agree that the Federal and WA Governments were serious about empowering their community to solve its own NRM problems – and more likely to disagree than agree that the regional approach had reduced the ‘red tape’ they faced in obtaining funding for on-ground NRM activities.

On the basis of the WSR2 test (Table D.8), we can conclude with at least 95 per cent confidence for each pairwise comparison that the wider population of Blackwood Basin farmers tended to agree more strongly with:

- ‘the regional approach is part of a strategy to increase government regulation of rural land-use’ than with each other statement except ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’ and ‘the regional approach is a way to transfer NRM costs onto volunteers’;
- ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’ than with each remaining statement except ‘the regional approach is a way to transfer NRM costs onto volunteers’;
- ‘the regional approach is a way to transfer NRM costs onto volunteers’ than with each remaining statement;
- ‘the regional approach is an improvement on previous approaches’ than with each remaining statement;
- ‘Federal Government is serious about empowering our community to solve our own NRM problems’ than with each remaining statement except ‘the regional approach has reduced the ‘red tape’ for landholders seeking NRM funds for on-ground activities’; and
- ‘the regional approach has reduced the ‘red tape’ for landholders seeking NRM funds for on-ground activities’ than the final remaining statement ‘the Western Australian

Government is serious about empowering our community to solve our own NRM problems’.

We can be at least 95 per cent confident, therefore, that Blackwood Basin farmers tended to regard the Federal Government as more serious than the WA Government in trying to empower their communities to solve their own NRM problems.

### 3.17 Attitudes regarding the regional delivery model in the South West Catchments Region

Respondents were provided with eight attitudinal statements in respect of the South West Catchments Council (SWCC, responsible for regional NRM delivery in their particular region – i.e., the South West Catchments Region), and asked to indicate their level of agreement or disagreement with each of those statements. Frequency distributions of responses for each statement are presented in Table 3.36.

Table 3.36: Frequency distributions of responses from Blackwood Basin respondents to: How strongly do you agree or disagree with each of the following statements about the South West Catchments Council?

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
SWCC is less bureaucratic than government generally	3.5	55.5	30.0	11.0	2.49	200
SWCC understands the issues faced in our district	8.3	53.7	23.4	14.6	2.44	205
Community members on SWCC can be trusted to argue forcefully for the best interests of the South West Catchments Region	5.7	57.2	27.8	9.3	2.41	194
Staff of SWCC care about our community	8.6	69.9	12.9	8.6	2.22	186
SWCC is serious about helping our community to solve our own NRM problems	6.0	66.8	20.1	7.1	2.28	184
SWCC is just a ‘rubber stamp’ for decisions made by the Federal Government	9.7	39.2	48.4	2.7	2.44	186
SWCC is just a ‘rubber stamp’ for decisions made by the WA Government	12.2	41.8	43.9	2.1	2.36	189
NRM at the scale of the South West Catchments Region is so remote that it discourages us from getting involved	17.3	43.4	35.7	3.6	2.26	196

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

Mean scores were assigned in this table to each statement, after scoring ‘strongly agree’ responses as one, ‘agree’ responses as two, ‘disagree’ responses as three, and ‘strongly disagree’ responses as four. The score for ‘ambivalent’ would be 2.5. The lower the mean score for a statement, therefore, the more strongly the average respondent agreed with that statement.

On this basis, the statement the average respondent agreed with most strongly was ‘staff of SWCC care about our community’. The mean score for this statement was 2.22, indicating that the average respondent’s view on this statement was midway between ‘agree’ and ambivalent.

The statement the average respondent agreed with next most strongly was ‘NRM at the scale of the South West Catchments Region is so remote that it discourages us from getting involved’, followed by:

- ‘SWCC is serious about helping our community to solve our own NRM problems’;
- ‘SWCC is just a ‘rubber stamp’ for decisions made by the WA Government’;
- ‘community members on SWCC can be trusted to argue forcefully for the best interests of the South West Catchments Region’;
- ‘SWCC is just a ‘rubber stamp’ for decisions made by the Federal Government’ with the same strength of agreement as ‘SWCC understands the issues faced in our district’; and
- ‘SWCC is less bureaucratic than government generally’.

The mean scores for all statements lie between two and 2.5, indicating that the average respondent’s views on each of these statements were closer to ‘agree’ than ‘disagree’ (although short of ‘agree’ in each case). However, the mean scores for all statements except ‘staff of SWCC care about our community’ exceeded 2.25, indicating that the average respondent’s views on each of these statements were closer to ambivalence than to ‘agree’.

On the basis of the WSR2 test (Table D.9), we can conclude with at least 95 per cent confidence for each pairwise comparison that the wider population of Blackwood Basin farmers tended to agree more strongly with:

- ‘staff of SWCC care about our community’ than with each other statement except ‘NRM at the scale of the South West Catchments Region is so remote that it discourages us from getting involved’ and ‘SWCC is serious about helping our community to solve our own NRM problems’;
- ‘NRM at the scale of the South West Catchments Region is so remote that it discourages us from getting involved’ than with each remaining statement except ‘SWCC is serious about helping our community to solve our own NRM problems’, ‘community members on SWCC can be trusted to argue forcefully for the best interests of the South West Catchments Region’ and ‘SWCC understands the issues faced in our district’;
- ‘community members on SWCC can be trusted to argue forcefully for the best interests of the South West Catchments Region’ than with each remaining statement except ‘SWCC is just a ‘rubber stamp’ for decisions made by the WA Government’, ‘SWCC understands the issues faced in our district’, and ‘SWCC is just a ‘rubber stamp’ for decisions made by the Federal Government’; and

- ‘SWCC is just a ‘rubber stamp’ for decisions made by the WA Government’ than with ‘SWCC is just a ‘rubber stamp’ for decisions made by the Federal Government’, but with the same strength as ‘SWCC understands the issues faced in our district’ or ‘SWCC is less bureaucratic than government generally’ – and ‘SWCC understands the issues faced in our district’ with the same strength as ‘SWCC is less bureaucratic than government generally’.

We are unable to conclude on this basis that Blackwood Basin farmers tended to agree more or less strongly with:

- ‘SWCC is just a ‘rubber stamp’ for decisions made by the WA Government’ than with ‘SWCC understands the issues faced in our district’; and
- ‘SWCC understands the issues faced in our district’ than with ‘SWCC is less bureaucratic than government generally’.

Nevertheless, we can be at least 95 per cent confident from the above results that Blackwood Basin farmers tended to regard SWCC as more a ‘rubber stamp’ for WA Government decisions than for Federal Government decisions.

### **3.18 Attitudes regarding application of the regional delivery model in the Blackwood Basin subregion**

Respondents were provided with eight attitudinal statements in respect of the Blackwood Basin Group (BBG, responsible for regional NRM delivery in their particular subregion – i.e., the Blackwood Basin), and asked to indicate their level of agreement or disagreement with each of those statements. Frequency distributions of responses for each statement are presented in Table 3.37.

Mean scores were assigned in this table to each statement, after scoring ‘strongly agree’ responses as one, ‘agree’ responses as two, ‘disagree’ responses as three, and ‘strongly disagree’ responses as four. The score for ‘ambivalent’ would be 2.5. The lower the mean score for a statement, therefore, the more strongly the average respondent agreed with that statement.

On this basis, the statement the average respondent agreed with most strongly was ‘staff of the BBG care about our community’. The mean score for this statement was 1.97, indicating that the average respondent’s view on this statement was slightly on the ‘strongly agree’ side of ‘agree’. The statement the average respondent agreed with next most strongly was ‘the BBG is serious about helping our community to solve our own NRM problems’, followed by:

- ‘the BBG understands the issues faced in our district’;
- ‘community members on the BBG can be trusted to argue forcefully for the best interests of the Blackwood Basin’;
- ‘the BBG is less bureaucratic than government generally’;

Table 3.37: Frequency distributions of responses from Blackwood Basin respondents to: How strongly do you agree or disagree with each of the following statements about the Blackwood Basin Group?

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
The BBG is less bureaucratic than government generally	9.2	73.4	13.3	4.1	2.12	218
The BBG understands the issues faced in our district	13.8	68.9	12.4	4.9	2.08	225
Community members on the BBG can be trusted to argue forcefully for the best interests of the South West Catchments Region	16.5	62.4	15.1	6.0	2.11	218
Staff of the BBG care about our community	15.5	74.8	7.3	2.4	1.97	206
The BBG is serious about helping our community to solve our own NRM problems	13.8	69.5	12.3	4.4	2.07	203
The BBG is just a 'rubber stamp' for decisions made by the Federal Government	6.0	25.5	62.0	6.5	2.69	200
The BBG is just a 'rubber stamp' for decisions made by the WA Government	7.0	26.9	58.7	7.5	2.67	201
The BBG is just a 'rubber stamp' for decisions made by SWCC	6.5	32.8	55.4	5.4	2.60	186
NRM at the scale of the Blackwood Basin is so remote that it discourages us from getting involved	10.8	35.8	46.6	6.9	2.50	204

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

- 'NRM at the scale of the Blackwood Basin is so remote that it discourages us from getting involved';
- 'the BBG is just a 'rubber stamp' for decisions made by SWCC';
- 'the BBG is just a 'rubber stamp' for decisions made by the WA Government'; and finally
- 'the BBG is just a 'rubber stamp' for decisions made by the Federal Government'.

The mean scores for 'the BBG is serious about helping our community to solve our own NRM problems', 'the BBG understands the issues faced in our district' and 'community members on the BBG can be trusted to argue forcefully for the best interests of the Blackwood Basin' lie in the range 2.08-2.12, indicating that the average respondent's views on each of these statements were slightly on the ambivalent side of 'agree'.

With a mean score of 2.50, the statement 'NRM at the scale of the Blackwood Basin is so remote that it discourages us from getting involved' was regarded ambivalently by the average respondent. The mean scores in the range 2.60-2.69 for the three statements 'the BBG is just a

‘rubber stamp’ for decisions made by SWCC / WA Government / Federal Government’ indicate that the average respondent’s views on each of these statements were on the ‘disagree’ side of ambivalent.

On the basis of the WSR2 test (Table D.10), we can conclude with at least 95 per cent confidence for each pairwise comparison that the wider population of Blackwood Basin farmers tended to agree more strongly with:

- ‘staff of the BBG care about our community’ than each other statement;
- ‘the BBG is serious about helping our community to solve our own NRM problems’ than each remaining statement except ‘the BBG understands the issues faced in our district’, ‘community members on the BBG can be trusted to argue forcefully for the best interests of the Blackwood Basin’ and ‘the BBG is less bureaucratic than government generally’;
- ‘the BBG understands the issues faced in our district’ than each remaining statement except ‘community members on the BBG can be trusted to argue forcefully for the best interests of the Blackwood Basin’ and ‘the BBG is less bureaucratic than government generally’;
- ‘community members on the BBG can be trusted to argue forcefully for the best interests of the Blackwood Basin’ than each remaining statement except ‘the BBG is less bureaucratic than government generally’;
- ‘the BBG is less bureaucratic than government generally’ than each remaining statement;
- ‘NRM at the scale of the Blackwood Basin is so remote that it discourages us from getting involved’ than each remaining statement except ‘the BBG is just a ‘rubber stamp’ for decisions made by SWCC’; and
- ‘the BBG is just a ‘rubber stamp’ for decisions made by SWCC’ than ‘the BBG is just a ‘rubber stamp’ for decisions made by the WA Government’ and ‘the BBG is just a ‘rubber stamp’ for decisions made by the Federal Government’.

We are unable to conclude on this basis that Blackwood Basin farmers tended to agree more or less strongly with ‘the BBG is just a ‘rubber stamp’ for decisions made by the WA Government’ than with ‘the BBG is just a ‘rubber stamp’ for decisions made by the Federal Government’. Nevertheless, we can be at least 95 per cent confident that Blackwood Basin farmers tended to regard the BBG as more a ‘rubber stamp’ for SWCC decisions than for WA or Federal Government decisions.

### 3.19 Attitudes regarding application of the regional delivery model: comparing attitudes in respect of regional and subregional levels

Aside from one attitudinal statement in respect of the BBG ('the BBG is just a 'rubber stamp' for decisions made by SWCC'), each other statement reported in section 3.19 matched a statement reported in section 3.18 – the only difference being substitution of 'SWCC' for 'BBG', or 'South West Catchments Region' for 'Blackwood Basin', in section 3.18. The mean scores for each pair of corresponding statements are compared in Table 3.38. Included also in the table are the probabilities that no difference exists between corresponding statements in respect of distributions of responses from the broader population of Blackwood Basin farmers. These probabilities were as obtained from the WSR2 test.

Table 3.38: Mean score comparisons for attitude statement pairs for the South West Catchments Region and the Blackwood Basin subregion

	Mean score*	p
SWCC is less bureaucratic than government generally	2.5	0.000
The BBG is less bureaucratic than government generally	2.1	
SWCC understands the issues faced in our district	2.4	0.000
The BBG understands the issues faced in our district	2.1	
Community members on SWCC can be trusted to argue forcefully for the best interests of the South West Catchments Region	2.4	0.000
Community members on the BBG can be trusted to argue forcefully for the best interests of the Blackwood Basin	2.1	
Staff of SWCC care about our community	2.2	0.000
Staff of the BBG care about our community	2.0	
SWCC is serious about helping our community to solve our own NRM problems	2.3	0.000
The BBG is serious about helping our community to solve our own NRM problems	2.1	
SWCC is just a 'rubber stamp' for decisions made by the Federal Government	2.4	0.000
The BBG is just a 'rubber stamp' for decisions made by the Federal Government	2.7	
SWCC is just a 'rubber stamp' for decisions made by the WA Government	2.4	0.000
The BBG is just a 'rubber stamp' for decisions made by the WA Government	2.7	
NRM at the scale of the South West Catchments Region is so remote that it discourages us from getting involved	2.3	0.000
NRM at the scale of the Blackwood Basin is so remote that it discourages us from getting involved	2.5	

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

For each of the pairs of corresponding statements expressing a positive attitude (i.e., the first five pairs of statements), the mean score for SWCC statement exceeds that for the corresponding BBG statement. For each of these pairs of statements, therefore, the average respondent feels that the positive attitude expressed is truer of the BBG than of SWCC.

The last three pairs of statements express negative attitudes. For each of these pairs, the mean score for the BBG statement exceeds that for the corresponding SWCC statement. For each of these pairs of statements, therefore, the average respondent feels that the negative attitude expressed is truer of SWCC than of the BBG.

With all probabilities in the right-most column less than 0.01, we can conclude with at least 99 per cent confidence for each of the eight pairs of statements that these patterns reported for the average respondent existed more generally as patterns among the wider population of farmers in the Blackwood Basin. With at least 99 per cent confidence for each pairwise comparison, therefore, we can conclude that Blackwood Basin farmers tended to perceive:

- the BBG as more successful than SWCC in operating less bureaucratically than government;
- the BBG as better understanding their district-level issues than SWCC;
- the BBG as represented by community members who argue more forcefully for the best interests of the Blackwood Basin subregion than do SWCC's community members in respect of the whole (South West Catchments) Region they represent;
- the BBG as staffed by people who, compared with staff of SWCC, care more for their communities;
- the BBG as more serious, compared with SWCC, about helping their communities solve their own NRM problems;
- the BBG as less a 'rubber stamp', compared with SWCC, for decisions made by the Federal Government;
- the BBG as less a 'rubber stamp', compared with SWCC, for decisions made by the WA Government; and
- the scale of the Blackwood Basin subregion, compared with the scale of the South West Catchments Region, as suffering less from any sense of remoteness that discourages their involvement in NRM.

### **3.20 Farmers' involvement with local groups concerned with NRM issues**

Respondents were asked the following: "We are also interested in local groups concerned with sustainable farming / grazing / irrigation issues, or natural resource or environmental issues, on or near your property. Please list any such groups that your property has been involved with over the last few years". Responses were coded in the first instance according to whether or not at least one such group had been listed. The frequency distribution for these coded responses is

presented in Table 3.39. We see that over half of respondents did not list involvement with a local group of this kind.

Table 3.39: Frequency distribution for whether Blackwood Basin respondents listed recent involvement with at least one local group concerned with NRM issues

Proportion of respondents (%)		n
At least one local group nominated	No local group nominated	
41.9	58.1	332

From the local groups they had listed, each respondent was asked to “circle the one local group that your property has been most involved with over the last few years”. Each group identified in this way was subsequently coded according to whether it fitted best into one of the following four categories: (i) landcare / LCDC / catchment group (with LCDC an acronym for Land Conservation District Committee); (ii) production group; (iii) nature / environmental group; (iv) local branch of the Western Australian Farmers Federation; and (v) other.

Category (i) includes the types of local- and district-scale groups upon which the community-based approach to NRM in rural Western Australia tended to focus during the 1990s when public funding for this approach came predominantly from the NLP and NHT1. Included in this category were the likes of ‘Swampy Creek Catchment Group’, ‘Queerfellows Creek Catchment Group’, ‘Lower Blackwood LCDC’, ‘Wagin Woodanilling Landcare Zone’, ‘52 Creek Catchment Group’, ‘Narrakine Landcare Group’, and ‘Williams Landcare Inc.’

Category (ii) includes groups established mainly with an agricultural focus, and concerned with NRM issues and practices relevant to this focus. Groups identified of this kind include ‘Donnybrook Dryland Improvement Group’, ‘Nyabing Farm Improvement Group’, ‘Lucerne Growers’, ‘Top Crop’, ‘Kulikup Lice Eradication Scheme’, ‘Farming for the Future’, ‘No Till Group’, ‘Facey Group’, ‘West Broome Hill Crop Group’, and so on.

Category (iii) includes groups established with a predominant focus on conserving aspects of the natural environment. Groups allocated to this category include ‘Land for Wildlife’ and ‘Friends of the Forest’. Category (iv) includes local branches of the Western Australian Farmers Federation, which is a peak organisation representing the interests of Western Australia’s rural producers. Category (v) comprises groups not fitting neatly into the other three categories; e.g., ‘Deep Drainage Group’, ‘Oil Mallee Association’, ‘Townsite Salinity Group’, and ‘Local Fire Brigade’.

The frequencies with which applicable respondents – i.e., the 41.9 per cent of respondents who indicated involvement with a local group engaged in NRM activities – identified greatest involvement with different categories of local group are shown in Table 3.40. Two-thirds of applicable respondents identified their greatest local involvement of this kind with a ‘landcare / LCDC / catchment group’, and almost one-fifth with a ‘production group’. ‘Nature / environmental group’ was identified as such by 3.6 per cent of applicable respondents, and ‘branch of the Western Australian Farmers Federation’ by only 0.7 per cent.

Table 3.40: Frequency distribution for categories of local NRM-related groups that Blackwood Basin respondents identified greatest involvement with

Proportion of respondents who listed involvement with a local group (%)					n
Landcare/ LCDC/ catchment group	Production group	Nature/ environmental group	Branch of WA Farmers Federation	Other	
66.2	19.4	3.6	0.7	10.1	139

Respondents who indicated involvement with at least one local group engaged in NRM activities (‘applicable respondents’) were requested, in respect of the group they had been most involved with, to “indicate your property’s level of involvement with this local group over the last few years”. The frequency distribution of responses is shown in Table 3.41. We see that just over one-third of respondents in this category recorded ‘active involvement’ over the previous few years with the particular group they had been most involved with. Almost a half indicated only ‘occasional involvement’ with this group.

Table 3.41: Frequency distribution for level of involvement by Blackwood Basin respondents with the local group they indicated greatest involvement with

Proportion of applicable respondents (%)			n
Active involvement	Fairly active involvement	Occasional involvement	
36.4	18.2	45.5	132

### 3.21 Attitudes regarding relationships of respondents’ highest-involvement local group with SWCC and the BBG

In addition, respondents who indicated involvement with at least one local group engaged in NRM activities were asked to indicate how strongly they agreed or disagreed with six statements about relationships between the group they were most involved with and SWCC on the one hand, and the BBG on the other. The three statements concerning SWCC were the same as those concerning the BBG, except with the names of the two bodies changed. Frequency distributions for the three statements concerned with the group’s relationship with SWCC are presented in Table 3.42.

Table 3.42: Frequency distributions of Blackwood Basin responses to: How strongly do you agree or disagree with each of these statements [concerning SWCC] about this local group?

	Proportion of respondents who listed involvement with a local group (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
SWCC understands the issues faced by this group	0.0	35.2	50.0	14.8	2.80	88
The work of SWCC has helped make this group more effective	2.4	32.1	47.6	17.9	2.81	84
This group should work wherever possible with SWCC on issues of common interest	10.8	73.1	11.8	4.3	2.10	93

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

Mean scores were assigned in this table to each statement, after scoring ‘strongly agree’ responses as one, ‘agree’ responses as two, ‘disagree’ responses as three, and ‘strongly disagree’ responses as four. ‘Ambivalent’ would thus be scored as 2.5. The lower the mean score for a statement, therefore, the more strongly the average applicable respondent agreed with that statement.

On this basis, the statement the average applicable respondent agreed with most strongly was ‘this group should work wherever possible with SWCC on issues of common interest’. The mean score for this statement was 2.10, indicating that the average applicable respondent’s view on this statement was slightly on the ambivalent side of ‘agree’. The mean scores for ‘SWCC understands the issues faced by this group’ and ‘the work of SWCC has helped make this group more effective’ are 2.80 and 2.81, respectively, revealing that the average applicable respondent’s views on each of these statements were near mid-way between ‘disagree’ and ambivalent.

Frequency distributions for the three statements concerned with the group’s relationship with the BBG are presented in Table 3.43. Mean scores were assigned in this table to each statement on the same basis as for Table 3.42. The statement the average applicable respondent agreed with most strongly was ‘this group should work wherever possible with the BBG on issues of common interest’. The mean score for this statement was 1.92, indicating that the average applicable respondent’s view on this statement was marginally on the ‘strongly agree’ side of ‘agree’. The statement agreed to next most strongly was ‘the BBG understands the issues faced by this group’, followed by ‘the work of the BBG has helped make this group more effective’. With mean score for these statements of 2.17 and 2.38, respectively, the average applicable respondent’s views on each lay between ‘disagree’ and ambivalent.

Table 3.43: Frequency distributions of Blackwood Basin responses to: How strongly do you agree or disagree with each of these statements [concerning the BBG] about this local group?

	Proportion of respondents who listed involvement with a local group (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
The BBG understands the issues faced by this group	7.8	72.5	14.7	4.9	2.17	102
The work of the BBG has helped make this group more effective	9.5	52.6	28.4	9.5	2.38	95
This group should work wherever possible with the BBG on issues of common interest	18.8	72.3	6.9	2.0	1.92	101

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

The mean scores for each pair of corresponding statements (concerning SWCC and the BBG, respectively) are compared in Table 3.44. Included also in the table are the probabilities of zero difference between corresponding statements in respect of distributions of responses from the broader population of Blackwood Basin farmers. These probabilities were as obtained from the WSR2 test.

For each of the pairs of corresponding statements, the mean score for the statement concerning SWCC exceeds that for the corresponding statement concerning the BBG. For each pair of statements, therefore, the average respondent feels that the positive attitude expressed is truer for the BBG than for SWCC. With all probabilities in the right-most column less than 0.01, we can conclude with at least 99 per cent confidence for each of the three pairs of statements that these patterns reported for the average applicable respondent reflect more general patterns among the wider population of farmers in the Blackwood Basin. With 99 per cent confidence for each pairwise comparison, therefore, we can conclude that Blackwood Basin farmers tended at the time of survey to agree more strongly that:

Table 3.44: Mean score comparisons for statement pairs in respect of SWCC and the BBG concerning their relationships with applicable respondents' highest-involvement local groups

	Mean score	p
SWCC understands the issues faced by this group	2.80	0.000
BBG understands issues faced by this group	2.17	
The work of SWCC has helped make this local group more effective	2.81	0.000
The work of the BBG has helped make this local group more effective	2.38	
This group should work wherever possible with the SWCC on issues of common interest	2.10	0.012
This group should work wherever possible with the BBG on issues of common interest	1.92	

- the BBG, compared with SWCC, understands the issues faced by their highest-involvement local group;
- the BBG’s work, compared with SWCC’s work, makes this group more effective; and
- this group should work where possible with the BBG, compared with SWCC.

### 3.22 Attitudes regarding staff support of respondents’ highest-involvement local group

Respondents who indicated involvement with at least one local group engaged in NRM activities were asked also, in respect of the group they had been most involved with: “Does this group have paid staff to support it?” The frequency distribution of responses from applicable respondents is presented in Table 3.45. Over half of applicable respondents answered this question affirmatively.

Table 3.45: Frequency distribution of Blackwood Basin responses to: Does this [highest-involvement local] group have paid staff to support it?

Proportion of respondents who listed involvement with a local group (%)			n
Yes	No	Unsure	
54.6	33.8	11.5	130

Respondents who answered affirmatively were asked to indicate how strongly they agreed or disagreed with four statements about paid staff supporting their highest-involvement local group. Frequency distributions of responses for each of these statements are presented in Table 3.46.

Table 3.46: Frequency distributions of Blackwood Basin responses to: How strongly do you agree or disagree with each of the following statements [about paid staff supporting your highest-involvement local group]?

	Proportion of applicable respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
Paid staff supporting this group have the experience and skills needed to do a good job	33.8	60.3	2.9	2.9	1.87	68
These staff understand the issues faced in our district	30.4	66.7	1.4	1.4	1.85	69
These staff care about our community	32.4	67.6	0.0	0.0	1.78	68
These staff are too busy to give this group the support it really needs	3.1	16.9	63.1	16.9	2.91	65

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

Mean scores were assigned in this table to each statement, after scoring ‘strongly agree’ responses as one, ‘agree’ responses as two, ‘disagree’ responses as three, and ‘strongly disagree’ responses as four. ‘Ambivalent’ would thus be scored as 2.5. The lower the mean score for a statement, therefore, the more strongly the average applicable respondent agreed with that statement.

On this basis, the statement the average applicable respondent agreed with most strongly was ‘these staff care about our community’. The next strongest agreement was with ‘these staff understand the issues faced in our district’, and then with ‘paid staff supporting this group have the experience and skills needed to do a good job’. The mean scores of 1.78, 1.85 and 1.87, respectively, for the three statements indicate that levels of agreement with each were on the ‘strongly agree’ side of ‘agree’. The weakest agreement was with ‘these staff are too busy to give this group the support it really needs’. With a mean score of 2.91, the view of the average applicable respondent on this statement was marginally on the ambivalent side of ‘disagree’.

### **3.23 Key findings from the Blackwood Basin case**

The following findings from the Blackwood Basin case are particularly relevant to the present project, given its focus on the role of community-based NRM under the regional delivery model in establishing farmers’ trust in this model and thereby increasing their adoption of conservation practices promoted under it:

- 77.5 per cent of respondents placed either a high or very high priority on the goal of maintaining or enhancing the condition of their natural resources and environment, compared with 86.3 per cent for the goal of maintaining or enhancing the profitability of their farm business;
- the proportion of respondents rating natural resource issues as at least a moderate threat to their farm businesses ranged from 53.4 per cent for ‘soil acidity/acid sulphate soils’ and 45.3 per cent for ‘dryland salinity’ to 25.1 per cent for ‘loss of native vegetation’;
- the proportion of respondents rating ‘government regulation’, ‘commodity prices’ and ‘drought’ as at least moderate threats to their farm businesses were 76.9 per cent, 95.4 per cent and 69.9 per cent, respectively;
- the proportion of respondents strongly agreeing they felt a bond with the South West Catchments Region (4.9 per cent) was much lower than the equivalent proportion in respect of their district (39.1 per cent), and somewhat lower than the equivalent proportion in respect of their Blackwood Basin subregion (7.5 per cent);
- the proportion of applicable respondents (i.e., respondents identifying a conservation practice as applicable to their property) answering that adoption of a conservation practice would ‘help greatly’ their property’s chances of achieving its goals ranged from 52.9 per cent for ‘zero or minimum tillage cropping’ to 24.3 per cent for ‘revegetation and protective fencing’;

- the proportion of applicable respondents expecting to increase their adoption of a conservation practice over the ensuing 10 years ranged from 45.5 per cent for ‘establish perennial pastures’ to 11.5 per cent for ‘pest and weed control’;
- the proportion of applicable respondents perceiving that effectiveness of a practice on their property depends (either ‘certainly depends’ or ‘possibly depends’) on the actions of others ranged from 79.2 per cent for ‘pest and weed control’ to 27.8 per cent for ‘zero or minimum tillage cropping’;
- 39.1 per cent of respondents were not aware that ‘much of the responsibility for deciding what on-ground activities to fund now lies with regional bodies’;
- the proportion of respondents not aware that their regional body is the South West Catchments Council (SWCC) was 36.1 per cent, while the proportion not aware that their subregional body is the Blackwood Basin Group (BBG) was substantially less at 10.7 per cent;
- the proportion of respondents not aware that the board of SWCC consists mostly of community representatives was 45.7 per cent, while the proportion not aware that the BBG committee consists mostly of community representatives was substantially less at 23.8 per cent;
- 66.1 per cent of answering respondents (i.e., excluding ‘don’t know’ responses<sup>8</sup>) agreed or strongly agreed that ‘the regional approach is an improvement on previous approaches’;
- 50.4 per cent of answering respondents agreed or strongly agreed that ‘Federal Government is serious about empowering our community to solve our own NRM problems’, while the equivalent proportion for the corresponding statement referring to the Western Australian (WA) Government was markedly less at 38.5 per cent;
- 69.5 per cent of answering respondents agreed or strongly agreed that ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’;
- 73.0 per cent of answering respondents agreed or strongly agreed that ‘the regional approach is part of a strategy to increase government regulation of rural land-use’;
- 72.8 per cent of answering respondents agreed or strongly agreed that ‘SWCC is serious about helping our community to solve our own NRM problems’, while the equivalent proportion for the corresponding statement referring to the Blackwood Basin Group was 83.3 per cent;
- 54.0 per cent of answering respondents agreed or strongly agreed that ‘SWCC is just a ‘rubber stamp’ for decisions made by the WA Government’, while 33.9 per cent agreed

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<sup>8</sup> The vast majority of these ‘don’t know’ responses were from respondents who indicated they were unaware of the regional delivery model.

or strongly agreed that 'the BBG is just a 'rubber stamp' for decisions made by the WA Government';

- 39.3 per cent of answering respondents agreed or strongly agreed that 'the BBG is just a 'rubber stamp' for decisions made by SWCC';
- 60.7 per cent of answering respondents agreed or strongly agreed that 'NRM at the scale of the South West Catchments Region is so remote that it discourages us from getting involved', while the equivalent proportion for the corresponding statement referring to the Blackwood Basin was 46.3 per cent;
- 41.9 per cent of respondents indicated involvement over the previous few years with at least one local group concerned with NRM issues (henceforth referred to as 'local NRM-related group');
- 66.2 per cent of respondents indicating recent involvement with a local NRM-related group identified their greatest involvement as having been with a 'landcare/LCDC/catchment group', compared with 19.4 per cent for 'production group'; and
- 35.5 per cent of answering respondents indicating recent involvement with a local NRM-related group agreed or strongly agreed that 'the work of SWCC has helped make this group more effective', while 62.1 per cent of these respondents agreed or strongly agreed that 'the work of the BBG has helped make this group more effective'.

## 4. Results for the Central Highlands Case

Results from descriptive and comparative analysis of survey data from the Central Highlands case are presented in this chapter. A summary of key findings from this case is presented in section 4.23.

### 4.1 Personal characteristics of respondents

Of all respondents to the survey of Central Highlands farmers, 83 per cent were male (Table 4.1). The mean age of respondents was 50.1 years, with the range extending from 22 to 87 years. Some 18 per cent of respondents were younger than 40 years, while one-fifth of respondents were older than 60 years (Table 4.2).

Table 4.1: Gender of Central Highlands respondents

Proportion of respondents (%)		n
Female	Male	
17.2	82.8	162

Table 4.2: Age of Central Highlands respondents

Proportion of respondents (%)				n
< 40 years	40 - 49 years	50 - 59 years	> 60 years	
17.8	31.9	29.5	20.8	154

Respondents had lived on average for 32.9 years in the district where their property was located. Of all respondents, some 90 per cent had lived in the same district as their property for at least 10 years, and 42.2 per cent for at least 40 years (Table 4.3).

Table 4.3: Central Highlands responses to: How long have you lived in the district where your property is located?

Proportion of respondents (%)						n
< 5 years	5 - 9 years	10 - 19 years	20 - 39 years	40 - 59 years	> 60 years	
4.0	6.2	13.6	33.9	36.6	5.6	163

Of all respondents, 70.6 per cent said it was likely or very likely that their property would be passed on to the next generation, and only 17.9 per cent said this was unlikely or very unlikely (Table 4.4). Slightly more than one in ten respondents were unsure about whether or not their property would be passed on to the next generation.

Table 4.4: Central Highlands responses to: How likely will your property be passed on to the next generation?

Proportion of respondents (%)					Mean score*	n
Very likely	Likely	Unsure	Unlikely	Very unlikely		
32.3	38.3	11.6	8.1	9.8	2.12	162

\* Very likely = 1; likely = 2; unsure = 3; unlikely = 4; and very unlikely = 5.

A mean score for each goal is presented in Table 4.4 also, based on scoring ‘very likely’ ratings as one, ‘likely’ ratings as two, ‘unsure’ as three, ‘unlikely’ as four, and ‘very unlikely’ as five. The lower the mean score, therefore, the more the ‘average respondent’ considered it likely that their property would be passed on to the next generation. The mean score of 2.12 indicates that the average respondent rated the likelihood of their property passing to the next generation marginally on the ‘unsure’ side of ‘likely’. To the extent that farmers are motivated to conserve or improving natural resource or environmental condition on their properties for the sake of their descendents, it appears that a moderate incentive of this kind does exist for the average respondent.

## 4.2 Education and farming experience of respondents

Respondents on average claimed 32.6 years of adult experience in owning, managing or working on an agricultural or grazing property. Only 4.5 per cent claimed less than 10 years of such experience (Table 4.5).

Table 4.5: Central Highlands responses to: As an adult (since turning 18), how many years practical experience do you have in owning, managing or working on an agricultural or grazing property?

Proportion of respondents (%)						n
< 5 yrs	5 - 9 yrs	10 - 19 yrs	20 - 29 yrs	30 - 39 yrs	> 40 yrs	
1.3	3.2	8.9	27.8	25.3	33.5	159

‘Diploma/associate diploma’ was nominated by 35.3 per cent of respondents as their highest level of formal education. The equivalent proportions for ‘trade/technical certificate’ and ‘all secondary school’ were 24.7 per cent and 11.3 per cent, respectively. Some 17 per cent of respondents identified their highest level of formal education as either ‘primary school’ or ‘part secondary school’. Eight per cent nominated a university degree as the highest level of formal education they had completed (Table 4.6).

Table 4.6: Highest level of formal education completed by Central Highlands respondents

Proportion of respondents (%)							n
Degree	Diploma / Associate Diploma	Trade / Technical certificate	All secondary school	Part secondary school	Primary school	Other	
8.0	35.3	24.7	11.3	11.4	6.0	3.2	161

### 4.3 Property characteristics

The mean area of land in the Central Highlands owned or managed by respondents and their immediate families was 8,782.0 ha. The median area was 3,918.5 ha, and the range extended from 10 to 204,905 ha. For 12.2 per cent of all respondents, the area owned or managed by themselves or their immediate families was less than 1,000 ha. For 37.3 per cent of respondents the area exceeded 5,000 ha (Table 4.7). When asked about the kind of tenure under which their property was mainly held, 77.6 per cent of respondents nominated freehold tenure, and 17.8 per cent nominated Crown leasehold (Table 4.8).

Table 4.7: Response to: What is the total area of land owned or managed by you or your immediate family in the Central Highlands?

Proportion of respondents (%)					n
< 100 ha	100 - 999 ha	1,000 - 1,999 ha	2,000 - 4,999 ha	> 5,000 ha	
1.8	10.4	11.8	38.3	37.3	259

Table 4.8: Central Highlands responses to: Under what tenure is your property mainly held?

Proportion of respondents (%)				n
Freehold	Crown leasehold	Leased, agisted or sharefarmed from another farmer	Other tenure	
77.6	17.8	2.4	2.2	164

### 4.4 Financial characteristics

Respondents were asked: “Approximately, what is your current level of equity in your property?”. The frequency distribution of responses is presented in Table 4.9.

Table 4.9: Frequency distribution of Central Highlands respondents' current equity ratios

Proportion of respondents (%)				n
>90% equity	70-89% equity	50-69% equity	<50% equity	
29.8	43.5	23.8	2.8	157

The median respondent reported a current equity ratio of 70-89 per cent. Over 40 per cent of respondents were in this category, while more than one-quarter reported a current equity ratio of less than 70 per cent.

A further question asked of respondents was: "How profitable has your property been over the last few years?". The frequency distribution of responses is presented in Table 4.10.

Table 4.10: Frequency distribution of Central Highlands respondents' recent profitability

Proportion of respondents (%)					n
Very profitable	Profitable	Breaking even	Unprofitable	Very unprofitable	
4.7	34.9	39.0	18.4	3.0	158

The reported recent profitability of the median respondent over recent years was 'breaking even'. Some two-fifths of respondents reported this level of profitability. While 39.6 per cent reported a better result than this ('very profitable' or 'profitable'), 21.4 per cent reported a result worse than breaking even ('unprofitable' or 'very unprofitable').

Respondents were also asked: "In the last few years, about what proportion of your household's total net income came from farming activities on your property?". The frequency distribution of responses is presented in Table 4.11.

Table 4.11: Frequency distribution of Central Highlands respondents' proportion of household net income over recent years obtained from farming their properties

Proportion of respondents (%)					n
> 90% of net income	70 - 89% of net income	50 - 69% of net income	20 - 49% of net income	< 20% of net income	
67.0	11.7	6.1	4.3	10.9	158

The median respondent reported at least 90 per cent of their household net income over recent years coming from farming activities on their property. Two-thirds of respondents were in this category, and almost four-fifths reported deriving at least 70 per cent of their household net income from farming their property. Some 15 per cent of respondents reported that less than half their household net income came from farming their properties.

Respondents were asked to estimate the percentages of their properties' net income (revenue minus expenses) from farming over the previous few years that came from different enterprise types. The mean percentages coming from grazing enterprises and broadacre dryland cropping enterprises were 65.0 per cent and 30.4 percent, respectively. Broadacre irrigated cropping, horticulture / viticulture and 'other' enterprises accounted for the remaining 4.6 per cent (Table 4.12). The median percentages of property net income derived from grazing and broadacre dryland cropping enterprises were 90 per cent and five per cent, respectively. The median percentages for each of the other enterprise categories were equal to zero.

Table 4.12: Percentage of net farm income derived from various enterprise types: mean and median values for the Central Highlands

Enterprise type	Mean % contribution to net farm income	Median % contribution to net farm income	n
Broadacre cropping - dryland	30.4	5.0	256
Broadacre cropping - irrigated	3.6	0.0	256
Grazing	65.0	90.0	256
Dairy	0.00	0.0	256
Horticulture / viticulture	0.4	0.0	256
Other farming enterprises	0.7	0.0	256

Only 10.2 per cent of respondents answered that zero net income had been derived from grazing enterprises, whereas 48.0 per cent indicated they had obtained no net income from broadacre cropping enterprises (Table 4.13). More than 90 per cent of respondents in each case said they had received zero net income from the remaining enterprise categories. Whereas 57.5 per cent of respondents answered that they had derived more than 75 per cent of their net farm income from grazing enterprises, only 22.6 per cent answered equivalently in respect of broadacre cropping enterprises.

Table 4.13: Percentage of net farm income derived from various enterprise types: frequency distributions for the Central Highlands

	Proportion of respondents (%)						n
	0% of net income	1 - 9% of net income	10 - 24% of net income	25 - 49% of net income	50 - 74% of net income	> 75% of net income	
Broadacre cropping - dryland	48.0	4.2	9.2	6.1	9.9	22.6	256
Broadacre cropping - irrigated	92.5	1.4	0.6	2.0	0.8	2.7	256
Grazing	10.2	5.4	10.5	7.9	8.5	57.5	256
Dairy	100.0	0.0	0.0	0.0	0.0	0.0	256
Horticulture / viticulture	99.5	0.0	0.0	0.0	0.0	0.5	256
Other farming enterprises	96.7	1.5	0.4	0.5	0.9	0.0	256

## 4.5 Goals in farming

Respondents were asked to rate how much priority they give to eight different ‘goals they are aiming for in farming’. Frequency distributions of the ratings for the different goals are shown in Table 4.14. A mean score for each goal is included also, based on scoring ‘very high priority’ ratings as one, ‘high priority’ ratings as two, and so on until ‘very low priority’ were scored as five. The lower the mean score for a goal, therefore, the more the ‘average respondent’ considered it a high priority.

Table 4.14: Frequency distributions of Central Highlands responses to: People have many different goals they are aiming for in farming, depending on their own situation. Please indicate the priority you give to each goal listed below.

Goal: To main or enhance ...	Proportion of respondents (%)					Mean score*	n
	Very high priority	High priority	Moderate priority	Low priority	Very low priority		
Profitability of our farm business	61.6	29.0	7.2	1.8	0.5	1.49	256
Our family's income	48.1	37.1	11.9	1.2	1.7	1.69	160
Productivity of our land and other resources	59.1	32.4	7.2	1.3	0.0	1.48	159
Condition of our natural resources and environment	48.8	42.5	8.3	0.5	0.0	1.59	256
Attractiveness of our property	18.8	42.8	32.3	6.1	0.0	2.24	157
Our way of life	35.3	43.1	17.3	3.6	0.7	1.85	160
Our technical skills and innovation	27.0	42.5	26.8	3.6	0.0	2.07	159
Our standing in the community	12.8	24.6	41.1	16.2	5.3	2.76	159

\* Very high priority = 1, high = 2, moderate = 3, low = 4, and very low priority = 5.

On this basis, the average respondent considered ‘productivity of our land and resources’ (hereafter ‘productivity’) and ‘profitability of our farm business’ (‘profitability’) to be the two goals of highest priority. The mean scores for each of these goals indicate the average respondent rated them mid-way between ‘high’ and ‘very high’ priority.

After the ‘productivity’ and ‘profitability’ goals, the goal of next highest priority for the average respondent was ‘condition of our natural resources and environment’ (hereafter ‘resource condition’), followed by ‘our way of life’. The mean score for ‘resource condition’ indicates the average respondent rated this goal close to midway between ‘high’ and ‘very high’ priority, but leaning towards ‘high’. The mean score for ‘way of life’ reveals the average respondent rated this goal marginally on the ‘very high priority’ side of ‘high priority’.

More than 90 per cent of respondents attributed at least ‘high priority’ to the ‘productivity’, ‘profitability’ and ‘resource condition goals’. The corresponding proportion for ‘way of life’ was 78 per cent (Table 4.15).

‘Our technical skills and innovation’ (hereafter ‘skills and innovation’) was the goal of next highest priority for the average respondent, followed by, ‘attractiveness of our property’ (‘property attractiveness’) and, finally, ‘our standing in the community’.

The mean scores for ‘skills and innovation’ and ‘property attractiveness’ were 2.07 and 2.22, respectively, indicating that the average respondent rated them on the ‘moderate priority’ side of ‘high priority’. The mean score of 2.76 for ‘our standing in the community’ suggests that the average respondent rated this goal on the ‘high priority’ side of ‘moderate priority’.

The WSR2 test was applied to assess the statistical significance of these differences (Table E.1), and we can conclude as a result with at least 95 per cent confidence for each pairwise comparison that farmers in the Central Highlands tended to rate:

- ‘productivity’ a higher priority than each other goal except ‘profitability’;
- ‘profitability’ a higher priority than each other goal except ‘productivity’;
- ‘resource condition’ a higher priority than each remaining goal except ‘family income’;
- ‘family income’ a higher priority than each remaining goal except ‘way of life’;
- ‘way of life’ a higher priority than each remaining goal;
- ‘skills and innovation’ as a higher priority than each remaining goal;
- ‘property attractiveness’ a higher priority than ‘standing in the community’; and
- ‘standing in the community’ a lower priority than each of the other goals.

The finding that Central Highlands farmers tend to prioritise the profitability and productivity goals more highly than the family income goal suggests they are prepared in some degree to sacrifice family income in the pursuit of farm profitability and productivity (e.g., by foregoing opportunities to divert family labour to off-farm employment that would contribute more to family income). This greater emphasis on profitability and productivity compared with family income is perhaps associated – to the extent that the way of life valued by Central Highlands farmers tends to be focused on-farm – with the finding that ‘way of life’ is the fourth highest priority. Almost 80 per cent of respondents attributed at least ‘high priority’ to the way of life goal (Table 4.15).

Table 4.15: Cumulative frequency distributions of Central Highlands responses to: People have many different goals they are aiming for in farming, depending on their own situation. Please indicate the priority you give to each goal listed below.

Goal: To main or enhance ...	Cumulative proportion of respondents (%)				
	Very high priority	High priority	Moderate priority	Low priority	Very low priority
Profitability of our farm business	61.6	90.6	97.7	99.5	100.0
Our family's income	48.1	85.2	97.1	98.3	100.0
Productivity of our land and other resources	59.1	91.5	98.7	100.0	100.0
Condition of our natural resources and environment	48.8	91.3	99.5	100.0	100.0
Attractiveness of our property	18.8	61.6	93.9	100.0	100.0
Our way of life	35.3	78.4	95.7	99.3	100.0
Our technical skills and innovation	27.0	69.6	96.4	100.0	100.0
Our standing in the community	12.8	37.4	78.5	94.7	100.0

Despite the statistical evidence that Central Highlands farmers tended to consider the ‘resource condition’ goal as less important for themselves than the ‘productivity’ and ‘profitability’ goals, they did not regard the resource condition goal as unimportant. Indeed, the statistical evidence suggests they tended to regard ‘resource condition’ with the same importance as ‘family income’, and of more importance than ‘way of life’, ‘skills and innovation’, ‘property attractiveness’ and ‘standing in the community’. Of all respondents, moreover, 48.8 per cent considered the resource condition goal a ‘very high’ priority. A further 42.5 per cent considered it a ‘high’ priority (Table 4.14). Only 0.5 per cent rated this goal as a ‘low’ or ‘very low’ priority. The proportion of respondents attributing ‘high’ or ‘very high’ priority to ‘resource condition’ was 2.4 times greater than the corresponding proportion for ‘standing in the community’ (Table 4.15).

## 4.6 Farm business threats

Respondents were asked to indicate the degree to which eleven different issues posed threats to the future of their farm businesses. Frequency distributions of the ratings for the different threats are shown in Table 4.16. A mean score for each issue is included also, based on scoring ‘very large threat’ ratings as one, ‘large threat’ ratings as two, and so on until ‘no threat’ was scored as five. The lower the mean score for an issue, therefore, the more the average respondent viewed it as a threat to their farm business.

These mean scores indicate that the average respondent rated ‘drought’ as the greatest threat to their farm business, followed by ‘government regulation’, ‘commodity prices’, ‘pest and plants’, ‘declining water quality and quantity’, ‘loss of soil fertility and structure’, ‘soil erosion’, ‘overclearing and biodiversity loss’ and, finally, ‘salinity’. The mean score of 1.71 for ‘drought’ compares with a mean score of 2.99 for ‘pest plants and animals’ – the resource condition issue posing the greatest threat to the average respondent – and with a mean score of 4.37 for ‘salinity’ – the resource condition issue posing the least threat to the average respondent.

Table 4.16: Frequency distributions of Central Highlands responses to: How much does each issue below pose a threat to the future of your farm business?

Issue	Proportion of respondents (%)					Mean score*	n
	Very large threat	Large threat	Moderate threat	Minor threat	No threat		
Government regulation	41.3	28.1	19.2	11.0	0.4	1.97	162
Commodity prices	30.9	37.9	27.0	3.1	1.2	2.06	168
Drought	50.9	31.4	14.2	3.1	0.4	1.71	159
Pest plants and animals	6.2	21.8	41.5	28.3	2.2	2.99	167
Soil erosion	4.4	11.4	31.0	45.9	7.4	3.41	165
Loss of soil fertility and structure	9.3	10.7	21.8	50.0	8.2	3.37	164
Overclearing and biodiversity loss	2.0	4.0	9.8	29.9	54.4	4.30	165
Declining water quality and quantity	12.5	17.8	15.6	31.8	22.3	3.35	165
Salinity	2.3	2.6	7.1	32.8	55.3	4.37	167

\* Very large threat = 1, large threat = 2, moderate threat = 3, minor threat = 4, and no threat = 5.

Somewhat simplistically (since the scores are measured on ordinal rather than interval scales), these figures might be taken to imply that the average Central Highlands respondent rated ‘drought’ as 1.8 times (2.99/1.71) more a threat to their farm business than ‘pest plants and animals’, and 2.6 times (4.37/1.71) times more a threat than ‘salinity’. On the same basis, we might assess the average respondent as rating ‘pest plants and animals’ as 1.5 times (4.37/2.99) more a threat than ‘salinity’.

Just over half all respondents rated ‘drought’ a very large threat, compared with 41 per cent for ‘government regulation’ and 31 per cent for ‘commodity prices’. The resource condition issue rated most frequently (13 per cent of respondents) as a ‘very large threat’ was ‘declining water quality and quantity’, while ‘overclearing and biodiversity loss’ was the resource condition issue rated least frequently (2 per cent of respondents) as a ‘very large threat’.

Of all respondents, 96.5 per cent of respondents rated ‘drought’ as at least a moderate threat (i.e., as a very large, large or moderate threat), compared with 95.8 per cent and 88.6 per cent, respectively, for ‘commodity prices’ and ‘government regulation’ (Table 4.17). The resource condition issue rated most frequently (by 69.5 per cent of respondents) as at least a moderate threat was ‘pest plants and animals’. The resource condition issue rated with the lowest frequency (7.1 per cent of respondents) as at least a moderate threat was ‘salinity’.

‘Salinity’, ‘overclearing and biodiversity loss’ and ‘declining water quality and quantity’ were the issues most frequently rated by respondents as ‘no threat’ (55.3 per cent, 54.4 per cent and 22.3 per cent, respectively; Table 4.16). The resource condition issue rated least frequently (by 2.2 per

Table 4.17 Cumulative frequency distributions of Central Highlands responses to: *How much does each issue below pose a threat to the future of your farm business?*

	Cumulative proportion of respondents (%)				
	Very large threat	Large threat	Moderate threat	Minor threat	No threat
Government regulation	41.3	69.4	88.6	99.6	100.0
Commodity prices	30.9	68.8	95.8	98.8	100.0
Drought	50.9	82.3	96.5	99.6	100.0
Pest plants and animals	6.2	28.0	69.5	97.8	100.0
Soil erosion	4.4	15.8	46.8	92.6	100.0
Loss of soil fertility and structure	9.3	20.0	41.8	91.8	100.0
Overclearing and biodiversity loss	2.0	5.9	15.7	45.6	100.0
Declining water quality and quantity	12.5	30.3	45.9	77.7	100.0
Salinity	2.3	4.8	11.9	44.7	100.0

cent of respondents) as ‘no threat’ was ‘pest plants and animals’. Only 0.4 per cent regarded each of ‘drought’ and ‘government regulation’ as ‘no threat’.

Hence, there appears to have been a strong tendency among respondents to rate the resource condition issues specified as substantially lesser threats to their farm businesses than the more generic issues of ‘drought’, ‘government regulation’ and ‘commodity prices’. Even so, the discussion suggests some marked differences between the resource condition issues in how Central Highlands farmers rated them as threats to their farm businesses.

The WSR2 test was applied to evaluate the statistical significance of differences between response distributions for the different issues (Table E.2). We can conclude consequently with at least 95 per cent confidence for each pairwise comparison that Central Highlands farmers tended to rate:

- ‘drought’ a greater threat than each of the other issues;
- ‘government regulation’ a greater threat than each of the remaining issues except ‘commodity prices’;
- ‘commodity prices’ a greater threat than each of the remaining issues;
- ‘pest plants and animals’ a greater threat than each of the remaining issues;
- ‘declining water quality and quantity’ a greater threat than each of the remaining issues except ‘loss of soil fertility and structure’ and ‘soil erosion’;
- ‘loss of soil fertility and structure’ a greater threat than each of the remaining issues except ‘soil erosion’; and

- ‘soil erosion’ a greater threat than each of the remaining issues.

However, we cannot conclude with 95 per cent confidence that Central Highlands farmers tended to rate ‘overclearing and biodiversity loss’ differently from ‘salinity’.

## 4.7 Attachment to place

Various studies have identified individuals’ ‘attachment’ to a place as a key influence on their decisions to adopt behaviours beneficial for that place. In order to account for this influence, respondents were asked to indicate how strongly they agreed or disagreed with four statements concerned with their feelings of attachment to different scales of place (i.e., their property, their district, their subregion, and their whole region). Frequency distributions of responses to each statement are presented in Table 4.18.

Table 4.18: Frequency distributions of Central Highlands responses to attitudinal statements concerning attachment to place

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
I feel a bond with our property	62.5	35.2	2.3	0.0	1.38	163
I feel a bond with our district	43.9	49.6	6.5	0.0	1.62	162
I feel a bond with the Central Highlands	37.3	55.3	7.4	0.0	1.70	160
I feel a bond with the Fitzroy Basin Region	6.2	50.7	39.8	3.2	2.38	153

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

A mean score for each goal is presented in the table also, based on scoring ‘strongly agree’ ratings as one, ‘agree’ ratings as two, ‘disagree’ as three, and ‘strongly disagree’ as four. Hence, ‘ambivalent’ would be scored as 2.5. The lower the mean score for a statement, therefore, the more strongly the ‘average respondent’ agreed with it. On this basis, the place the average respondent agrees most strongly they feel a bond with is their own property, followed by their district, the Central Highlands, and, finally, by the Fitzroy Basin Region.

The mean scores for ‘our property’, ‘our district’ and ‘Central Highlands’ (i.e., their subregion) indicate that the average respondent’s level of agreement that they feel a bond with each lies between ‘agree’ and ‘strongly agree’. However, note that the mean score for ‘our property’ is markedly lower than the mean scores (close to one another) for ‘our district’ and ‘Central Highlands’. It seems, therefore, that the average respondent feels a substantially closer bond with their property than with either their district or subregion. The mean score in respect of the Fitzroy Basin Region indicates that the average respondent’s level of agreement that they feel a bond with this Region lies marginally on the ‘agree’ side of ambivalent.

On the basis of the WSR2 test (Table E.3), we can conclude with at least 95 per cent confidence for each pairwise comparison that the wider population of Central Highlands farmers tended to agree more strongly that they feel a bond with their:

- own property than with their district;
- district than with their subregion (Central Highlands); and
- subregion (Central Highlands) than with their whole NRM region (Fitzroy Basin).

We can conclude, therefore, that a tendency exists among farmers in the Central Highlands for their feelings of attachment to ‘their place’ to weaken as the boundaries of ‘their place’ are drawn further from their own property boundaries.

## **4.8 Farmers’ perceptions of how different NRM practices contribute to their goals**

### **4.8.1 All respondents**

Respondents were asked to rate how eight different on-farm natural resource management (NRM) practices would help or hurt pursuit of their main farming goals. These NRM practices are listed in Table 4.19. These practices were included on advice from the Central Highlands Regional Resources Use Planning Cooperative (CHRRUP) that they were reasonably relevant to farmers across its subregion and also included the main kinds of on-farm NRM practices at which its programs were targeted.

Of these practices, ‘irrigation water-use efficiency measures’ (hereafter ‘irrigation efficiency measures’) was rated most often (81.2 per cent of respondents) as ‘not applicable’, followed by ‘minimum or zero tillage cropping’ (33.4 per cent), ‘property management planning’ (27.7 per cent), ‘soil conservation measures’ (18.5 per cent), ‘fencing riparian areas’ (17.8 per cent) and ‘fencing to land type for grazing’ (15.0 per cent) (‘fencing to land type’) (Table 4.19). ‘Environmental weeds control’ was rated *least* often (3.7 per cent of respondents) as ‘not applicable’, followed by ‘maintain groundcover on grazing land’ (‘maintain groundcover’) (9.5 per cent).

‘Maintain groundcover’ was the practice that respondents rated most frequently as ‘help greatly’ (67.3 per cent of respondents), followed by ‘environmental weeds control’ (49.7 per cent), ‘soil conservation measures’ (46.7 per cent), ‘minimum or zero tillage cropping’ (45.5 per cent), ‘fencing to land type’ and ‘fencing riparian areas’ (30.8 per cent). ‘Irrigation efficiency measures’ was the practice that respondents rated *least* frequently as ‘help greatly’ (10.8 per cent of respondents), followed by ‘property management planning’ (16.0 per cent) (Table 4.19).

‘Maintain groundcover’ was rated also most often (90.1 per cent of respondents) as at least ‘help slightly’ (i.e., as ‘help greatly’, ‘help moderately’ or ‘help slightly’), followed by ‘environmental

Table 4.19: Frequency distributions of Central Highlands responses to: How strongly would use of each practice below help or hurt your property’s chances of achieving its main goals?

Practice	Proportion of respondents (%)							n
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly	Not applicable	
Maintain groundcover on grazing land	67.3	17.1	5.7	0.0	0.4	0.0	9.5	158
Fencing to land type for grazing	37.2	28.6	14.8	2.1	1.2	1.0	15.0	161
Minimum or zero tillage cropping	45.5	10.6	8.0	0.7	0.0	1.7	33.4	157
Soil conservation measures (eg, contour banks)	46.7	25.2	8.4	0.0	0.0	1.3	18.5	158
Irrigation water-use efficiency measures	10.8	3.8	3.3	3.3	3.3	0.9	81.2	150
Property management planning (eg, with CHRRUP, cotton BMP, or FMS programs)	16.0	19.2	30.2	2.2	2.1	2.6	27.7	154
Fencing riparian areas and installing watering points	30.8	22.0	16.2	4.0	5.0	4.3	17.8	159
Environmental weeds control (eg, parthenium, parkinsonia, rubber vine)	49.7	22.5	16.8	1.8	2.6	2.9	3.7	163

weeds control’ (88.9 per cent), ‘fencing to land type’ (80.7 per cent) and ‘soil conservation measures’ (80.3 per cent) (Table 4.20). The practice rated *least* often (17.9 per cent of respondents) as at least ‘help slightly’ was ‘irrigation efficiency measures’, followed by ‘minimum or zero tillage cropping’ (64.1 per cent), ‘property management planning’ (65.4 per cent) and ‘fencing riparian areas’ (68.9 per cent).

#### 4.8.2 Respondents for whom practices were applicable

Statistical testing for differences between the frequency distributions for the different practices is complicated by the difficulty of assigning a help/hurt score to the ‘not applicable’ (‘na’) responses. This complication was addressed by (i) first testing statistically for differences between practices in terms of proportions of respondents rating them as ‘not applicable’, and then (ii) excluding such respondents from the samples and proceeding to test for differences between frequency distributions in respect of the resulting samples of ‘applicable respondents’.

Step (i) involved WSR2 tests (Table E.4), from which we can conclude with at least 95 per cent confidence for each pairwise comparison that:

Table 4.20: Cumulative frequency distributions of Central Highlands responses to: How strongly would use of each practice below help or hurt your property’s chances of achieving its main goals?

	Cumulative proportion of respondents (%)						
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly	Not applic
Maintain groundcover on grazing land	67.3	84.4	90.1	90.1	90.5	90.5	100.0
Fencing to land type for grazing	37.2	65.9	80.7	82.8	84.0	85.0	100.0
Minimum or zero tillage cropping	45.5	56.1	64.1	64.9	64.9	66.6	100.0
Soil conservation measures	46.7	71.9	80.3	80.3	80.3	81.5	100.0
Irrigation water-use efficiency measures	10.8	14.5	17.9	17.9	17.9	18.8	100.0
Property management planning	16.0	35.2	65.4	67.6	69.7	72.3	100.0
Fencing riparian areas and installing watering points	30.8	52.8	68.9	72.9	77.9	82.2	100.0
Environmental weeds control	49.7	72.2	88.9	90.7	93.4	96.3	100.0

- ‘irrigation efficiency measures’ was rated ‘na’ by a higher proportion of Central Highlands farmers than each of the other practices;
- ‘minimum or zero tillage cropping’ was rated ‘na’ by a higher proportion than each of the remaining practices except ‘property management planning’;
- ‘property management planning’ was rated ‘na’ by a higher proportion than each of the remaining practices except ‘soil conservation measures’ and ‘fencing riparian areas’;
- ‘soil conservation measures’ was rated ‘na’ by a higher proportion than each of the remaining practices except ‘fencing riparian areas’;
- ‘fencing riparian areas’ was rated ‘na’ by a higher proportion than ‘environmental weeds control’; and
- ‘fencing to land type’ was rated ‘na’ by a higher proportion than ‘environmental weeds control’.

We cannot conclude with 95 per cent confidence that ‘maintain groundcover’ and ‘environmental weeds control’ tended to be rated ‘na’ by different proportions of Central Highlands farmers.

The outcomes of step (ii) are shown in Table 4.21, which presents frequency distributions of help/hurt ratings from applicable respondents. The distributions for practices with the largest shares of ‘na’ responses – ‘irrigation efficiency measures’ and ‘minimum or zero tillage cropping’ – logically are affected most by recalculating the distributions without such responses. Whereas ‘irrigation efficiency measures’ was ranked eighth for ‘help greatly’ ratings when ‘na’

Table 4.21: Frequency distributions for responses from applicable Central Highlands respondents to:  
How strongly would use of each practice below help or hurt your property’s chances of achieving its main goals?

	Proportion of respondents identifying practice as applicable (%)						Mean score*	n
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly		
Maintain groundcover on grazing land	74.4	18.9	6.3	0.0	0.4	0.0	1.33	143
Fencing to land type for grazing	43.8	33.7	17.4	2.5	1.5	1.2	1.88	136
Minimum or zero tillage cropping	68.4	15.9	12.0	1.1	0.0	2.6	1.56	104
Soil conservation measures	57.3	30.9	10.2	0.0	0.0	1.5	1.59	129
Irrigation water-use efficiency measures	57.4	20.0	17.8	0.0	0.0	4.8	1.80	28
Property management planning	22.1	26.6	41.8	3.0	3.0	3.6	2.49	111
Fencing riparian areas and installing watering points	37.4	26.7	19.7	4.8	6.1	5.3	2.31	130
Environmental weeds control	51.6	23.3	17.4	1.9	2.7	3.0	1.90	157

\* Help greatly = 1; Help moderately = 2; Help slightly = 3; Hurt slightly = 4; Hurt moderately = 5; and Hurt greatly = 6.

responses were included (Table 4.19), it became ranked third when these responses were excluded (Table 4.21). While this practice was ranked eighth for ratings of at least ‘help slightly’ (i.e., ‘help greatly’, ‘help moderately’ or help slightly’) when ‘na’ responses were included (Table 4.20), it became ranked fourth when these responses were excluded (Table 4.22).

Similarly, ‘minimum or zero tillage cropping’ was ranked fourth for ‘help greatly’ ratings when ‘na’ responses were included, and became ranked second once these responses were excluded. This practice was ranked only seventh eighth for ratings of at least ‘help slightly’ when ‘na’ responses were included. However, it became ranked third when these responses were excluded.

Mean help/hurt scores were assigned in Table 4.21 to each practice, after scoring ‘help greatly’ ratings as one, ‘help moderately’ ratings as two, and so on until ‘hurt greatly’ ratings were scored as six. The lower the mean score for a practice, therefore, the more the ‘average applicable respondent’ considered the practice to be helpful. On this basis, the ‘average applicable respondent’ rated ‘maintain groundcover’ as the most helpful practice. With a mean score of 1.33, the average applicable respondent rated it on the ‘help moderately’ side of ‘help greatly’.

On the same basis, ‘minimum or zero tillage cropping’ was rated by the average applicable respondent as the next most helpful practice, followed by ‘soil conservation measures’, ‘irrigation efficiency measures’, ‘fencing to land type’, and ‘environmental weeds control’. The mean scores for these last five practices lie between 1.5 and two, indicating that the average applicable respondent rated each on the ‘help greatly’ side of ‘help moderately’. The practice with the highest mean score was ‘property management planning’, followed by ‘fencing riparian areas’. The mean scores for these two practices were 2.49 and 2.31, respectively, indicating that the

Table 4.22: Cumulative frequency distributions for responses from applicable Central Highlands respondents to: *How strongly would use of each practice below help or hurt your property's chances of achieving its main goals?*

	Cumulative proportion of respondents identifying practice as applicable (%)					
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly
Maintain groundcover on grazing land	74.4	93.3	99.6	99.6	100.0	100.0
Fencing to land type for grazing	43.8	77.5	94.9	97.3	98.8	100.0
Minimum or zero tillage cropping	68.4	84.3	96.3	97.4	97.4	100.0
Soil conservation measures	57.3	88.2	98.5	98.5	98.5	100.0
Irrigation water-use efficiency measures	57.4	77.4	95.2	95.2	95.2	100.0
Property management planning	22.1	48.7	90.5	93.5	96.4	100.0
Fencing riparian areas and installing watering points	37.4	64.1	83.8	88.6	94.7	100.0
Environmental weeds control	51.6	75.0	92.4	94.3	97.0	100.0

average applicable respondent rated each on the ‘help moderately’ side of ‘help slightly’. Somewhat simplistically (since the scores are measured on ordinal rather than interval scales), we might deduce from the above figures that ‘maintain groundcover’ was rated by its average applicable respondent as 1.9 times (2.49/1.33) more helpful to their property than ‘property management planning’ was rated by its average applicable respondent.

On the basis of the WSR2 test (Table E.5), we can conclude with at least 95 per cent confidence for each pairwise comparison that ‘applicable Central Highlands farmers’<sup>9</sup> tended to rate:

- ‘maintain groundcover’ as more helpful than each other practice except ‘minimum or zero tillage cropping’;
- ‘minimum or zero tillage cropping’ as more helpful than ‘fencing to land type’, ‘fencing riparian areas’ and ‘property management planning’;
- ‘soil conservation measures’ as more helpful than ‘fencing riparian areas’ and ‘property management planning’;
- ‘irrigation efficiency measures’ as more helpful than ‘environmental weeds control’ and ‘property management planning’;
- ‘environmental weeds control’ as more helpful than ‘fencing riparian areas’ and ‘property management planning’; and

<sup>9</sup> That is, Central Highlands farmers who identified both practices in a comparison as applicable to their properties.

- ‘fencing riparian areas’ as more helpful than ‘property management planning’.

## 4.9 Current and expected future use of targeted on-farm conservation practices

Applicable respondents were asked to indicate the approximate areas of their properties on which each of the on-farm practices detailed in the previous section were (i) currently being used, and (ii) expected to be used after ten years. Frequency distributions for current areas of use of each practice by applicable respondents are presented in Table 4.23. The proportions of applicable respondents reporting zero current use ranged from a minimum of 8.0 per cent for ‘maintain groundcover’ to a maximum of 52.9 per cent for ‘irrigation efficiency measures’.

Table 4.23: Frequency distributions for responses from applicable Central Highlands respondents to:  
Please indicate the approximate areas of your property on which each practice below is already in use.

Practice	Proportion of applicable respondents (%)						n
	0 ha	1-49 ha	50-199 ha	200-499 ha	500-1,999 ha	>= 2,000 ha	
Maintain groundcover on grazing land	8.0	2.0	4.1	12.5	19.9	53.5	134
Fencing to land type for grazing	36.4	0.0	3.1	6.9	18.2	35.4	125
Minimum or zero tillage cropping	17.0	1.4	5.2	13.3	37.6	25.5	97
Soil conservation measures	23.4	3.7	4.2	7.1	31.3	30.1	120
Irrigation water-use efficiency measures	52.9	5.1	4.8	18.6	16.2	2.4	26
Property management planning	40.1	0.0	0.0	2.4	8.6	48.9	106
Fencing riparian areas and installing watering points	45.2	1.1	2.9	15.3	11.9	23.5	118
Environmental weeds control	23.4	2.7	4.7	9.8	16.1	43.3	142

The mean and median responses for each practice for both parts of the question are shown in Table 4.24. For each practice, the mean area of use expected by applicable respondents after ten years exceeds their current mean area, and the median expected area exceeds the current median area. ‘Minimum or zero tillage cropping’ is the practice for which the median area was expected to increase the least. For each practice, both currently and after 10 years, the mean area substantially exceeds the median area. For ‘irrigation efficiency practices’, current use by the median applicable respondent was zero hectares.

The WSR2 test was applied to assess the statistical confidence with which we can conclude that differences in current and expected areas for each practice exist in the wider population of applicable Central Highlands farmers<sup>10</sup>. With over 95 per cent confidence for each practice except

<sup>10</sup> The non-parametric WSR2 test was used instead of the t-test since the distributions for most practices contravened the assumption of normality upon which the accuracy of parametric tests including the t-test depends.

Table 4.24: Mean and median areas of practice use per applicable Central Highlands respondent, currently and expected after ten years

Practice	Mean area used per applicable respondent (ha)		Median area used per applicable respondent (ha)		p*
	Current	Expected after 10 years	Current	Expected after 10 years	
Maintain groundcover on grazing land	7,008.2	7,293.4	2,429.1	2,514.2	0.003
Fencing to land type for grazing	3,857.4	4,745.5	778.2	1,424.1	0.000
Minimum or zero tillage cropping	1,477.4	1,532.6	1,214.6	1,221.4	0.151
Soil conservation measures	2,602.5	3,407.2	1,170.5	1,360.0	0.000
Irrigation water-use efficiency measures	425.2	627.3	0.0	28.7	0.031
Property management planning	6,065.0	6,874.8	1,816.0	2,407.2	0.000
Fencing riparian areas and installing watering points	3,211.5	3,985.9	200.6	373.7	0.000
Environmental weeds control	4,414.4	4,417.2	1,308.0	1,732.3	0.007

\* Wilcoxon Signed Ranks Test, 2-tailed

‘minimum or zero tillage cropping’, we can conclude as a result that Central Highlands farmers did tend at the time of survey to expect their area of use of each practice to be higher after 10 years than it was currently.

Whereas Tables 4.23 and 4.24 were concerned with current adoption *areas* for each practice, in Table 4.25 the focus shifts to current adoption *rates*. The current adoption rate of a practice by each applicable respondent was calculated by dividing their current area of use by the area of their property, and expressing this rate as a percentage.

‘Irrigation efficiency measures’ was the practice with the highest proportion of applicable respondents (69.2 per cent) indicating a current adoption rate of less than 10 per cent, followed by ‘fencing riparian areas’ (59.2 per cent), ‘property management planning’ (41.2 per cent), ‘fencing to land type’ (40.3 per cent), ‘soil conservation measures’ (31.6 per cent), ‘minimum or zero tillage cropping’ (31.5 per cent) and ‘environmental weeds control’ (31.3 per cent). ‘Maintain groundcover’ had the lowest proportion (10.6 per cent) indicating a current adoption rate of less than 10 per cent.

‘Property management planning’ had the highest proportion of applicable respondents (45.4 per cent) indicating a current adoption rate of at least 90 per cent, followed by ‘maintain groundcover’ (41.7 per cent) and ‘environmental weeds control’ (38.9 per cent). ‘Irrigation efficiency measures’ had the lowest proportion (2.4 per cent) indicating a current adoption rate of 90 per cent or better, followed by ‘fencing riparian areas’ (9.4 per cent), ‘minimum or zero tillage cropping’ (9.6 per cent), ‘fencing to land type’ (15.8 per cent) and ‘soil conservation measures’ (17.4 per cent).

Next we turn our attention to *future* adoption rates (i.e., expected by applicable respondents 10 years after survey). These rates were calculated similarly as for current adoption rates. Frequency

distributions of future adoption rates by applicable respondents for each practice are presented in Table 4.26.

Table 4.25: Frequency distributions for current adoption rates by applicable Central Highlands respondents calculated from their responses to: *Please indicate the approximate areas of your property on which each practice below is already in use.*

Practice	Proportion (%) of applicable respondents with adoption rate:							n
	0%	1-9%	10-29%	30-49%	50-69%	70-89%	90% & over	
Maintain groundcover on grazing land	8.0	2.6	10.4	16.1	8.5	12.8	41.7	134
Fencing to land type for grazing	36.4	3.9	12.4	12.1	10.0	9.5	15.8	125
Minimum or zero tillage cropping	17.0	14.5	15.1	11.1	13.0	19.7	9.6	97
Soil conservation measures	23.4	8.1	15.5	10.2	12.9	12.5	17.4	120
Irrigation water-use efficiency measures	52.9	16.2	18.2	5.1	0.0	5.1	2.4	26
Property management planning	40.1	1.1	3.0	1.1	2.8	6.6	45.4	106
Fencing riparian areas and installing watering points	45.2	14.0	12.1	5.0	9.7	4.6	9.4	118
Environmental weeds control	23.4	7.9	9.7	9.1	3.8	7.2	38.9	142

Table 4.26: Frequency distributions for expected adoption rates after 10 years by applicable Central Highlands respondents calculated from their responses to: *Please indicate the approximate areas of your property on which you expect each practice to be used in 10 years time.*

Practice	Proportion (%) of applicable respondents with adoption rate:							n
	0%	1-9%	10-29%	30-49%	50-69%	70-89%	90% & over	
Maintain groundcover on grazing land	7.5	1.7	7.8	12.7	10.0	8.3	51.9	134
Fencing to land type for grazing	31.1	2.5	6.3	11.1	12.0	8.4	28.7	125
Minimum or zero tillage cropping	13.5	15.8	16.0	11.1	13.4	20.4	9.6	97
Soil conservation measures	21.4	6.5	13.5	9.7	12.5	12.6	23.9	120
Irrigation water-use efficiency measures	41.1	30.9	15.4	0.0	0.0	5.1	7.5	26
Property management planning	30.8	0.0	2.4	0.0	0.0	8.3	58.6	106
Fencing riparian areas and installing watering points	39.3	12.6	9.4	8.1	6.9	2.7	20.9	118
Environmental weeds control	22.9	4.4	10.1	7.1	3.7	4.9	46.8	142

The summary statistics – mean and median values – presented in Table 4.27 assist us to compare the current and future frequency distributions of adoption rates for each practice. For each

practice, the mean adoption rate expected by applicable respondents after ten years exceeds the mean current adoption rate, and the median expected adoption rate exceeds the median current adoption rate. For ‘minimum or zero tillage cropping’ and ‘irrigation efficiency measures’, however, the differences were slight. On the basis of the WSR2 test, we can conclude with over 95 per cent confidence for each practice except ‘minimum or zero tillage cropping’ and ‘irrigation efficiency measures’ that Central Highlands farmers tended at the time of survey to expect their adoption rate to increase over the ensuing 10 years.

Table 4.27: Mean and median adoption rate by applicable Central Highlands respondents for each practice, currently and as expected after ten years

Practice	Mean adoption rate per applicable respondent (% of property area)		Median adoption rate per applicable respondent (% of property area)		p*
	Current	Expected after 10 years	Current	Expected after 10 years	
Maintain groundcover on grazing land	65.4	71.0	79.7	90.3	0.000
Fencing to land type for grazing	36.2	47.5	21.8	45.7	0.000
Minimum or zero tillage cropping	40.9	42.0	39.2	40.0	0.147
Soil conservation measures	42.0	47.5	37.2	45.0	0.000
Irrigation water-use efficiency measures	11.6	15.1	0.0	1.6	0.156
Property management planning	53.1	65.7	78.0	100.0	0.000
Fencing riparian areas and installing watering points	23.6	32.4	3.3	7.7	0.000
Environmental weeds control	52.6	57.7	50.0	84.7	0.002

\* Wilcoxon Signed Ranks Test, 2-tailed

Observe that of all practices ‘maintain groundcover’ ranks highest in respect of median current adoption rate by applicable respondents (79.7 per cent), followed by ‘property management planning’ (78.0 per cent) and ‘environmental weeds control’ (50.0 per cent). In terms of median expected adoption rates after 10 years, however, ‘property management planning’ ranks the highest (100.0 per cent adoption by applicable respondents), followed by ‘property management planning’ (90.3 per cent) and ‘environmental weeds control’ (84.7 per cent).

Of all practices, ‘irrigation efficiency measures’ ranks lowest in respect of median current adoption rate by applicable respondents (0.0 per cent), followed by ‘fencing riparian areas’ (3.3 per cent), ‘fencing to land type’ (21.8 per cent), ‘soil conservation measures’ (37.2 per cent) and ‘minimum or zero tillage cropping’ (39.2 per cent). By the criterion of median expected adoption rate after 10 years, ‘irrigation efficiency measures’ (1.6 per cent adoption by applicable respondents) remains lowest ranked, followed by ‘fencing riparian areas’ (7.7 per cent), ‘minimum or zero tillage cropping’ (40.0 per cent), ‘soil conservation measures’ (45.0 per cent) and ‘fencing to land type’ (45.7 per cent).

Finally in this section, we examine the expectations of applicable respondents in respect of whether, and by how much, their use of each practice will have changed 10 years after the

survey<sup>11</sup>. Table 4.28 presents frequency distributions for these expectations. For all practices, we see that the proportion of applicable respondents expecting no change in practice use over the ensuing 10 years exceeds 60 per cent. This proportion is least for ‘fencing riparian areas’ (64.9 per cent) and greatest for ‘property management planning’ (81.1 per cent).

Table 4.28: Frequency distributions for differences in practice use expected by applicable Central Highlands respondents between the survey date and ten years afterwards.

Practice	Proportion (%) of applicable respondents expecting to change their use of practice by:							n
	<= -500 ha	-500 to -100 ha	-99 to -1 ha	0 ha	1 to 99 ha	100 to 499 ha	>= 500 ha	
Maintain groundcover on grazing land	0.5	0.0	0.0	76.8	2.9	5.3	14.6	134
Fencing to land type for grazing	0.5	0.0	0.0	66.1	0.0	4.0	29.4	125
Minimum or zero tillage cropping	2.7	1.8	2.4	79.6	0.0	7.8	5.6	97
Soil conservation measures	1.7	1.5	1.0	70.1	3.9	9.7	12.2	120
Irrigation water-use efficiency measures	0.0	0.0	5.1	73.1	5.1	6.7	9.9	26
Property management planning	0.0	0.0	1.1	81.1	0.0	2.6	15.3	106
Fencing riparian areas and installing watering points	1.5	1.0	0.5	64.9	5.2	5.9	20.9	118
Environmental weeds control	1.8	0.9	1.6	75.7	1.9	4.3	13.8	142

Across all practices, the proportion of applicable respondents anticipating reduced use ranges from a minimum of 0.5 per cent for ‘maintain groundcover’ and ‘fencing to land type’ to a maximum of 6.9 per cent for ‘minimum or zero tillage cropping’. The practice for which the largest proportion of applicable respondents anticipated increased use was ‘fencing to land type’ (33.4 per cent) followed by ‘fencing riparian areas’ (32.0 per cent), ‘soil conservation measures’ (25.8 per cent), ‘maintain groundcover’ (22.8 per cent), ‘irrigation efficiency measures’ (21.7 per cent), ‘environmental weeds control’ (20.0 per cent), ‘property management planning’ (17.9 per cent) and, finally, ‘minimum or zero tillage cropping’ (13.4 per cent).

#### 4.10 Perceptions regarding other farmers’ current use of targeted on-farm practices

Applicable respondents<sup>12</sup> were asked: “From what you have seen and heard, how widely is each practice below already used in your district”. Frequency distributions of the responses for each practice are shown in Table 4.29. Mean scores were assigned in this table to each practice, after scoring ‘wide use’ ratings as one, ‘moderate use’ ratings as two, ‘limited use’ ratings as three, and ‘zero or minimal use’ ratings as four. The lower the mean score for a practice, therefore, the

<sup>11</sup> For each practice, expected change in use was calculated for each applicable respondent by subtracting their current area of use from their expected area of use after 10 years.

<sup>12</sup> Respondents were asked to answer this question only for practices they indicated were applicable to their own properties.

more the ‘average applicable respondent’ considered the practice to be used widely within their district.

On this basis, the average applicable respondent perceives ‘minimum or zero tillage cropping’ as used most widely in their district – about mid-way between ‘moderate use’ and ‘wide use’. On the same basis, the average applicable respondent perceives ‘soil conservation measures’ to be the practice adopted next most widely in their district – also between ‘moderate’ and ‘wide’ use.

Table 4.29: Frequency distributions of responses from applicable Central Highlands respondents to:  
*From what you have seen and heard, how widely is each practice below already used in your district?*

Practice	Proportion of applicable respondents (%)				Mean score*	n
	Wide use	Moderate use	Limited use	Zero / minimal use		
Maintain groundcover on grazing land	18.1	51.6	24.3	6.0	2.18	138
Fencing to land type for grazing	6.7	42.6	43.8	6.9	2.51	132
Minimum or zero tillage cropping	60.0	30.7	6.0	3.3	1.53	101
Soil conservation measures	47.5	44.9	6.5	1.0	1.61	123
Irrigation water-use efficiency measures	28.9	45.1	18.7	7.2	2.04	25
Property management planning	10.0	36.1	45.3	8.6	2.53	108
Fencing riparian areas and installing watering points	6.1	36.2	45.6	12.1	2.64	122
Environmental weeds control	19.0	49.9	29.0	2.1	2.14	147

\* Wide use = 1; moderate use = 2; limited use = 3; and zero / minimal use = 4.

‘Irrigation efficiency measures’ is ranked third on this basis, followed by ‘environmental weeds control’, ‘maintain groundcover’, ‘fencing to land type’, ‘property management planning’ and, finally, ‘fencing riparian areas’. The mean score for each of these six practices lies between two and three, indicating that the applicable respondent perceives their use within their district as between ‘moderate use’ and ‘limited use’ (although the first three are close to ‘moderate use’ and the last three are around mid-way between ‘moderate use’ and ‘limited use’).

With what statistical confidence can we conclude that this ranking of practices for the average applicable respondent on a scale of wide / limited use applies to the broader population of applicable Central Highlands farmers? Results from the WSR2 test (Table E.6) indicate we can conclude with at least 95 per cent confidence for each pairwise comparison that applicable Central Highlands farmers tended to rate:

- ‘minimum or zero tillage cropping’ as used more widely in their district than each other practice except ‘soil conservation measures’;

- ‘soil conservation measures’ as used more widely in their district than each remaining practice;
- ‘irrigation efficiency measures’ as used more widely in their district than ‘maintain groundcover’;
- ‘environmental weeds control’ as used more widely in their district than ‘fencing to land type’, ‘property management planning’ and ‘fencing riparian areas’;
- ‘maintain groundcover’ as used more widely in their district than ‘fencing to land type’, ‘property management planning’ and ‘fencing riparian areas’;
- ‘fencing to land type’ as used more widely in their district than ‘fencing riparian areas’; and
- ‘property management planning’ as used more widely in their district than ‘fencing riparian areas’.

#### **4.11 Perceptions regarding other farmers’ *eventual* use of targeted on-farm practices**

Following on from the survey question just covered, applicable respondents<sup>13</sup> were asked: “How widely do you expect each practice will *eventually* be used in your district?”. Frequency distributions of the responses for each practice are presented in Table 4.30. Similarly as for Table 4.29, mean scores were assigned in this table to each practice. The lower the mean score for a practice, therefore, the more the ‘average applicable respondent’ expects the practice to eventually be used widely within their district.

Comparison of Tables 4.29 and 4.30 reveals, for each practice, that the mean score for perceived current district use exceeds the mean score for perceived eventual district use; i.e., the average applicable respondent expects eventual district use of each practice to exceed current district use. On the basis of the WSR2 test, we can conclude with over 95 per cent confidence for each practice except ‘irrigation efficiency measures’ that the broader population of central Highlands farmers does tend to expect eventual district use of each practice to exceed current district use.

Figures in the ‘mean score ratio’ column of Table 4.30 indicate the proportionate degree to which the average applicable respondent expects eventual use of each practice in their district to exceed current use. The ratio for each practice was calculated by dividing the relevant mean score in Table 4.29 by the relevant mean score in Table 4.30. For ‘maintain groundcover’, accordingly, the ratio was calculated as  $2.18/1.59 = 1.37$ .

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<sup>13</sup> Respondents were asked to answer this question only for practices they indicated were applicable to their own properties.

Table 4.30: Frequency distributions of responses from applicable Central Highlands respondents to:  
*How widely do you expect each practice (below) will eventually be used in your district?*

Practice	Proportion of applicable respondents (%)				Mean score*	Mean score ratio	n
	Wide use	Moderate use	Limited use	Zero / minimal use			
Maintain groundcover on grazing land	51.9	39.0	7.5	1.7	1.59	1.37	138
Fencing to land type for grazing	37.0	46.0	12.8	4.1	1.84	1.36	131
Minimum or zero tillage cropping	77.9	15.3	5.1	1.8	1.31	1.17	101
Soil conservation measures	66.4	29.2	2.5	1.9	1.40	1.15	123
Irrigation water-use efficiency measures	59.1	26.1	14.9	0.0	1.56	1.31	25
Property management planning	35.0	42.1	21.8	1.1	1.89	1.34	106
Fencing riparian areas and installing watering points	30.5	39.8	27.2	2.6	2.02	1.31	122
Environmental weeds control	47.8	42.1	7.7	2.4	1.65	1.30	148

\* Wide use = 1; moderate use = 2; limited use = 3; and zero / minimal use = 4.

On this basis (rough-and-ready, since current and eventual district use are each measured on ordinal scales), we might conclude that the average applicable respondent expects ‘maintain groundcover’ to be the practice for which district use will eventually increase by the highest proportion, followed by ‘fencing to land type’, ‘property management planning’, ‘irrigation efficiency measures’ and ‘fencing riparian areas’ (same mean score ratio) and ‘environmental weeds control’. We might conclude similarly that the average applicable respondent expects ‘soil conservation measures’ to be the practice for which district use will eventually increase by the *lowest* proportion, followed by ‘minimum or zero tillage cropping’.

#### 4.12 Perceptions of how the effectiveness of each practice depends on its use by other landholders

Applicable respondents<sup>14</sup> were asked: “Sometimes, if a practice is going to work on one place, it needs also to be used by other landholders in the same district. In your view, how much does the effectiveness on your property of each practice below depend on what others in your district are doing?”. Frequency distributions of responses for each practice are presented in Table 4.31.

Mean scores were assigned in this table to each practice, after scoring ‘certainly depends on others’ responses as one, ‘possibly depends on others’ responses as two, and ‘doesn’t depend on others’ responses as three. The lower the mean score for a practice, therefore, the more the ‘average applicable respondent’ considered the effectiveness of the practice on their property to

<sup>14</sup> Respondents were asked to answer this question only for practices they indicated were applicable to their own properties.

Table 4.31: Frequency distributions of responses from applicable Central Highlands respondents to: How much does the effectiveness on your property of each practice below depend on what others in your district are doing?

Practice	Proportion of applicable respondents (%)			Mean score*	n
	Certainly depends on others	Possibly depends on others	Doesn't depend on others		
Maintain groundcover on grazing land	4.3	21.8	73.9	2.70	141
Fencing to land type for grazing	2.3	18.0	79.7	2.77	133
Minimum or zero tillage cropping	12.1	18.3	69.6	2.58	103
Soil conservation measures	24.8	36.8	38.4	2.14	126
Irrigation water-use efficiency measures	21.8	14.5	63.7	2.42	26
Property management planning	7.8	32.1	60.1	2.52	111
Fencing riparian areas and installing watering points	10.8	26.9	62.3	2.52	125
Environmental weeds control	58.4	23.6	18.0	1.60	151

\* Certainly depends = 1; possibly depends = 2; and doesn't depend =3.

depend on its use by others in the same district. On this basis, the average applicable respondent perceived 'environmental weeds control' as the practice depending most for its effectiveness on use by other landholders. The mean score of 1.60 for this practice indicates that the average applicable respondent rated it about midway between 'certainly' and 'possibly' depending for its effectiveness on use by others in the same district.

On the same basis, the average applicable respondent perceived 'soil conservation measures' as the practice depending second-most for its effectiveness on use by other landholders, followed by 'irrigation efficiency measures', 'property management planning' and 'fencing riparian areas' (identical mean scores), 'minimum or zero tillage cropping', 'maintain groundcover' and 'fencing to land type'. The mean scores for each of these practices are between two and three, indicating that the average applicable respondent perceives them as somewhere between 'possibly depends on others' and 'doesn't depend on others'. 'Soil conservation measures' is closer to the 'possibly depends' end of this range, and 'maintain groundcover' and 'fencing to land type' to the 'doesn't depend' end, while 'irrigation efficiency measures', 'property management planning' and 'fencing riparian areas' and 'minimum or zero tillage cropping' lie around the middle of this range.

#### 4.13 Perceived likelihood of other landholders using practices identified as dependent on others' use

Following on from the question covered in the preceding section, a further question was asked of respondents who answered that the effectiveness of a practice on their own property depended 'certainly' or 'possibly' on its use by other landholders. The follow-up question for this narrower

set of applicable respondents was: “This question is concerned only with those practices for which you marked ‘possibly / certainly depends on others’. For each of these practices, how likely is it that other landholders in your district will use the practice sufficiently for it to work properly on your place?”. Frequency distributions of responses for each practice are presented in Table 4.32.

Table 4.32: Frequency distributions of responses from applicable Central Highlands respondents to: How likely is it that other landholders in your district will use [each practice below] sufficiently for it to work properly on your place?”.

Practice	Proportion of applicable respondents (%)					Mean score*	n
	Highly likely	Likely	Neither likely or unlikely	Unlikely	Highly unlikely		
Maintain groundcover on grazing land	0.0	54.8	17.4	16.2	11.7	2.85	35
Fencing to land type for grazing	4.8	46.9	25.8	18.2	4.4	2.56	27
Minimum or zero tillage cropping	8.9	59.6	13.0	14.5	4.1	2.48	28
Soil conservation measures	15.6	52.8	22.0	5.1	4.4	2.28	71
Irrigation water-use efficiency measures	0.0	78.5	21.5	0.0	0.0	2.25	8
Property management planning	6.6	48.0	33.7	11.7	0.0	2.46	39
Fencing riparian areas and installing watering points	2.7	44.6	33.1	19.6	0.0	2.63	46
Environmental weeds control	19.9	42.6	21.7	11.5	4.2	2.36	111

\* Highly likely = 1; likely = 2; neither likely or unlikely = 3; unlikely = 4; and highly unlikely = 5.

Mean scores were assigned in this table to each practice, after scoring ‘highly likely’ responses as one, ‘likely’ responses as two, and so on until ‘highly unlikely’ responses were scored as five. The lower the mean score for a practice, therefore, the more the average applicable respondent thought it likely that other landholders would use that practice sufficiently for it to work properly on their own property. On this basis, the average applicable respondent perceived ‘irrigation efficiency measures’ as the practice other landholders were most likely to use sufficiently for it to work effectively on their own property, followed by ‘soil conservation measures’, ‘environmental weeds control’, ‘property management planning’, ‘minimum or zero tillage cropping’, ‘fencing to land type’, ‘fencing riparian areas’ and, finally, ‘maintain groundcover’.

Mean scores for all practices lie between two and three, indicating that the average applicable respondent rates the likelihood of other landholders using each practice sufficiently to make its use effective on their own property as somewhere between ‘likely’ and ‘neither likely or unlikely’. With the mean scores for ‘maintain groundcover’, ‘fencing riparian areas’ and ‘fencing to land type’ closer to three than two, the average applicable respondent’s assessment of the likelihood of sufficient use of these practices by other landholders is closer to ‘neither likely or unlikely’ than to ‘likely’.

## 4.14 Awareness of the regional model for NRM delivery

Respondents were provided with six statements describing the regional model for NRM delivery as it applies to them, and asked to indicate their degree of awareness of the information contained in each statement. Frequency distributions of responses for each statement are presented in Table 4.33.

Table 4.33: Frequency distributions of Central Highlands responses to: Please indicate whether or not you have heard about the following (statements regarding the regional approach to natural resource management).

Statement	Proportion of respondents (%)			Mean score*	n
	Heard about it	Possibly heard about it	Haven't heard about it		
Much of the responsibility for deciding what on-ground NRM activities to fund now lies with regional bodies	43.1	25.0	31.9	1.89	241
The regional body for the region where your property is located is the Fitzroy Basin Association (FBA)	72.4	16.0	11.6	1.39	245
The board of the FBA consists mostly of community representatives	44.7	22.6	32.7	1.88	138
The part of this region where your property lies has its own NRM body called the Central Highlands Regional Resources Use Planning Cooperative (CHRRUP)	76.1	15.1	8.8	1.33	240
The board of CHRRUP consists mostly of community representatives	45.8	27.7	26.4	1.81	132
CHRRUP advises the FBA on NRM funding decisions concerned with the Central Highlands	46.8	29.4	23.8	1.77	145

\* Yes, I've heard about it = 1; possibly I heard about it = 2; and haven't heard about it = 3.

Mean scores were assigned in this table to each practice, after scoring 'yes, I've heard about it' responses as one, 'possibly I heard about it' responses as two, and 'haven't heard about it' responses as three. The lower the mean score for a statement, therefore, the more the average respondent was aware of the information contained in that statement. On this basis, the average respondent was most aware that the CHRRUP is the NRM body for their subregion. The mean score of 1.3 for this statement placed it reasonably close to 'yes, I've heard about it'. The two statements the average respondent was least aware of were 'much of the responsibility for deciding what on-ground activities to fund now lies with regional bodies' and 'the board of the FBA consists mostly of community representatives' and 'the board of CHRRUP consists mostly of community representatives'. The mean scores for these three statements are between of 1.8 and 1.9, placing them only marginally on the 'heard about it side' of 'possibly heard about it'.

On the basis of the WSR2 test (Table E.7), we can conclude with at least 95 per cent confidence for each pairwise comparison that Central Highlands farmers tended to be:

- more aware that the CHRRUP is their subregional NRM body than in respect of any other statement except the one informing that FBA is their regional NRM body;

- more aware that FBA is their regional NRM body than in respect of any other statement except the one informing that CHRRUP is their subregional NRM body;
- more aware that ‘CHRRUP advises the FBA on NRM funding decisions concerned with the Central Highlands’ than in respect of ‘much of the responsibility for deciding what on-ground NRM activities to fund now lies with regional bodies’;
- more aware that ‘the board of CHRRUP consists mostly of community representatives’ than ‘much of the responsibility for deciding what on-ground NRM activities to fund now lies with regional bodies’; and
- more aware that ‘the board of the FBA consists mostly of community representatives’ than ‘much of the responsibility for deciding what on-ground NRM activities to fund now lies with regional bodies’.

Accordingly, we can be at least 95 per cent confident that Central Highlands farmers tended to be more aware that FBA is their regional NRM body than aware that regional NRM bodies have assumed much of the responsibility for deciding what on-ground NRM activities to fund. However, we are unable to conclude on this basis for each pairwise comparison that Central Highlands farmers tended to be more aware that (i) CHRRUP is their subregional NRM body than that the FBA is their regional body (or vice versa); or (ii) that ‘the board of CHRRUP consists mostly of community representatives’ than that ‘the board of the FBA consists mostly of community representatives’ (or vice versa).

#### **4.15 Personal contact with the FBA and CHRRUP**

Respondents were asked: “In the last few years, how much have you or others on your property had personal contact with the Fitzroy Basin Association and the Central Highlands Regional Resources Use Planning Cooperative?”. Frequency distributions of responses for each entity are presented in Table 4.34.

Mean scores were assigned in this table to each entity, after scoring ‘frequent’ responses as one, ‘fairly frequent’ responses as two, ‘occasional’ responses as three, and ‘none’ responses as four. The lower the mean score for an entity, therefore, the more frequent the average respondent’s personal contact with that entity.

On this basis, the average respondent’s personal contact with CHRRUP over the previous few years was more frequent than with the FBA. The mean score in each case lie between three and four, indicating that the average respondent rated their frequency of personal contact with each entity between ‘occasional’ and ‘none’. According to the WSR2 test, we can conclude with more than 99 per cent confidence that Central Highlands farmers tended over the previous few years to have more frequent personal contact with the CHRRUP than with the FBA.

Table 4.34: Frequency distributions of responses to: In the last few years, how much have you or others on your property had personal contact with the Fitzroy Basin Association and the Central Highlands Regional Resources Use Planning Cooperative?

	Proportion of respondents (%)				Mean score*	n
	Frequent	Fairly frequent	Occasional	None		
Fitzroy Basin Association (FBA)	3.7	5.7	22.2	68.4	3.55	154
Central Highlands Regional Resources Use Planning Cooperative (CHRRUP)	8.2	7.6	39.4	44.9	3.21	158

\* Frequent = 1; fairly frequent = 2; occasional = 3; and none = 4.

#### 4.16 Location within a ‘neighbourhood catchment’ already targeted by CHRRUP for funding of on-ground actions

Respondents to the full questionnaire were asked to respond to the following item: “CHRRUP and the FBA already have directed on-ground funding to the following Neighbourhood Catchments. If your property is located in one of these catchments, please tick the appropriate box”. Frequency distributions of responses are presented in Table 4.35. Respondents to the full questionnaire who did not indicate being located in one of the neighbourhood catchments already targeted for funding are categorised in the table as ‘other Central Highlands’.

Table 4.35: Frequency distributions of responses to: CHRRUP and the FBA already have directed on-ground funding to the following Neighbourhood Catchments. If your property is located in one of these catchments, please tick the appropriate box.

Proportion of respondents (%)						n
Emerald	Consuelo Creek	Carnarvon Creek	Wolfgang (Clermont)	Orion/ Springsure/ Minerva Creeks	Other Central Highlands	
11.6	1.4	0.7	10.8	16.5	59.0	168

We see from the table that 41 per cent of respondents to this item were located in one of the five neighbourhood catchments to which CHRRUP and the FBA had already directed funding for on-ground NRM activities.

#### 4.17 Attitudes regarding the regional delivery model generally

Respondents were provided with seven attitudinal statements in respect of the regional delivery model as it applies to them generally, and asked to indicate their level of agreement or disagreement with each of those statements. Frequency distributions of responses for each statement are presented in Table 4.36.

Table 4.36: Frequency distributions of Central Highlands responses to: How strongly do you agree or disagree with each of the following statements about the regional approach to natural resource management?

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
The regional approach is an improvement on previous approaches	9.9	62.0	20.7	7.4	2.24	124
The regional approach has reduced the 'red tape' for landholders seeking NRM funds for on-ground activities	10.9	42.0	34.6	12.5	2.47	133
Federal Government is serious about empowering our community to solve our own NRM problems	3.2	46.8	41.3	8.7	2.57	138
The Queensland Government is serious about empowering our community to solve our own NRM problems	4.9	29.7	39.3	26.1	2.89	141
The regional approach is a way for governments to 'pass the buck' on difficult issues	23.3	48.0	26.1	2.7	2.07	142
The regional approach is part of a strategy to increase government regulation of rural land-use	24.1	53.7	18.8	3.3	1.99	143
The regional approach is a way to transfer NRM costs onto volunteers	11.9	61.2	24.1	2.8	2.18	133

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

Mean scores were assigned in this table to each statement, after scoring 'strongly agree' responses as one, 'agree' responses as two, 'disagree' responses as three, and 'strongly disagree' responses as four. Hence, the score for 'ambivalent' (or 'neither agree or disagree') would be 2.5. The lower the mean score for a statement, therefore, the more strongly the average respondent agreed with that statement.

On this basis, the statement the average respondent agreed with most strongly was 'the regional approach is part of a strategy to increase government regulation of rural land-use'. The mean score for this statement was 1.99, indicating that the average respondent's view on this statement closely approximated 'agree'.

The statement the average respondent agreed with next most strongly was:

- 'the regional approach is a way for governments to 'pass the buck' on difficult issues', followed by:
- 'the regional approach is a way to transfer NRM costs onto volunteers';
- 'the regional approach is an improvement on previous approaches';
- 'the regional approach has reduced the 'red tape' for landholders seeking NRM funds for on-ground activities';

- ‘Federal Government is serious about empowering our community to solve our own NRM problems’; and, finally,
- ‘the Queensland Government is serious about empowering our community to solve our own NRM problems’.

Aside from the last two of these statements, the mean scores for the remaining statements lie between two and 2.5, indicating that the average respondent’s views on each of these statements were on the ‘agree’ side of ambivalent. The mean scores for ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’, ‘the regional approach is a way to transfer NRM costs onto volunteers’ and ‘the regional approach is an improvement on previous approaches’ indicate that the average respondent’s views on these statements are closer to ‘agree’ than ambivalent. On the other hand, the mean score for ‘the regional approach has reduced the ‘red tape’ for landholders seeking NRM funds for on-ground activities’ indicates that the average respondent’s view on this statement is closer to ambivalent than to ‘agree’.

The mean scores for the last two statements lie between 2.5 and three, indicating that the average respondent’s views on these statements were on the ‘disagree’ side of ambivalent. Hence, the average respondent was more likely to disagree than agree that the Federal and Queensland Governments were serious about empowering their community to solve its own NRM problems.

On the basis of the WSR2 test (Table E.8), we can conclude with at least 95 per cent confidence for each pairwise comparison that the wider population of Central Highlands farmers tended to agree more strongly with:

- ‘the regional approach is part of a strategy to increase government regulation of rural land-use’ than with each other statement except ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’ and ‘the regional approach is an improvement on previous approaches’;
- ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’ than with each remaining statement except ‘the regional approach is an improvement on previous approaches’ and ‘the regional approach is a way to transfer NRM costs onto volunteers’;
- ‘the regional approach is a way to transfer NRM costs onto volunteers’ than with each remaining statement except ‘the regional approach is an improvement on previous approaches’;
- ‘the regional approach is an improvement on previous approaches’ than with each remaining statement;
- ‘the regional approach has reduced the ‘red tape’ for landholders seeking NRM funds for on-ground activities’ than with ‘the Queensland Government is serious about empowering our community to solve our own NRM problems; and

- ‘Federal Government is serious about empowering our community to solve our own NRM problems’ than with ‘the Queensland Government is serious about empowering our community to solve our own NRM problems’.

Hence, we can be at least 95 per cent confident that Central Highlands farmers tended to regard the Federal Government as more serious than the Queensland Government in trying to empower their communities to solve their own NRM problems.

#### 4.18 Attitudes regarding the regional delivery model in the Fitzroy Basin Region

Respondents were provided with eight attitudinal statements in respect of the Fitzroy Basin Association (FBA, responsible for regional NRM delivery in their particular region – i.e., the Fitzroy Basin Region), and asked to indicate their level of agreement or disagreement with each of those statements. Frequency distributions of responses for each statement are presented in Table 4.37.

Table 4.37: Frequency distributions of Central Highlands responses to: How strongly do you agree or disagree with each of the following statements about the Fitzroy Basin Association?

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
The FBA is less bureaucratic than government generally	4.6	68.2	23.5	3.6	2.26	110
The FBA understands the issues faced in our district	6.5	63.4	27.0	3.0	2.27	112
Community members on the FBA can be trusted to argue forcefully for the best interests of the Fitzroy Basin Region	7.6	57.2	29.9	5.3	2.33	114
Staff of the FBA care about our community	6.9	69.9	22.0	1.2	2.17	109
The FBA is serious about helping our community to solve our own NRM problems	8.0	68.1	21.4	2.4	2.18	108
The FBA is just a ‘rubber stamp’ for decisions made by the Federal Government	7.8	33.2	57.3	1.7	2.53	110
The FBA is just a ‘rubber stamp’ for decisions made by the Queensland Government	9.8	39.2	49.3	1.7	2.43	111
NRM at the scale of the Fitzroy Basin is so remote that it discourages us from getting involved	10.9	35.1	51.5	2.4	2.46	107

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

Mean scores were assigned in this table to each statement, after scoring ‘strongly agree’ responses as one, ‘agree’ responses as two, ‘disagree’ responses as three, and ‘strongly disagree’ responses as four. The score for ‘ambivalent’ would be 2.5. The lower the mean score for a statement, therefore, the more strongly the average respondent agreed with that statement.

On this basis, the statement the average respondent agreed with most strongly was ‘staff of the FBA care about our community’, followed by ‘the FBA is serious about helping our community to solve our own NRM problems’. The mean scores for these statements indicate that the average respondent’s views on each were on the ambivalent side of ‘agree’.

The statement the average respondent agreed with next most strongly was ‘the FBA is less bureaucratic than government generally’, followed by:

- ‘the FBA understands the issues faced in our district’;
- ‘community members on the FBA can be trusted to argue forcefully for the best interests of the Fitzroy Basin Region’;
- ‘the FBA is just a ‘rubber stamp’ for decisions made by the Queensland Government’;
- ‘NRM at the scale of the Fitzroy Basin is so remote that it discourages us from getting involved’; and, finally,
- ‘the FBA is just a ‘rubber stamp’ for decisions made by the Federal Government’.

The mean scores for the first four of these last five statements all statements extended from 2.26 to 2.47, indicating that the average respondent’s views on each ranged from midway between ambivalent and ‘agree’ to almost ambivalent. The mean score for ‘the FBA is just a ‘rubber stamp’ for decisions made by the Federal Government’ marginally exceeded 2.5, indicating that the average respondent’s view on this statement was slightly on the ‘disagree’ side of ambivalent.

On the basis of the WSR2 test (Table E.9), we can conclude with at least 95 per cent confidence for each pairwise comparison that the wider population of Central Highlands farmers tended to agree more strongly with:

- ‘staff of the FBA care about our community’ than with each other statement except ‘the FBA is serious about helping our community to solve our own NRM problems’, ‘the FBA understands the issues faced in our district’ and ‘the FBA is less bureaucratic than government generally’;
- ‘the FBA is serious about helping our community to solve our own NRM problems’ than with each other statement except ‘staff of the FBA care about our community’, ‘the FBA understands the issues faced in our district’ and ‘the FBA is less bureaucratic than government generally’;
- ‘the FBA understands the issues faced in our district’ than with each remaining statement except ‘the FBA is less bureaucratic than government generally’ and ‘community members on the FBA can be trusted to argue forcefully for the best interests of the Fitzroy Basin Region’;
- ‘the FBA is less bureaucratic than government generally’ than with each remaining statement except ‘community members on the FBA can be trusted to argue forcefully for

the best interests of the Fitzroy Basin Region’ and ‘the FBA is just a ‘rubber stamp’ for decisions made by the Queensland Government’

- ‘community members on the FBA can be trusted to argue forcefully for the best interests of the Fitzroy Basin Region’ than with each remaining statement except ‘the FBA is just a ‘rubber stamp’ for decisions made by the Queensland Government’ and ‘NRM at the scale of the Fitzroy Basin is so remote that it discourages us from getting involved’; and
- ‘the FBA is just a ‘rubber stamp’ for decisions made by the Queensland Government’ than with each remaining statement except ‘NRM at the scale of the Fitzroy Basin is so remote that it discourages us from getting involved’.

We are unable to conclude on this basis with 95 per cent confidence that Central Highlands farmers tended to agree more strongly with ‘NRM at the scale of the Fitzroy Basin is so remote that it discourages us from getting involved’ than with ‘the FBA is just a ‘rubber stamp’ for decisions made by the Federal Government’. However, we can be at least 95 per cent confident on this basis that this population of farmers tended to regard the FBA as more a ‘rubber stamp’ for Queensland Government decisions than for Federal Government decisions.

#### **4.19 Attitudes regarding application of the regional delivery model in the Central Highlands subregion**

Respondents were provided with eight attitudinal statements in respect of the Central Highlands Resources Use Planning Cooperative (CHRRUP, responsible for regional NRM delivery in their particular subregion – i.e., the Central Highlands), and asked to indicate their level of agreement or disagreement with each of those statements. Frequency distributions of responses for each statement are presented in Table 4.38.

Mean scores were assigned in this table to each statement, after scoring ‘strongly agree’ responses as one, ‘agree’ responses as two, ‘disagree’ responses as three, and ‘strongly disagree’ responses as four. The score for ‘ambivalent’ would be 2.5. The lower the mean score for a statement, therefore, the more strongly the average respondent agreed with that statement.

On this basis, the statement the average respondent agreed with most strongly was ‘staff of CHRRUP care about our community’. The mean score for this statement was 2.01, indicating that the average respondent’s view on this statement closely approximated ‘agree’. The statement the average respondent agreed with next most strongly was ‘CHRRUP is serious about helping our community to solve our own NRM problems’, followed by:

- ‘CHRRUP is less bureaucratic than government generally’ and ‘CHRRUP understands the issues faced in our district’ (same mean scores);
- ‘community members on CHRRUP can be trusted to argue forcefully for the best interests of the Central Highlands’;
- ‘CHRRUP is just a ‘rubber stamp’ for decisions made by the FBA’;

Table 4.38: Frequency distributions of responses to: How strongly do you agree or disagree with each of the following statements about the Central Highlands Resources Use Planning Cooperative?

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
CHRRUP is less bureaucratic than government generally	11.0	66.6	19.7	2.7	2.14	124
CHRRUP understands the issues faced in our district	12.2	63.9	21.9	2.0	2.14	121
Community members on CHRRUP can be trusted to argue forcefully for the best interests of the Central Highlands	11.8	54.9	32.8	0.6	2.22	114
Staff of CHRRUP care about our community	14.0	71.9	13.6	0.6	2.01	112
CHRRUP is serious about helping our community to solve our own NRM problems	15.0	63.3	21.6	0.0	2.07	115
CHRRUP is just a 'rubber stamp' for decisions made by the Federal Government	5.4	35.5	57.0	2.1	2.56	114
CHRRUP is just a 'rubber stamp' for decisions made by the Queensland Government	9.3	35.4	52.1	3.1	2.49	113
CHRRUP is just a 'rubber stamp' for decisions made by the FBA	6.8	40.2	51.4	1.7	2.48	108
NRM at the scale of the Central Highlands is so remote that it discourages us from getting involved	5.2	35.5	54.1	5.2	2.59	120

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

- 'CHRRUP is just a 'rubber stamp' for decisions made by the Queensland Government';
- 'CHRRUP is just a 'rubber stamp' for decisions made by the Federal Government' and, finally,
- 'NRM at the scale of the Central Highlands is so remote that it discourages us from getting involved'.

The mean scores for 'CHRRUP is serious about helping our community to solve our own NRM problems', 'CHRRUP is less bureaucratic than government generally', 'CHRRUP understands the issues faced in our district' and 'community members on CHRRUP can be trusted to argue forcefully for the best interests of the Central Highlands' lie in the range 2.07-2.22, indicating that the average respondent's views on each of these statements were on the ambivalent side of 'agree'. The mean scores of 2.48 and 2.49, respectively, for 'CHRRUP is just a 'rubber stamp' for decisions made by the FBA' and 'CHRRUP is just a 'rubber stamp' for decisions made by the Queensland Government' that the average respondent's views on these two statements were only marginally on the 'agree' side of ambivalent.

In contrast, the mean scores for 'CHRRUP is just a 'rubber stamp' for decisions made by the Federal Government' and 'NRM at the scale of the Central Highlands is so remote that it

discourages us from getting involved' were 2.56 and 2.59, respectively, revealing that the average respondent's views on these statements were marginally on the 'disagree' side of ambivalent.

On the basis of the WSR2 test (Table E.10), we can conclude with at least 95 per cent confidence for each pairwise comparison that the wider population of Central Highlands farmers tended to agree more strongly with:

- 'staff of CHRRUP care about our community' than each other statement except 'CHRRUP is serious about helping our community to solve our own NRM problems', 'CHRRUP understands the issues faced in our district' and 'CHRRUP is less bureaucratic than government generally';
- 'CHRRUP is serious about helping our community to solve our own NRM problems' than each other statement except 'staff of CHRRUP care about our community', 'CHRRUP is less bureaucratic than government generally' and 'CHRRUP understands the issues faced in our district';
- 'CHRRUP understands the issues faced in our district' than each other statement except 'staff of CHRRUP care about our community', 'CHRRUP is serious about helping our community to solve our own NRM problems' and 'CHRRUP is less bureaucratic than government generally';
- 'CHRRUP is less bureaucratic than government generally' than 'CHRRUP is just a 'rubber stamp' for decisions made by the FBA', 'CHRRUP is just a 'rubber stamp' for decisions made by the Queensland Government', 'CHRRUP is just a 'rubber stamp' for decisions made by the Federal Government' and 'NRM at the scale of the Central Highlands is so remote that it discourages us from getting involved';
- 'community members on CHRRUP can be trusted to argue forcefully for the best interests of the Central Highlands' than 'CHRRUP is just a 'rubber stamp' for decisions made by the FBA', 'CHRRUP is just a 'rubber stamp' for decisions made by the Queensland Government', 'CHRRUP is just a 'rubber stamp' for decisions made by the Federal Government' and 'NRM at the scale of the Central Highlands is so remote that it discourages us from getting involved';
- 'CHRRUP is just a 'rubber stamp' for decisions made by the FBA' than 'NRM at the scale of the Central Highlands is so remote that it discourages us from getting involved'; and
- 'CHRRUP is just a 'rubber stamp' for decisions made by the Queensland Government' than 'NRM at the scale of the Central Highlands is so remote that it discourages us from getting involved'.

We are unable to conclude on this basis with 95 per cent confidence that Central Highlands farmers tended to agree more strongly with 'CHRRUP is just a 'rubber stamp' for decisions made by the Federal Government' than with 'NRM at the scale of the Central Highlands is so remote that it discourages us from getting involved'. Moreover, we are unable to conclude with 95 per

cent confidence on this basis that Central Highland farmers tended to regard CHRRUP as more a ‘rubber stamp’ for FBA decisions than for Queensland Government decisions (or vice versa), or as more as ‘rubber stamp’ for Queensland Government decisions than for Federal Government decisions (or vice versa).

#### **4.20 Attitudes regarding application of the regional delivery model: comparing attitudes in respect of regional and subregional levels**

Aside from one attitudinal statement in respect of CHRRUP (‘CHRRUP is just a ‘rubber stamp’ for decisions made by the FBA’), each other statement reported in section 4.20 matched a statement reported in section 4.19 – the only difference being substitution of ‘FBA’ for ‘CHRRUP’, or ‘Fitzroy Basin Region’ for ‘Central Highlands’, in section 4.19. The mean scores for each pair of corresponding statements are compared in Table 4.39. Included also in the table are the probabilities that no difference exists between corresponding statements in respect of distributions of responses from the broader population of Central Highlands farmers. These probabilities were obtained from the WSR2 test.

The first five pairs of corresponding statements express positive attitudes. For each of these pairs, the mean score for the FBA statement exceeds that for the corresponding CHRRUP statement. For each of these three pairs of statements, therefore, the average respondent feels that the positive attitude expressed is truer of CHRRUP than of the FBA. On the basis of the WSR2 test, however, we are able to conclude with at least 95 per cent confidence for only two of these pairs (‘FBA/CHRRUP understands the issues faced in our district’ and ‘staff of FBA/CHRRUP care about our community’) that these patterns reported for the average respondent existed more generally as patterns among the wider population of Central Highlands farmers.

The last three pairs of statements express negative attitudes. For each of these pairs, the mean score for the CHRRUP/Central Highlands statement exceeds that for the corresponding FBA/Fitzroy Basin statement. For each of these pairs of statements, therefore, the average respondent feels that the negative attitude expressed is truer of the FBA/Fitzroy Basin than of CHRRUP/Central Highlands. On the basis of the WSR2 test, however, we are able to conclude with at least 95 per cent confidence for only one of these pairs (‘NRM at the scale of the Fitzroy Basin Region/Central Highlands is so remote that it discourages us from getting involved’) that these patterns reported for the average respondent existed more generally as patterns among the wider population of Central Highlands farmers.

With at least 95 per cent confidence for each pairwise comparison, therefore, we can conclude that Central Highlands farmers tended at the time of survey to perceive:

- CHRRUP as better understanding their district-level issues than the FBA;
- CHRRUP as staffed by people who, compared with staff of the FBA, care more for their communities; and

- the scale of the Central Highlands subregion, compared with the scale of the Fitzroy Basin Region, as suffering less from any sense of remoteness that discourages their involvement in NRM.

Table 4.39: Mean score comparisons for attitude statement pairs for the Fitzroy Basin Region and the Central Highlands subregion

	Mean score*	p**
The FBA is less bureaucratic than government generally	2.26	0.058
CHRRUP is less bureaucratic than government generally	2.14	
The FBA understands the issues faced in our district	2.27	0.042
CHRRUP understands the issues faced in our district	2.14	
Community members on the FBA can be trusted to argue forcefully for the best interests of the Fitzroy Basin Region	2.33	0.166
Community members on CHRRUP can be trusted to argue forcefully for the best interests of the Central Highlands	2.22	
Staff of the FBA care about our community	2.17	0.032
Staff of CHRRUP care about our community	2.01	
The FBA is serious about helping our community to solve our own NRM problems	2.18	0.124
CHRRUP is serious about helping our community to solve our own NRM problems	2.07	
The FBA is just a 'rubber stamp' for decisions made by the Federal Government	2.53	1.000
CHRRUP is just a 'rubber stamp' for decisions made by the Federal Government	2.56	
The FBA is just a 'rubber stamp' for decisions made by the Queensland Government	2.43	0.833
CHRRUP is just a 'rubber stamp' for decisions made by the Queensland Government	2.49	
NRM at the scale of the Fitzroy Basin Region is so remote that it discourages us from getting involved	2.46	0.009
NRM at the scale of the Central Highlands is so remote that it discourages us from getting involved	2.59	

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

## 4.21 Farmers' involvement with local groups concerned with NRM issues

Respondents were asked the following: “We are also interested in local groups concerned with sustainable farming / grazing / irrigation issues, or natural resource or environmental issues, on or near your property. Please list any such groups that your property has been involved with over the last few years”. Responses were coded in the first instance according to whether or not at least one such group had been listed. The frequency distribution for these coded responses is presented in Table 4.40. We see that almost two-thirds of respondents did not list involvement with a local group of this kind.

From the local groups they had listed, each respondent was asked to “circle the one local group that your property has been most involved with over the last few years”. Each group identified in this way was subsequently coded according to whether it fitted best into one of the following four

Table 4.40: Frequency distribution for whether Central Highlands respondents listed recent involvement with at least one local group concerned with NRM issues

Proportion of respondents (%)		n
At least one local group nominated	No local group nominated	
35.0	65.0	168

categories: (i) landcare / catchment group; (ii) production group; (iii) nature / environmental group; (iv) local branch of Agforce Queensland; and (v) other.

Category (i) includes the types of local- and catchment-scale groups upon which the community-based approach to NRM in rural Queensland tended to focus during the 1990s when public funding for this approach came predominantly from the NLP and NHT1. Included in this category were the likes of ‘Campbell’s Creek Catchment Group’, ‘Comet Catchment Group’, ‘Theresa Creek Catchment Group’ and ‘Clermont District Landcare Association’.

Category (ii) includes groups established mainly with an agricultural focus, and concerned with NRM issues and practices relevant to this focus. Groups identified of this kind include ‘Comet Sustainable Farming Association’, ‘Capella Sustainable Farming Systems Group’, ‘Central Queensland Sustainable Farming Systems Group’, ‘Conservation Farming Inc.’, ‘Central Highland Cotton Growers and Irrigators Association’, and so on.

Category (iii) includes groups established with a predominant focus on conserving aspects of the natural environment. No respondent identified a group of this kind as the local group with which they had been most involved with during the previous few years. Category (iv) includes local branches of Agforce Queensland, which is a peak organisation representing the interests of Queensland’s rural producers. Category (v) comprises groups which could not be allocated to the other three categories.

The frequencies with which applicable respondents – i.e., the 35.0 per cent of respondents who indicated involvement with a local group engaged in NRM activities – identified greatest involvement with different categories of local group are shown in Table 4.41. Almost one-quarter of applicable respondents identified their greatest local involvement of this kind with a ‘landcare/catchment group’, and almost two-thirds with a ‘production group’. Some 11 per cent of applicable respondents identified their greatest local involvement of this kind with a local branch of Agforce Queensland’. As mentioned previously, ‘nature/environmental group’ was identified as such by none of the applicable respondents.

Table 4.41: Frequency distribution for categories of local NRM-related groups that Central Highlands respondents identified greatest involvement with

Proportion of respondents who listed involvement with a local group (%)					n
Landcare/ catchment group	Production group	Nature / environmental group	Agforce branch	Other	
24.0	62.5	0.0	11.3	2.1	59

Respondents who indicated involvement with at least one local group engaged in NRM activities were requested, in respect of the group they had been most involved with, to “indicate your property’s level of involvement with this local group over the last few years”. The frequency distribution of responses is shown in Table 4.42. Some 40 per cent of respondents in this category recorded ‘active involvement’ over the previous few years with the particular group they had been most involved with, and a further 28 per cent indicated ‘fairly active involvement’. Just under one-third of applicable respondents nominated ‘occasional involvement’ with this group.

Table 4.42: Frequency distribution for level of involvement by Central Highlands respondents with the local group they indicated greatest involvement with

Proportion of respondents who listed involvement with a local group (%)			n
Active involvement	Fairly active involvement	Occasional involvement	
39.8	28.0	32.2	57

## 4.22 Attitudes regarding relationships of respondents’ highest-involvement local group with the FBA and CHRRUP

In addition, respondents who indicated involvement with at least one local group engaged in NRM activities were asked to indicate how strongly they agreed or disagreed with six statements about relationships between the group they were most involved with and the FBA on the one hand, and CHRRUP on the other. The three statements concerning the FBA were the same as those concerning CHRRUP, except with the names of the two bodies changed. Frequency distributions for the three statements concerned with the group’s relationship with the FBA are presented in Table 4.43.

Table 4.43: Frequency distributions for: How strongly do you agree or disagree with each of these statements [concerning the FBA] about this local group?

	Proportion of respondents who listed involvement with a local group (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
The FBA understands the issues faced by this group	2.9	57.4	32.4	7.3	2.44	43
The work of the FBA has helped make this group more effective	4.4	51.4	39.7	4.6	2.45	43
This group should work wherever possible with the FBA on issues of common interest	14.3	68.2	14.2	3.3	2.06	42

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

Mean scores were assigned in this table to each statement, after scoring ‘strongly agree’ responses as one, ‘agree’ responses as two, ‘disagree’ responses as three, and ‘strongly disagree’ responses as four. ‘Ambivalent’ would thus be scored as 2.5. The lower the mean score for a

statement, therefore, the more strongly the average applicable respondent agreed with that statement.

On this basis, the statement the average applicable respondent agreed with most strongly was ‘this group should work wherever possible with the FBA on issues of common interest’. The mean score for this statement is 2.06, indicating that the average applicable respondent’s view on this statement was slightly on the ambivalent side of ‘agree’. The mean scores for ‘the FBA understands the issues faced by this group’ and ‘the work of the FBA has helped make this group more effective’ are 2.44 and 2.45, respectively, revealing that the average applicable respondent’s views on each of these statements were only slightly on the ‘agree’ side of ambivalent.

Frequency distributions for the three statements concerned with the group’s relationship with CHRRUP are presented in Table 4.44. Mean scores were assigned in this table to each statement on the same basis as for Table 4.43. The statement the average applicable respondent agreed with most strongly was ‘this group should work wherever possible with CHRRUP on issues of common interest’. The mean score for this statement was 1.96, indicating that the average applicable respondent’s view on this statement was marginally on the ‘strongly agree’ side of ‘agree’. The statement agreed to next most strongly was ‘CHRRUP understands the issues faced by this group’, followed by ‘the work of CHRRUP has helped make this group more effective’. With mean score for these statements of 2.08 and 2.11, respectively, the average applicable respondent’s views on each were marginally on the ambivalent side of ‘agree’.

Table 4.44: Frequency distributions for: How strongly do you agree or disagree with each of these statements [concerning CHRRUP] about this local group?

	Proportion of respondents who listed involvement with a local group (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
CHRRUP understands the issues faced by this group	8.3	76.7	13.6	1.4	2.08	45
The work of CHRRUP has helped make this group more effective	10.0	70.5	18.0	1.4	2.11	44
This group should work wherever possible with CHRRUP on issues of common interest	15.8	72.3	11.8	0.0	1.96	48

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

The mean scores for each pair of corresponding statements (concerning the FBA and CHRRUP, respectively) are compared in Table 4.45. Included also in the table are the probabilities of zero difference between corresponding statements in respect of distributions of responses from the broader population of Central Highlands farmers. These probabilities were obtained from the WSR2 test.

For each of the pairs of corresponding statements, the mean score for the statement concerning the FBA exceeds that for the corresponding statement concerning CHRRUP. For each pair of statements, therefore, the average respondent feels that the positive attitude expressed is truer for CHRRUP than for the FBA. With the probabilities in the right-most column for the first two pairs

of statements less than 0.05, we can conclude with at least 95 per cent confidence for each of these pairs that these patterns reported for the average applicable respondent reflect more general patterns among the wider population of farmers in the Central Highlands. With over 95 per cent confidence for each pairwise comparison, therefore, we can conclude that Central Highlands farmers tended at the time of survey to agree more strongly that:

- CHRRUP, compared with the FBA, understands the issues faced by their highest-involvement local group; and

Table 4.45: Mean score comparisons for statement pairs in respect of the FBA and CHRRUP concerning their relationships with applicable respondents' highest-involvement local groups

	Mean score*	p**
The FBA understands the issues faced by this group	2.44	0.002
CHRRUP understands issues faced by this group	2.08	
The work of the FBA has helped make this local group more effective	2.45	0.014
The work of CHRRUP has helped make this local group more effective	2.11	
This group should work wherever possible with the FBA on issues of common interest	2.06	0.289
This group should work wherever possible with CHRRUP on issues of common interest	1.96	

- CHRRUP's work, compared with the FBA's work, makes this group more effective.

However, we cannot conclude on this basis with at least 95 per cent confidence that Central Highlands farmers tended to agree more strongly that their highest-involvement local group should work where possible with CHRRUP, compared with the FBA.

## 4.23 Key findings from the Central Highlands case

The following findings from the Central Highlands case are particularly relevant to the present project, given its focus on the role of community-based NRM under the regional delivery model in establishing farmers' trust in this model and thereby increasing their adoption of conservation practices promoted under it:

- 91.3 per cent of respondents placed either a high or very high priority on the goal of maintaining or enhancing the condition of their natural resources and environment, compared with 90.6 per cent for the goal of maintaining or enhancing the profitability of their farm business;
- the proportion of respondents rating natural resource issues as at least a moderate threat to their farm businesses ranged from 69.5 per cent for 'pest plants and animals' to 15.7 per cent for 'overclearing and biodiversity loss' and 11.9 per cent for 'salinity';

- the proportion of respondents rating ‘government regulation’, ‘commodity prices’ and ‘drought’ as at least moderate threats to their farm businesses were 88.6 per cent, 95.8 per cent and 96.5 per cent, respectively;
- the proportion of respondents strongly agreeing they felt a bond with the Fitzroy Basin Region (6.2 per cent) was much lower than the equivalent proportion in respect of their district (43.9 per cent), and also appreciably lower than the equivalent proportion in respect of their Central Highlands subregion (37.3 per cent);
- the proportion of applicable respondents (i.e., respondents identifying a conservation practice as applicable to their property) answering that adoption of a conservation practice would ‘help greatly’ their property’s chances of achieving its goals ranged from 74.4 per cent for ‘maintain groundcover on grazing land’ to 37.4 per cent for ‘fencing riparian areas and installing watering points’ and 22.1 per cent for ‘property management planning’;
- the proportion of applicable respondents expecting to increase their adoption of a conservation practice over the ensuing 10 years ranged from 33.4 per cent for ‘fence to land type for grazing’ and 32.0 per cent for ‘fencing riparian areas and installing watering points’ to 13.4 per cent for ‘minimum or zero tillage cropping’;
- the proportion of applicable respondents perceiving that effectiveness of a practice on their property depends (either ‘certainly depends’ or ‘possibly depends’) on the actions of others ranged from 82.0 per cent for ‘environmental weeds control’ to 20.3 per cent for ‘fencing to land type for grazing’;
- 31.9 per cent of respondents were not aware that ‘much of the responsibility for deciding what on-ground activities to fund now lies with regional bodies’;
- the proportion of respondents not aware that their regional body is the Fitzroy Basin Association (FBA) was 11.6 per cent, while the proportion not aware that their subregional body is the Central Highlands Regional Resources Use Planning Cooperative (CHRRUP) was less at 8.8 per cent;
- the proportion of respondents not aware that the board of the FBA consists mostly of community representatives was 32.7 per cent, while the proportion not aware that the CHRRUP board consists mostly of community representatives was less at 26.4 per cent;
- 71.9 per cent of answering respondents (i.e., excluding ‘don’t know’ responses<sup>15</sup>) agreed or strongly agreed that ‘the regional approach is an improvement on previous approaches’;
- 50.0 per cent of answering respondents agreed or strongly agreed that ‘Federal Government is serious about empowering our community to solve our own NRM

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<sup>15</sup> The vast majority of these ‘don’t know’ responses were from respondents who indicated they were unaware of the regional delivery model.

problems’, while the equivalent proportion for the corresponding statement referring to the Queensland Government was markedly less at 34.6 per cent;

- 71.3 per cent of answering respondents agreed or strongly agreed that ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’;
- 77.8 per cent of answering respondents agreed or strongly agreed that ‘the regional approach is part of a strategy to increase government regulation of rural land-use’;
- 76.1 per cent of answering respondents agreed or strongly agreed that ‘the FBA is serious about helping our community to solve our own NRM problems’, while the equivalent proportion for the corresponding statement referring to CHRRUP was 78.3 per cent;
- 49.0 per cent of answering respondents agreed or strongly agreed that ‘the FBA is just a ‘rubber stamp’ for decisions made by the Queensland Government’, while 44.7 per cent agreed or strongly agreed that ‘CHRRUP is just a ‘rubber stamp’ for decisions made by the Queensland Government’;
- 47.0 per cent of answering respondents agreed or strongly agreed that ‘CHRRUP is just a ‘rubber stamp’ for decisions made by the FBA’;
- 46.0 per cent of answering respondents agreed or strongly agreed that ‘NRM at the scale of the Fitzroy Basin is so remote that it discourages us from getting involved’, while the equivalent proportion for the corresponding statement referring to the Central Highlands was 40.7 per cent;
- 35.0 per cent of respondents indicated involvement over the previous few years with at least one local group concerned with NRM issues (henceforth referred to as ‘local NRM-related group’);
- 24.0 per cent of respondents indicating recent involvement with a local NRM-related group identified their greatest involvement as having been with a ‘landcare/ catchment group’, compared with 62.5 per cent for ‘production group’; and
- 55.8 per cent of answering respondents indicating recent involvement with a local NRM-related group agreed or strongly agreed that ‘the work of the FBA has helped make this group more effective’, while 80.5 per cent of these respondents agreed or strongly agreed that ‘the work of CHRRUP has helped make this group more effective’.

## 5. Results for the Mallee Region Dryland Case

Results from descriptive and comparative analysis of survey data from the Mallee Region dryland case are presented in this chapter. A summary of key findings from this case is presented in section 5.21.

### 5.1 Personal characteristics of respondents

Of all respondents to the survey of farmers in dryland areas of the Mallee NRM Region, 91 per cent were male (Table 5.1). The mean age of respondents was 54.4 years, with the range extending from 25 to 88 years. Only 10.8 per cent of respondents were younger than 40 years, while almost one-third of respondents were older than 60 years (Table 5.2).

Table 5.1: Gender of Mallee dryland respondents

Proportion of respondents (%)		n
Female	Male	
8.8	91.2	306

Table 5.2: Age of Mallee dryland respondents

Proportion of respondents (%)				n
< 40 years	40 - 49 years	50 - 59 years	> 60 years	
10.8	25.2	31.8	32.1	305

Respondents had lived on average for 49.2 years in the district where their property was located. Of all respondents, 99.3 per cent had lived in the same district as their property for at least 10 years, and 78.3 per cent for at least 40 years (Table 5.3).

Table 5.3: Mallee dryland responses to: How long have you lived in the district where your property is located?

Proportion of respondents (%)						n
< 5 years	5 - 9 years	10 - 19 years	20 - 39 years	40 - 59 years	> 60 years	
0.0	0.7	2.0	19.1	53.5	24.8	303

More than half (51.0 per cent) of respondents said it was likely or very likely that their property would be passed on to the next generation, compared with the almost one-third (32.1 per cent) who said this was unlikely or very unlikely (Table 5.4). Only 16.9 per cent were unsure about whether or not their property would be passed on to the next generation. To the extent that farmers are motivated to conserve or improving natural resource or environmental condition on

their properties for the sake of their descendents, it appears from this evidence that this motive is positive for most respondents.

Table 5.4: Mallee dryland responses to: How likely will your property be passed on to the next generation?

Proportion of respondents (%)					Mean score*	n
Very likely	Likely	Unsure	Unlikely	Very unlikely		
28.9	22.1	16.9	18.8	13.3	2.67	308

\* Very likely = 1; likely = 2; unsure = 3; unlikely = 4; and very unlikely = 5.

A mean score for each goal is presented in Table 5.4 also, based on scoring ‘very likely’ ratings as one, ‘likely’ ratings as two, ‘unsure’ as three, ‘unlikely’ as four, and ‘very unlikely’ as five. The lower the mean score, therefore, the more the ‘average respondent’ considered it likely that their property would be passed on to the next generation. The mean score of 2.67 indicates that the average respondent rated the likelihood of their property passing to the next generation on the ‘likely’ side of ‘unsure’. To the extent that farmers are motivated to conserve or improving natural resource or environmental condition on their properties for the sake of their descendents, it appears that this motive is weak for the average respondent.

## 5.2 Education and farming experience of respondents

Respondents on average claimed 35.1 years of adult experience in owning, managing or working on an agricultural or grazing property. Only 2.0 per cent claimed less than 10 years of such experience (Table 5.5).

Table 5.5: Mallee dryland responses to: As an adult (since turning 18), how many years practical experience do you have in owning, managing or working on an agricultural or grazing property?

Proportion of respondents (%)						n
< 5 yrs	5 - 9 yrs	10 - 19 yrs	20 - 29 yrs	30 - 39 yrs	> 40 yrs	
0.3	1.7	8.9	21.2	30.8	37.1	302

‘All of secondary school’ was nominated by 13.9 per cent of respondents as their highest level of formal education. The equivalent proportions for trade/technical certificate and diploma/associate diploma were 19.9 per cent and 48.7 per cent, respectively. About five per cent nominated a university degree as the highest level of formal education they had completed (Table 5.6).

Table 5.6: Highest level of formal education completed by Mallee dryland respondents

Proportion of respondents (%)							n
Degree	Diploma / Associate Diploma	Trade / Technical certificate	All secondary school	Part secondary school	Primary school	Other	
4.6	48.7	19.9	13.9	6.0	5.3	1.7	302

### 5.3 Property characteristics

The mean area of land in the Mallee NRM Region owned or managed by respondents and their immediate families was 2,296.0 ha. The median area was 1,810.0 ha, and the range extended from 18 to 24,000 ha. For 18.3 per cent of respondents, the area owned or managed by themselves or their immediate families was less than 1,000 ha. For 7.7 per cent this area exceeded 5,000 ha (Table 5.7). When asked about the kind of tenure under which their property was mainly held, 97.5 per cent of respondents nominated freehold tenure (Table 5.8).

Table 5.7: Mallee dryland responses to: What is the total area of land owned or managed by you or your immediate family in the Mallee NRM Region of Victoria?

Proportion of respondents (%)					n
< 100 ha	100 - 999 ha	1,000 - 1,999 ha	2,000 - 4,999 ha	> 5,000 ha	
1.3	17.0	36.1	37.9	7.7	388

Table 5.8: Mallee dryland responses to: Under what tenure is your property mainly held?

Proportion of respondents (%)				n
Freehold	Crown leasehold	Leased, agisted or sharefarmed from another farmer	Other tenure	
97.5	0.6	1.6	0.3	318

### 5.4 Financial characteristics

Respondents were asked: “Approximately, what is your current level of equity in your property?”. The frequency distribution of responses is presented in Table 5.9.

Table 5.9: Frequency distribution of Mallee dryland respondents’ current equity ratios

Proportion of respondents (%)				n
90% equity and over	70-89% equity	50-69% equity	<50% equity	
47.5	32.2	15.3	5.1	295

The median respondent reported a current equity ratio in the range 70-89 per cent. However, almost half the respondents reported their current equity ratio was at least 90 per cent. A further 32 per cent reported a current equity ratio in the range 70-89 per cent, leaving 20.4 per cent respondents with a reported equity ratio of less than 70 per cent.

A further question asked of respondents was: “How profitable has your property been over the last few years?”. The frequency distribution of responses is presented in Table 5.10.

Table 5.10: Frequency distribution of Mallee dryland respondents’ recent profitability

Proportion of respondents (%)					n
Very profitable	Profitable	Breaking even	Unprofitable	Very unprofitable	
3.3	34.6	45.2	13.0	4.0	301

The reported profitability of the median respondent over recent years was ‘breaking even’. Almost half the respondents reported this level of profitability. While 37.9 per cent reported a better result than this (‘very profitable’ or ‘profitable’), 17.0 cent reported a result worse than breaking even (‘unprofitable’ or ‘very unprofitable’).

Respondents were also asked: “In the last few years, about what proportion of your household’s total net income came from farming activities on your property?”. The frequency distribution of responses is presented in Table 5.11.

Table 5.11: Frequency distribution of Mallee dryland respondents’ proportion of household net income over recent years obtained from farming their properties

Proportion of respondents (%)					n
At least 90% of net income	70 - 89% of net income	50 - 69% of net income	20 - 49% of net income	< 20% of net income	
57.9	20.5	10.9	6.0	4.6	302

The median respondent reported at least 90 per cent of their household net income over recent years coming from farming activities on their property. Almost 60 per cent of respondents were in this category, and a further one-fifth reported deriving 70-89 per cent of their household net income from farming their property. Only 10.6 per cent reported less than half their household net income coming from farming their properties.

Respondents were asked to estimate the percentages of their properties’ net income (revenue minus expenses) from farming over the previous few years that came from different enterprise types. The mean percentages coming from grazing and broadacre cropping enterprises were 23.3 per cent and 74.1 per cent, respectively. Horticulture / viticulture and ‘other’ enterprises accounted for the remaining 2.6 per cent (Table 5.12). The median percentages of property net income derived from broadacre cropping and grazing enterprises were 80 per cent and 20 per

Table 5.12: Percentage of net farm income derived from various enterprise types: mean and median values for Mallee dryland respondents

Enterprise type	Mean % contribution to net farm income	Median % contribution to net farm income	n
Broadacre cropping	74.1	80.0	382
Grazing	23.3	20.0	382
Horticulture / viticulture	0.64	0.0	382
Other farming enterprises	1.98	0.0	382

cent, respectively. The median percentages for each of the other enterprise categories were equal to zero.

Only 1.3 per cent of respondents answered that zero net income had been derived from broadacre cropping enterprises, whereas 15.7 per cent indicated they had obtained no net income from grazing enterprises (Table 5.13). While 58.4 per cent of respondents answered that they had derived more than 75 per cent of their net farm income from broadacre cropping enterprises, only 1.0 per cent answered equivalently in respect of grazing enterprises.

Table 5.13: Percentage of net farm income derived from various enterprise types: frequency distributions for Mallee dryland respondents

	Proportion of respondents (%)						n
	0% of net income	1 - 9% of net income	10 - 24% of net income	25 - 49% of net income	50 - 74% of net income	> 75% of net income	
Broadacre cropping	1.3	0.0	1.0	5.8	33.5	58.4	382
Grazing	15.7	5.5	34.6	33.5	9.7	1.0	382
Horticulture / viticulture	98.4	0.0	1.0	0.0	0.0	0.5	382
Other farming enterprises	92.9	2.6	1.6	0.8	1.6	0.5	382

## 5.5 Goals in farming

Respondents were asked to rate how much priority they give to eight different ‘goals they are aiming for in farming’. Frequency distributions of the ratings for the different goals are shown in Table 5.14. A mean score for each goal is included also, based on scoring ‘very high priority’ ratings as one, ‘high priority’ ratings as two, and so on until ‘very low priority’ were scored as five. The lower the mean score for a goal, therefore, the more the ‘average respondent’ considered it a high priority.

Table 5.14 Frequency distributions of Mallee dryland responses to: People have many different goals they are aiming for in farming, depending on their own situation. Please indicate the priority you give to each goal listed below.

Goal: To main or enhance ...	Proportion of respondents (%)					Mean score*	n
	Very high priority	High priority	Moderate priority	Low priority	Very low priority		
Profitability of our farm business	59.8	33.5	5.9	0.3	0.5	1.48	373
Our family's income	49.7	39.9	10.1	0.3	0.0	1.61	298
Productivity of our land and other resources	52.7	40.3	7.0	0.0	0.0	1.54	298
Condition of our natural resources and environment	26.5	43.5	26.2	3.2	0.5	2.08	370
Attractiveness of our property	22.1	41.9	30.5	4.4	1.0	2.20	298
Our way of life	29.8	52.9	15.6	1.4	0.3	1.89	295
Our technical skills and innovation	23.0	48.3	26.0	2.4	0.3	2.09	296
Our standing in the community	18.1	31.4	34.8	13.0	2.7	2.51	293

\* Very high priority = 1, high = 2, moderate = 3, low = 4, and very low priority = 5.

On this basis, the average respondent considered ‘profitability of our farm business’ hereafter ‘profitability’) and ‘productivity of our land and resources’ (hereafter ‘productivity’) to be the two goals of highest priority, followed by ‘our family’s income’ (hereafter ‘family income’) and then ‘our way of life’. The mean scores for each of these four goals indicate the average respondent rated them between ‘high’ and ‘very high’ priority. Over 90 per cent of respondents attributed at least ‘high priority’ to the ‘profitability’ and ‘productivity’ goals, and more than 80 per cent attributed at least ‘high priority’ to the ‘family income’ and ‘way of life’ goals (Table 5.15).

After the ‘productivity’, ‘profitability’, ‘family income’ and ‘way of life’ goals, the goals of next highest priority for the average respondent were ‘condition of our natural resources and environment’ (hereafter ‘resource condition’) and ‘our technical skills and innovation’ (‘skills and innovation’). With mean scores near 2.1 for these latter two goals, the average respondent rated them marginally on the ‘moderate priority’ side of ‘high priority’. ‘Attractiveness of our property’ (‘property attractiveness’) was the goal of next highest priority for the average respondent, followed by ‘our standing in the community’. The mean scores for these last two goals were 2.2 and 2.5, respectively, indicating that the average respondent rated them on the ‘moderate priority’ side of ‘high priority’.

We can conclude from WSR2 tests (Table F.1) with at least 95 per cent confidence for each pairwise comparison that dryland farmers in the Mallee NRM region tended to rate:

- ‘profitability’ a higher priority than each other goal except ‘productivity’;
- ‘productivity’ a higher priority than each other goal except ‘family income’;

Table 5.15: Cumulative frequency distributions of Mallee dryland responses to: People have many different goals they are aiming for in farming, depending on their own situation. Please indicate the priority you give to each goal listed below.

	Cumulative proportion of respondents (%)				
	Very high priority	High priority	Moderate priority	Low priority	Very low priority
Profitability of our farm business	59.8	93.3	99.2	99.5	100.0
Our family's income	49.7	89.6	99.7	100.0	100.0
Productivity of our land and other resources	52.7	93.0	100.0	100.0	100.0
Condition of our natural resources and environment	26.5	70.0	96.2	99.5	100.0
Attractiveness of our property	22.1	64.1	94.6	99.0	100.0
Our way of life	29.8	82.7	98.3	99.7	100.0
Our technical skills and innovation	23.0	71.3	97.3	99.7	100.0
Our standing in the community	18.1	49.5	84.3	97.3	100.0

- ‘family income’ a higher priority than each remaining goal;
- ‘our way of life’ a higher priority than each remaining goal;
- ‘resource condition’ a higher priority than each remaining goal except ‘skills and innovation’;
- ‘skills and innovation’ a higher priority than each remaining goal except ‘property attractiveness’; and
- ‘property attractiveness’ a higher priority than ‘our standing in the community’.

The finding that dryland farmers in the Mallee Region tended to prioritise the profitability and productivity goals more highly than the family income goal suggests they are prepared in some degree to sacrifice family income in the pursuit of farm profitability and productivity (e.g., by foregoing opportunities to divert family labour to off-farm employment that would contribute more to family income). This greater emphasis on profitability and productivity compared with family income is perhaps associated – to the extent that the way of life valued by dryland farmers in the Mallee Region tends to be focused on-farm – with the finding that ‘way of life’ is the next highest priority. Over 80 per cent of respondents attributed at least ‘high priority’ to the way of life goal (Table 5.15).

Despite the statistical evidence that Mallee Region’s dryland farmers tended to consider the resource condition goal as less important than the productivity, profitability and family income goals, they did not regard the resource condition goal as unimportant. Of all respondents, 31.9 per cent considered the resource condition goal a ‘very high’ priority, and a further 45.6 per cent considered it a ‘high’ priority (Table 5.14). Only 2.7 per cent rated this goal as a ‘low’ or ‘very low’ priority. This goal’s mean score of 1.9 reveals the average respondent regarded it as more

than a ‘high’ priority, albeit further from a ‘very high priority’ than the productivity, profitability and family income goals.

Moreover, the statistical evidence indicates that dryland farmers in the Mallee Region tended to consider the resource condition goal as more important to them than goals relating to their skills and innovation, property attractiveness and standing in the community. It is noteworthy that the proportion of respondents attributing ‘high’ or ‘very high’ priority to the resource condition goal (70.0 per cent) was 1.4 times greater than the equivalent proportion for the ‘standing in the community’ goal (49.5 per cent) (Table 5.15).

## 5.6 Farm business threats

Respondents were asked to indicate the degree to which nine different issues posed threats to the future of their farm businesses. Frequency distributions of the ratings for the different threats are shown in Table 5.16. A mean score for each issue is included also, based on scoring ‘very large threat’ ratings as one, ‘large threat’ ratings as two, and so on until ‘no threat’ was scored as five. The lower the mean score for an issue, therefore, the more the average respondent viewed it as a threat to their farm business.

Table 5.16: Frequency distributions of Mallee dryland responses to: How much does each issue below pose a threat to the future of your farm business?

Issue	Proportion of respondents (%)					Mean score*	n
	Very large threat	Large threat	Moderate threat	Minor threat	No threat		
Government regulation	18.8	35.5	32.6	11.2	1.9	2.42	313
Commodity prices	49.0	39.8	9.6	1.3	0.3	1.64	314
Drought	61.2	22.3	12.9	3.6	0.0	1.59	309
Pest animals (eg, rabbits, foxes, wild dogs)	6.7	17.0	34.6	35.3	6.4	3.18	312
Wind erosion	3.2	10.8	28.9	50.8	6.3	3.46	315
Soil salinization	2.3	7.7	22.9	51.6	15.5	3.70	310
Environmental weeds (eg, horehound, silver leaf nightshade)	4.1	11.1	32.5	41.7	10.5	3.43	314
Loss of native vegetation	2.9	3.8	16.6	41.9	34.8	4.02	313
Fragmentation of habitat	3.0	2.3	13.8	44.9	36.1	4.09	305

\* Very large threat = 1, large threat = 2, moderate threat = 3, minor threat = 4, and no threat = 5.

These mean scores indicate that the average respondent rated ‘drought’ as the greatest threat to their farm business, followed by ‘commodity prices’. The mean scores for these threats are near 1.6, indicating that the average respondent rated each around mid-way between a ‘large’ and a very large’ threat. Next comes ‘government regulation’ with a mean score of 2.4, indicating that the average respondent considered this about mid-way between a ‘moderate’ and a ‘large’ threat.

'Pest animals' was the threat with the next lowest mean score (3.2), followed by 'environmental weeds' (3.4), 'wind erosion' (3.5) and 'soil salinization' (3.7). These mean scores indicate that the average respondent rated each of them between a 'moderate' and a 'large' threat.

The mean scores for both 'fragmentation of habitat' (hereafter 'habitat fragmentation') and 'loss of native vegetation' slightly exceed four, indicating that the average respondent rated each marginally on the 'no threat' side of 'minor threat'. The mean score of 1.59 for 'drought' compares with a mean score of 3.18 for 'pest animals' – the resource condition issue posing the greatest threat to the average respondent – and with a mean score of 4.09 for 'fragmentation of habitat' – the resource condition issue posing the least threat to the average respondent.

Somewhat simplistically (since the scores are measured on ordinal rather than interval scales), these figures might be taken to imply that the average Mallee Region respondent rated 'drought' as 2.0 times (3.18/1.59) more a threat to their farm business than 'pest animals', and 2.6 times (4.09/1.59) times more a threat than 'habitat fragmentation'. On the same basis, we might assess the average respondent as rating 'pest animals' as 1.3 times (4.09/3.18) more a threat than 'habitat fragmentation'.

The proportion of respondents rating 'drought' a very large threat (61.2 per cent) was one-quarter higher than for 'commodity prices' and 3.25 times higher than for 'government regulation'. However, it was more than nine times greater than for 'pest animals' which was the resource condition issue rated most frequently as a very large threat. Of all respondents, 98.4 per cent of respondents rated 'commodity prices' as at least a moderate threat (i.e., as a very large, large or moderate threat), compared with 96.4 per cent for 'drought' 86.9 per cent for government regulation (Table 5.17). The resource condition issue rated most frequently (by 58.3 per cent of respondents) as at least a moderate threat was 'pest animals'. The resource condition issue rated with the lowest frequency (19.0 per cent of respondents) as at least a moderate threat was 'habitat fragmentation'.

'Habitat fragmentation' and 'native vegetation loss' were the issues most frequently rated by respondents as 'no threat' (36.1 per cent and 34.8 per cent, respectively; Table 5.16). The resource condition issue rated least frequently (by 6.3 per cent of respondents) as 'no threat' was 'wind erosion'. Zero respondents regarded 'drought' as 'no threat', while 0.3 per cent answered similarly in respect of 'commodity prices'.

Hence, there appears to have been a strong tendency among respondents to rate the resource condition issues specified as substantially lesser threats to their farm businesses than the more generic issues of drought, commodity prices and government regulation. Even so, the discussion suggests some marked differences between the resource condition issues in how Mallee Region dryland farmers rated them as threats to their farm businesses.

The WSR2 test was applied to evaluate the statistical significance of differences between response distributions for the different issues (Table F.2), and we can conclude consequently with at least 95 per cent confidence for each pairwise comparison that dryland farmers in the Mallee NRM region tended to rate:

Table 5.17: Cumulative frequency distributions of Mallee dryland responses to: How much does each issue below pose a threat to the future of your farm business?

	Cumulative proportion of respondents (%)				
	Very large threat	Large threat	Moderate threat	Minor threat	No threat
Government regulation	18.8	54.3	86.9	98.1	100.0
Commodity prices	49.0	88.9	98.4	99.7	100.0
Drought	61.2	83.5	96.4	100.0	100.0
Pest animals	6.7	23.7	58.3	93.6	100.0
Wind erosion	3.2	14.0	42.9	93.7	100.0
Soil salinisation	2.3	10.0	32.9	84.5	100.0
Environmental weeds	4.1	15.3	47.8	89.5	100.0
Loss of native vegetation	2.9	6.7	23.3	65.2	100.0
Fragmentation of habitat	3.0	5.2	19.0	63.9	100.0

- ‘drought’ a greater threat than each of the other issues except ‘commodity prices’;
- ‘commodity prices’ a greater threat than each of the remaining issues;
- ‘government regulation’ a greater threat than each of the remaining issues;
- ‘pest animals’ a greater threat than each of the remaining issues;
- ‘environmental weeds’ a greater threat than each of the remaining issues except ‘wind erosion’;
- ‘wind erosion’ a greater threat than each of the remaining issues;
- ‘soil salinisation’ a greater threat than each of the remaining issues; and, finally,
- ‘native vegetation loss’ a greater threat than ‘habitat fragmentation’.

## 5.7 Attachment to place

Various studies have identified individuals’ ‘attachment’ to a place as a key influence on their decisions to adopt behaviours beneficial for that place. In order to account for this influence, respondents were asked to indicate how strongly they agreed or disagreed with four statements concerned with their feelings of attachment to different scales of place (i.e., their property, their district, dryland areas of their NRM region, and their whole NRM region). Frequency distributions of responses to each statement are presented in Table 5.18.

Table 5.18: Frequency distributions of Mallee dryland responses to attitudinal statements concerning attachment to place

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
I feel a bond with our property	57.9	40.5	1.3	0.3	1.44	304
I feel a bond with our district	44.2	51.5	3.6	0.7	1.61	303
I feel a bond with dryland areas of the Mallee Region of Victoria	34.3	58.4	6.6	0.7	1.74	303
I feel a bond with the whole Mallee Region of Victoria	28.1	59.6	10.9	1.3	1.85	302

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

A mean score for each goal is presented in the table also, based on scoring ‘strongly agree’ ratings as one, ‘agree’ ratings as two, ‘disagree’ as three, and ‘strongly disagree’ as four. Hence, ‘ambivalent’ would be scored as 2.5. The lower the mean score for a statement, therefore, the more strongly the ‘average respondent’ agreed with it. On this basis, the place the average respondent agrees most strongly they feel a bond with is their own property, followed by their district, dryland areas of their NRM region, and, finally, by their whole NRM region. The mean scores in respect of the four different scales of ‘their place’ lie between one and two, indicating that the average respondent’s level of agreement that they feel a bond with each scale of ‘their place’ lies between ‘agree and ‘strongly agree’.

On the basis of the WSR2 test (Table F.3), we can conclude with at least 99 per cent confidence for each pairwise comparison that the wider population of dryland farmers in the Mallee NRM Region tend to agree more strongly that they feel a bond with:

- their own property than with their district;
- their district than with dryland areas of their NRM region; and
- dryland areas of their NRM region than with the whole region.

We can conclude, therefore, that a tendency exists among dryland farmers in the Mallee Region for their feelings of attachment to ‘their place’ to weaken as the boundaries of ‘their place’ are drawn further from their own property boundaries.

## 5.8 Farmers’ perceptions of how different NRM practices contribute to their goals

### 5.8.1 All respondents

Respondents were asked to rate how seven different on-farm natural resource management (NRM) practices would help or hurt pursuit of their main farming goals. These NRM practices

are listed in Table 5.19. These practices were included on advice from the Mallee Catchment Management Authority that they were reasonably relevant to farmers across dryland areas of its Region and also included the main kinds of on-farm NRM practices at which its dryland area programs were targeted.

Table 5.19: Frequency distributions of Mallee dryland responses to: How strongly would use of each practice below help or hurt your property's chances of achieving its main goals?

Practice	Proportion of respondents (%)							n
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly	Not applicable	
Reduced or minimum tillage	52.7	27.2	12.5	2.6	2.2	0.3	2.6	313
Continuous cropping	19.4	25.7	13.5	13.5	9.2	5.9	12.8	304
Establish high water-use plants (eg, Lucerne)	9.0	15.6	30.6	8.3	1.7	2.3	32.6	301
Control pest animals	30.9	31.6	25.3	2.3	1.0	1.0	7.9	304
Control environmental weeds	38.4	27.5	23.6	2.0	0.7	1.3	6.6	305
Remove grazing pressure from native vegetation	6.5	8.8	15.6	11.7	4.2	3.2	50.0	308
Link patches of native vegetation (to extend wildlife corridors)	5.2	9.8	18.6	13.7	5.9	7.2	39.5	306

Of these practices, 'remove grazing pressure from native vegetation' (hereafter 'remove grazing pressure') was rated most often (50.0 per cent of respondents) as 'not applicable', followed by 'link patches of native vegetation' (39.5 per cent, hereafter 'link native vegetation'), and 'establish high water-use plants' (32.6 per cent) (Table 5.19). 'Reduced or minimum tillage' was rated *least* often (by 2.6 per cent of respondents) as 'not applicable', followed by 'control environmental weeds' (6.6 per cent), 'control pest animals' (7.9 per cent), and 'continuous cropping' (12.8 per cent).

'Reduced or minimum tillage' was the practice that respondents rated most frequently as 'help greatly' (52.7 per cent of respondents), followed by 'control environmental weeds' (38.4 per cent), 'control pest animals' (30.9 per cent), and 'continuous cropping' (19.4 per cent). 'Link native vegetation' was the practice that respondents rated *least* frequently as 'help greatly' (5.2 per cent of respondents), followed by 'remove grazing pressure' (6.5 per cent) and 'establish high water-use plants' (9.0 per cent) (Table 5.19).

'Reduced or minimum tillage' was also rated most often (by 92.3 per cent of respondents) as at least 'help slightly' (i.e., as 'help greatly', 'help moderately' or 'help slightly'), followed by 'control environmental weeds' (89.5 per cent) and 'control pest animals' (87.8 per cent) (Table 5.20). The practice rated *least* often (30.8 per cent of respondents) as at least 'help slightly' was 'remove grazing pressure', followed by 'link native vegetation' (33.7 per cent), 'establish high water-use plants' (55.1 per cent), then finally 'continuous cropping' and 'link native vegetation' (each 58.6 per cent).

Table 5.20: Cumulative frequency distributions of Mallee dryland responses to: How strongly would use of each practice below help or hurt your property’s chances of achieving its main goals?

	Cumulative proportion of respondents (%)						
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly	Not applic
Reduced or minimum tillage	52.7	79.9	92.3	94.9	97.1	97.4	100.0
Continuous cropping	19.4	45.1	58.6	72.0	81.3	87.2	100.0
Establish high water-use plants	9.0	24.6	55.1	63.5	65.1	67.4	100.0
Control pest animals	30.9	62.5	87.8	90.1	91.1	92.1	100.0
Control environmental weeds	38.4	65.9	89.5	91.5	92.1	93.4	100.0
Remove grazing pressure from native vegetation	6.5	15.3	30.8	42.5	46.8	50.0	100.0
Link patches of native vegetation	5.2	15.0	33.7	47.4	53.3	60.5	100.0

## 5.8.2 Respondents for whom practices were applicable

Statistical testing for differences between the frequency distributions for the different practices is complicated by the difficulty of assigning a help/hurt score to the ‘not applicable’ (‘na’) responses. This complication was addressed by (i) first testing statistically for differences between practices in terms of proportions of respondents rating them as ‘not applicable’, and then (ii) excluding such respondents from the samples and proceeding to test for differences between frequency distributions in respect of the resulting samples of ‘applicable respondents’.

Step (i) involved WSR2 tests (Table F.4), from which we can conclude with at least 95 per cent confidence for each pairwise comparison that:

- ‘remove grazing pressure’ was rated ‘na’ by a higher proportion of Mallee Region dryland farmers than each of the other practices;
- ‘link native vegetation’ was rated ‘na’ by a higher proportion than each of the remaining practices;
- ‘establish high water-use plants’ was rated ‘na’ by a higher proportion than each of the remaining practices;
- ‘continuous cropping’ was rated ‘na’ by a higher proportion than each of the remaining practices except ‘control pest animals’;
- ‘control pest animals’ was rated ‘na’ by a higher proportion than ‘reduced or minimum tillage’ but not a higher proportion than ‘control environmental weeds’; and, finally,

- ‘control environmental weeds’ was rated ‘na’ by a higher proportion than ‘reduced or minimum tillage’.

The outcomes of step (ii) are shown in Table 5.21, which presents frequency distributions of help/hurt ratings from applicable respondents. The distributions for practices with the largest share of ‘na’ responses – ‘remove grazing pressure’, ‘link native vegetation’ and ‘establish high water-use plants’ – logically are affected most by recalculating the distributions without such responses.

Table 5.21: Frequency distributions of responses from applicable Mallee dryland respondents to:  
How strongly would use of each practice below help or hurt your property’s chances of achieving its main goals?

	Proportion of respondents identifying practice as applicable (%)						Mean score*	n
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly		
Reduced or minimum tillage	54.1	27.9	12.8	2.6	2.3	0.3	1.77	305
Continuous cropping	22.3	29.4	15.5	15.5	10.6	6.8	3.16	265
Establish high water-use plants	13.3	23.2	45.3	12.3	2.5	3.4	2.96	203
Control pest animals	33.6	34.3	27.5	2.5	1.1	1.1	2.11	280
Control environmental weeds	41.1	29.5	25.3	2.1	0.7	1.4	2.00	285
Remove grazing pressure from native vegetation	13.1	17.6	31.4	22.9	8.5	6.5	3.54	153
Link patches of native vegetation	8.7	16.3	31.0	22.3	9.8	12.0	3.88	184

\* Help greatly = 1; Help moderately = 2; Help slightly = 3; Hurt slightly = 4; Hurt moderately = 5; and Hurt greatly = 6.

We see from Table 5.21 that ‘reduced or minimum tillage’ was the practice that applicable respondents rated most frequently as ‘help greatly’ (54.7 per cent of respondents), followed by ‘control environmental weeds’ (41.1 per cent), ‘control pest animals’ (33.6 per cent), and ‘continuous cropping’ (22.3 per cent). ‘Link native vegetation’ was the practice that respondents rated *least* frequently as ‘help greatly’ (8.7 per cent of respondents), followed by ‘remove grazing pressure’ (13.1 per cent) and ‘establish high water-use plants’ (13.3 per cent).

Cumulative frequency distributions derived from Table 5.21 are presented in Table 5.22. This table reveals that ‘control environmental weeds’ was rated most often (by 95.8 per cent of applicable respondents) as at least ‘help slightly’ (i.e., as ‘help greatly’, ‘help moderately’ or ‘help slightly’), followed closely by ‘control pest animals’ (95.4 per cent) and ‘reduced or minimum tillage’ (94.8 per cent). The practice rated *least* often (56.0 per cent of applicable respondents) as at least ‘help slightly’ was ‘link native vegetation’, followed by ‘remove grazing pressure’ (62.1 per cent), ‘continuous cropping’ (67.2 per cent), then, finally, ‘establish high water-use plants’ (81.8 per cent).

Table 5.22: Cumulative frequency distributions of responses from applicable Mallee dryland respondents to: How strongly would use of each practice below help or hurt your property’s chances of achieving its main goals?

	Cumulative proportion of respondents identifying practice as applicable (%)					
	Help greatly	Help moderately	Help slightly	Hurt slightly	Hurt moderately	Hurt greatly
Reduced or minimum tillage	54.1	82.0	94.8	97.4	99.7	100.0
Continuous cropping	22.3	51.7	67.2	82.6	93.2	100.0
Establish high water-use plants	13.3	36.5	81.8	94.1	96.6	100.0
Control pest animals	33.6	67.9	95.4	97.9	98.9	100.0
Control environmental weeds	41.1	70.5	95.8	97.9	98.6	100.0
Remove grazing pressure from native vegetation	13.1	30.7	62.1	85.0	93.5	100.0
Link patches of native vegetation	8.7	25.0	56.0	78.3	88.0	100.0

Mean help/hurt scores were assigned in Table 5.21 to each practice, after scoring ‘help greatly’ ratings as one, ‘help moderately’ ratings as two, and so on until ‘hurt greatly’ ratings were scored as six. ‘Ambivalent’ would thus be scored as 3.5. The lower the mean score for a practice, therefore, the more the ‘average applicable respondent’ considered the practice to be helpful. On this basis, the ‘average applicable respondent’ rated ‘reduced or minimum tillage’ as the most helpful practice, and as more than ‘moderately’ helpful. On the same basis, ‘link native vegetation’ was rated as the least helpful practice, and as between ‘hurt slightly’ and ambivalent’.

On the basis of the WSR2 test (Table F.5), we can conclude with at least 95 per cent confidence for each pairwise comparison that ‘applicable dryland farmers in the Mallee Region’<sup>16</sup> tended to rate:

- ‘reduced or minimum tillage’ as more helpful than each other practice;
- ‘control environmental weeds’ as more helpful than each remaining practice;
- ‘control pest animals’ as more helpful than each remaining practice;
- ‘establish high water-use plants’ as more helpful than each remaining practice except ‘continuous cropping’;
- ‘continuous cropping’ as more helpful than each remaining practice except ‘remove grazing pressure’; and, finally,
- ‘remove grazing pressure’ as more helpful than ‘link native vegetation’.

<sup>16</sup> That is, dryland farmers in the Mallee Region who identified both practices in a comparison as applicable to their properties.

## 5.9 Current and expected future use of targeted on-farm conservation practices

Applicable respondents were asked to indicate the approximate areas of their properties on which each of the on-farm practices detailed in the previous section were (i) currently being used, and (ii) expected to be used after ten years. Frequency distributions for current areas of use of each practice by applicable respondents are presented in Table 5.23. Aside from ‘reduced or minimum tillage’ (for which 7.5 per cent of applicable respondents reported zero current use), the proportions of applicable respondents reporting zero current use were substantial for each of the remaining practices (ranging from 31.3 per cent for ‘control pest animals’ to 64.5 per cent for ‘establish high water-use plants’).

Table 5.23: Frequency of responses from applicable Mallee dryland respondents to: Please indicate the approximate areas of your property on which each practice below is already in use.

Practice	Proportion of applicable respondents (%)						n
	0 ha	1-49 ha	50-199 ha	200-499 ha	500-1,999 ha	>= 2,000 ha	
Reduced or minimum tillage	7.5	1.8	3.6	10.4	48.6	28.2	280
Continuous cropping	42.1	1.2	5.5	10.2	26.8	14.2	254
Establish high water-use plants	64.5	11.2	16.2	3.6	4.1	0.5	197
Control pest animals	31.3	5.3	2.6	2.3	29.8	28.7	265
Control environmental weeds	34.6	7.4	2.6	1.1	28.6	25.7	269
Remove grazing pressure from native vegetation	61.1	19.4	14.6	1.4	2.1	1.4	144
Link patches of native vegetation	65.1	22.3	7.4	2.3	1.1	1.7	175

The mean and median responses for each practice for both parts of the question are shown in Table 5.24. For each practice except ‘control environmental weeds’, the mean area of use expected by applicable respondents after ten years exceeds their current mean area. In the case of ‘control environmental weeds’, the mean area of use expected by applicable respondents after ten years is less than the current mean area.

For each practice except ‘establish high water-use plants’, ‘remove grazing pressure’ and ‘link native vegetation’, the median area of use expected by applicable respondents after ten years exceeds the current median area. For each of these exceptions, the median current area and the median expected area remain unchanged at zero hectares.

Table 5.24: Mean and median areas of practice use per applicable Mallee dryland respondent, currently and expected after ten years

Practice	Mean area used per applicable respondent (ha)		Median area used per applicable respondent (ha)		p*
	Current	Expected after 10 years	Current	Expected after 10 years	
Reduced or minimum tillage	1557.2	1710.6	1214.6	1400.0	0.000
Continuous cropping	811.1	983.1	201.2	500.0	0.000
Establish high water-use plants	91.0	136.0	0.0	0.0	0.000
Control pest animals	1332.1	1339.9	1000.0	1012.1	0.637
Control environmental weeds	1212.2	1202.8	780.0	690.0	0.821
Remove grazing pressure from native vegetation	81.5	105.2	0.0	0.0	0.000
Link patches of native vegetation	86.9	93.9	0.0	0.0	0.000

\* Wilcoxon Signed Ranks Test, 2-tailed

The WSR2 test was applied to assess the statistical confidence with which we can conclude that differences in current and expected areas for each practice exist in the wider population of applicable Mallee Region dryland farmers<sup>17</sup>. With over 95 per cent confidence for each practice except ‘control pest animals’ and ‘control environmental weeds’, we can conclude as a result that Mallee Region dryland farmers did tend at the time of survey to expect their area of use of each practice to be higher after 10 years than it was currently. For the two exceptions, we cannot conclude with 95 per cent confidence that Mallee Region dryland farmers tended to expect their area of use of each practice to be lower after 10 years than what it was currently.

Whereas Tables 5.23 and 5.24 were concerned with current adoption *areas* for each practice, in Table 5.25 the focus shifts to current adoption *rates*. The current adoption rate of a practice by each applicable respondent was calculated by dividing their current area of use by the area of their property, and expressing this rate as a percentage.

‘Link native vegetation’ was the practice with the highest proportion of applicable respondents (95.4 per cent) indicating a current adoption rate of less than 10 per cent, followed by ‘remove grazing pressure’ (95.1 per cent), and ‘establish high water-use plants’ (90.3 per cent). ‘Reduced or minimum tillage’ had the lowest proportion (11.2 per cent) indicating a current adoption rate of less than 10 per cent, followed by ‘control pest animals’ (39.5 per cent), ‘control environmental weeds’ (43.8 per cent) and ‘continuous cropping’ (49.0 per cent).

‘Control pest animals’ had the highest proportion of applicable respondents (53.2 per cent) indicating a current adoption rate of at least 90 per cent, followed by ‘control environmental weeds’ (50.6 per cent) and ‘reduced or minimum tillage’ (46.8 per cent). ‘Establish high water-use plants’ had the lowest proportion (2.0 per cent) indicating a current adoption rate of 90 per

<sup>17</sup> The non-parametric WSR2 test was used instead of the t-test since the distributions for most practices contravened the assumption of normality upon which the accuracy of parametric tests including the t-test depends.

cent or better, followed by ‘link native vegetation’ (2.3 per cent), ‘remove grazing pressure’ (3.5 per cent) and ‘continuous cropping’ (15.4 per cent).

Table 5.25: Frequency distributions for current adoption rates by applicable Mallee dryland respondents, calculated from their responses to: *Please indicate the approximate areas of your property on which each practice below is already in use.*

Practice	Proportion (%) of applicable respondents with adoption rate:							n
	0%	1-9%	10-29%	30-49%	50-69%	70-89%	90% & over	
Reduced or minimum tillage	7.6	3.6	9.4	11.5	11.9	9.4	46.8	278
Continuous cropping	42.3	6.7	10.7	5.5	7.9	11.5	15.4	253
Establish high water-use plants	64.8	25.5	5.6	1.0	0.5	0.5	2.0	196
Control pest animals	31.6	8.0	0.4	1.5	2.3	3.0	53.2	263
Control environmental weeds	34.8	9.0	1.1	1.1	1.1	2.2	50.6	267
Remove grazing pressure from native vegetation	61.5	33.6	1.4	0.0	0.0	0.0	3.5	143
Link patches of native vegetation	65.5	29.9	0.6	0.6	1.1	0.0	2.3	174

Next we turn our attention to *future* adoption rates (i.e., expected by applicable respondents 10 years after survey). These rates were calculated similarly as for current adoption rates. Frequency distributions of future adoption rates by applicable respondents for each practice are presented in Table 5.26.

The summary statistics – mean and median values – presented in Table 5.27 assist us to compare the current and future frequency distributions of adoption rates for each practice, as presented in Tables 5.25 and 5.26 respectively. For each practice, the mean adoption rate expected by applicable respondents after ten years exceeds the mean current adoption rate. For three of the practices – ‘reduced or minimum tillage’, ‘continuous cropping’ and ‘control pest animals’ – the median adoption rate expected after 10 years exceeds the median current adoption rate (albeit only slightly for ‘control pest animals’). For another three practices – ‘establish high water-use plants’, ‘remove grazing pressure’ and ‘link native vegetation’ – the median current and expected adoption rates remain unchanged at zero. For ‘control environmental; weeds’, finally, the median current and expected adoption rates remain unchanged at 90.9 per cent.

Except for ‘control pest animals’ and ‘control environmental weeds’, the probabilities for each practice in the right-most column of Table 5.27 are less than 0.01. For each of these five practices, therefore, we can conclude with at least 99 per cent confidence from the WSR2 test that dryland farmers in the Mallee Region tended at the time of survey to expect their adoption rate to increase over the ensuing 10 years. The same conclusion cannot be stated for ‘control pest animals’ and ‘control environmental weeds’, however, even with only 95 per cent confidence.

Table 5.26: Frequency distributions for expected adoption rates after 10 years by applicable Mallee dryland respondents, calculated from their responses to: *Please indicate the approximate areas of your property on which you expect each practice to be used in 10 years time.*

Practice	Proportion (%) of applicable respondents with adoption rate:							n
	0%	1-9%	10-29%	30-49%	50-69%	70-89%	90% & over	
Reduced or minimum tillage	4.3	1.4	9.0	9.7	10.8	12.2	52.5	278
Continuous cropping	35.6	5.1	9.1	9.1	8.7	11.5	20.9	253
Establish high water-use plants	55.6	27.0	12.2	2.0	0.5	0.5	2.0	196
Control pest animals	31.6	7.6	0.8	1.1	1.9	2.7	54.4	263
Control environmental weeds	35.6	7.5	2.2	0.0	1.1	2.6	50.9	267
Remove grazing pressure from native vegetation	57.3	35.0	3.5	0.7	0.0	0.0	3.5	143
Link patches of native vegetation	58.6	35.6	1.7	0.6	1.1	0.0	2.3	174

Table 5.27: Mean and median adoption rate by applicable Mallee dryland respondents for each practice, currently and as expected after ten years

Practice	Mean adoption rate per applicable respondent (% of property area)		Median adoption rate per applicable respondent (% of property area)		p*
	Current	Expected after 10 years	Current	Expected after 10 years	
	Reduced or minimum tillage	67.2	73.6	83.8	
Continuous cropping	33.2	40.3	11.5	30.0	0.000
Establish high water-use plants	4.8	6.6	0.0	0.0	0.000
Control pest animals	57.5	58.0	97.8	98.8	0.667
Control environmental weeds	53.3	53.6	90.9	90.9	0.827
Remove grazing pressure from native vegetation	4.7	5.4	0.0	0.0	0.000
Link patches of native vegetation	3.7	4.1	0.0	0.0	0.000

\* Wilcoxon Signed Ranks Test, 2-tailed

Observe that of all practices ‘control pest animals’, ‘control environmental weeds’ and ‘reduced or minimum tillage’ rank easily the highest in respect of median adoption rate by applicable respondents, both now and expected after 10 years. For all other practices except ‘continuous cropping’, both current and expected median adoption rates are zero.

Finally in this section, we examine the expectations of applicable respondents in respect of whether, and by how much, their use of each practice will have changed 10 years after the

survey<sup>18</sup>. Table 5.28 presents frequency distributions for these expectations. For all practices, we see that the proportion of applicable respondents expecting no change in practice use over the ensuing 10 years exceeds 70 per cent. This proportion is least for ‘establish high water-use plants’ (72.6 per cent) and greatest for ‘control pest animals’ (95.8 per cent).

Table 5.28: Frequency distributions for differences in practice use expected by applicable Mallee dryland respondents between the survey date and ten years afterwards.

Practice	Proportion of respondents identifying practices as applicable (%)							n
	<= -500 ha	-500 to -100 ha	-99 to -1 ha	0 ha	1 to 99 ha	100 to 499 ha	>= 500 ha	
Reduced or minimum tillage	1.4	1.8	0.4	76.1	1.8	7.1	11.4	280
Continuous cropping	1.2	2.0	0.4	72.8	1.2	9.1	13.4	254
Establish high water-use plants	0.5	0.5	0.5	72.6	11.7	11.7	2.5	197
Control pest animals	1.1	0.4	0.4	95.8	0.4	0.0	1.9	265
Control environmental weeds	2.2	0.4	1.1	92.5	0.7	1.1	1.9	268
Remove grazing pressure from native vegetation	0.0	0.0	0.0	81.9	13.2	4.2	0.7	144
Link patches of native vegetation	0.0	0.0	1.1	79.4	17.7	1.7	0.0	175

Across all practices, the proportion of applicable respondents anticipating reduced use ranges from a minimum of zero per cent for ‘remove grazing pressure’ to a maximum of 3.7 per cent for ‘control environmental weeds’. The practice for which the largest proportion of applicable respondents anticipated increased use was ‘establish high water-use plants’ (25.9 per cent), followed by ‘continuous cropping’ (23.7 per cent), ‘reduced or minimum tillage’ (20.3 per cent), ‘link native vegetation’ (19.4 per cent), ‘remove grazing pressure’ (18.1 per cent), ‘control environmental weeds’ (3.7 per cent), and, finally, ‘control pest animals’ (2.3 per cent).

The relatively low proportions of applicable respondents expecting to increase their use of ‘control pest animals’ and ‘control environmental weeds’ may follow from these practices’ current adoption rates being typically much higher than for the other practices aside from ‘reduced or minimum tillage’. As mentioned previously, 57.1 per cent of applicable respondents already ‘control pest animals’ on at least 70 per cent of the area of their properties, and 53.5 per cent of applicable respondents already ‘control environmental weeds’ on at least 70 per cent of the area of their properties. Even so, 20.3 per cent of applicable respondents expected to increase their use of ‘reduced or minimum tillage’ despite 64.7 per cent of them already using this practice on at least 70 per cent of the area of their properties.

<sup>18</sup> For each practice, expected change in use was calculated for each applicable respondent by subtracting their current area of use from their expected area of use after 10 years.

## 5.10 Perceptions regarding other farmers' current use of targeted on-farm practices

Applicable respondents<sup>19</sup> were asked: “From what you have seen and heard, how widely is each practice below already used in your district”. Frequency distributions of the responses for each practice are shown in Table 5.29. Mean scores were assigned in this table to each practice, after scoring ‘wide use’ ratings as one, ‘moderate use’ ratings as two, ‘limited use’ ratings as three, and ‘zero or minimal use’ ratings as four. The lower the mean score for a practice, therefore, the more the ‘average applicable respondent’ considered the practice to be used widely within their district. On this basis, the average applicable respondent perceives ‘reduced or minimum tillage cropping’ as used most widely in their district –between ‘moderate use’ and ‘wide use’.

Table 5.29: Frequency distributions of responses from applicable Mallee dryland respondents to:  
From what you have seen and heard, how widely is each practice below already used in your district?

Practice	Proportion of applicable respondents (%)				Mean score*	n
	Wide use	Moderate use	Limited use	Zero / minimal use		
Reduced or minimum tillage	43.9	45.2	9.6	1.3	1.68	303
Continuous cropping	18.7	48.9	29.9	2.6	2.16	268
Establish high water-use plants	2.5	7.5	54.7	35.3	3.23	201
Control pest animals	28.0	41.6	27.6	2.9	2.05	279
Control environmental weeds	22.2	47.7	26.5	3.6	2.11	279
Remove grazing pressure from native vegetation	2.6	21.2	51.7	24.5	2.98	151
Link patches of native vegetation	2.8	13.3	48.1	35.9	3.17	181

\* Wide use = 1; moderate use = 2; limited use = 3; and zero / minimal use = 4.

On the same basis, the average applicable respondent perceives ‘control pest animals’ to be the practice adopted next most widely in their district, followed by ‘control environmental weeds’, ‘continuous cropping’, ‘remove grazing pressure’, ‘link native vegetation’, and, finally, ‘establish high water-use plants’. The mean scores for ‘control pest animals’, ‘control environmental weeds’ and ‘continuous cropping’ indicate that the average respondent perceives the use of each of these practices within their district to lie slightly on the ‘limited use’ side of ‘moderate use’. The mean score for ‘remove grazing pressure’ indicates that the average respondent perceived the use level of this practice within their district to be ‘limited use’, whereas the mean scores for ‘link native vegetation’ and ‘establish high water-use plants’ reveal that average respondent viewed these practices as used in their district on the ‘zero/minimal use’ side of ‘limited use’.

<sup>19</sup> Respondents were asked to answer this question only for practices they indicated were applicable to their own properties.

On the basis of the WSR2 test (Table F.6), we can conclude with at least 95 per cent confidence for each pairwise comparison that applicable dryland farmers in the Mallee Region tended to rate:

- ‘reduced or minimum tillage’ as used more widely in their district than each other practice;
- ‘control pest animals’ as used more widely in their district than each remaining practice except ‘control environmental weeds’;
- ‘control environmental weeds’ as used more widely in their district than each remaining practice;
- ‘continuous cropping’ as used more widely in their district than each remaining practice;
- ‘remove grazing pressure’ as used more widely in their district than each remaining practice; and
- ‘link native vegetation’ as used no more widely in their district than ‘establish high water-use plants’.

### **5.11 Perceptions regarding other farmers’ *eventual* use of targeted on-farm practices**

Following on from the survey question just covered, applicable respondents<sup>20</sup> were asked: “How widely do you expect each practice will *eventually* be used in your district?”. Frequency distributions of the responses for each practice are presented in Table 5.30. Similarly as for Table 5.29, mean scores were assigned in this table to each practice. The lower the mean score for a practice, therefore, the more the ‘average applicable respondent’ expects the practice to eventually be used widely within their district.

Comparison of Tables 5.29 and 5.30 reveals, for each practice, that the mean score for perceived current district use exceeds the mean score for perceived eventual district use (albeit by only slight margins for ‘control pest animals’ and ‘control environmental weeds’). That is, the average applicable respondent expects eventual district use of each practice to exceed current district use. On the basis of the WSR2 test, we can conclude with over 99 per cent confidence for each practice except ‘control pest animals’ and ‘control environmental weeds’ that the wider population of applicable dryland farmers in the Mallee Region tended at the time of survey to expect eventual district use of each practice to exceed current district use (the same conclusion is not warranted for the two exceptions even with the confidence level lowered to 90 per cent).

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<sup>20</sup> Respondents were asked to answer this question only for practices they indicated were applicable to their own properties.

Table 5.30: Frequency distributions of responses from applicable Mallee dryland respondents to:  
*How widely do you expect each practice (below) will eventually be used in your district?*

Practice	Proportion of applicable respondents (%)				Mean score*	Mean score ratio	n
	Wide use	Moderate use	Limited use	Zero / minimal use			
Reduced or minimum tillage	76.9	20.1	2.0	1.0	1.27	1.32	299
Continuous cropping	38.3	47.7	13.2	0.8	1.76	1.23	266
Establish high water-use plants	5.4	20.1	51.5	23.0	2.92	1.11	204
Control pest animals	28.6	43.8	23.2	4.3	2.03	1.01	276
Control environmental weeds	27.8	44.4	23.5	4.3	2.04	1.03	277
Remove grazing pressure from native vegetation	8.1	30.2	51.0	10.7	2.64	1.13	149
Link patches of native vegetation	6.7	22.8	52.2	18.3	2.82	1.12	180

\* Wide use = 1; moderate use = 2; limited use = 3; and zero / minimal use = 4.

Figures in the ‘mean score ratio’ column of Table 5.30 indicate the proportionate degree to which the average applicable respondent expected eventual use of each practice in their district to exceed current use. The ratio for each practice was calculated by dividing the relevant mean score in Table 5.29 by the relevant mean score in Table 5.30. For ‘reduced or minimum tillage’, accordingly, the ratio was calculated as  $1.68/1.27 = 1.32$ .

On this basis (rough-and-ready, since current and eventual district use are each measured on ordinal scales), we might conclude that the average applicable respondent expects ‘zero or minimum tillage’ to be the practice for which district use will eventually increase by the highest proportion, followed by ‘continuous cropping’, ‘remove grazing pressure’, ‘link native vegetation’ and ‘establish high water-use plants’. We might conclude similarly that the average applicable respondent expects ‘control pest animals’ to be the practice for which district use will eventually increase by the *lowest* proportion, followed by ‘control environmental weeds’.

## 5.12 Perceptions of how the effectiveness of each practice depends on its use by other landholders

Applicable respondents<sup>21</sup> were asked: “Sometimes, if a practice is going to work on one place, it needs also to be used by other landholders in the same district. In your view, how much does the effectiveness on your property of each practice below depend on what others in your district are doing?”. Frequency distributions of responses for each practice are presented in Table 5.31.

<sup>21</sup> Respondents were asked to answer this question only for practices they indicated were applicable to their own properties.

Table 5.31: Frequency distributions of responses from applicable Mallee dryland respondents to:  
How much does the effectiveness on your property of each practice below depend on what others in your district are doing?

Practice	Proportion of applicable respondents (%)			Mean score*	n
	Certainly depends on others	Possibly depends on others	Doesn't depend on others		
Reduced or minimum tillage	7.7	23.2	69.1	2.61	298
Continuous cropping	7.9	23.3	68.8	2.61	266
Establish high water-use plants	5.0	22.3	72.8	2.68	202
Control pest animals	60.9	18.1	21.0	1.60	276
Control environmental weeds	59.4	18.5	22.1	1.63	281
Remove grazing pressure from native vegetation	12.2	27.9	59.9	2.48	147
Link patches of native vegetation	27.5	32.6	39.9	2.12	178

\* Certainly depends = 1; possibly depends = 2; and doesn't depend =3.

Mean scores were assigned in this table to each practice, after scoring 'certainly depends on others' responses as one, 'possibly depends on others' responses as two, and 'doesn't depend on others' responses as three. The lower the mean score for a practice, therefore, the more the 'average applicable respondent' considered the effectiveness of the practice on their property to depend on its use by others in the same district. On this basis, the average applicable respondent perceived 'control pest animals' as the practice depending most for its effectiveness on use by other landholders, followed closely by 'control environmental weeds'. The mean scores for each of these two practices are below two, indicating that the average applicable respondent perceives them as more than 'possibly' (substantially towards 'certainly') depending for their effectiveness on use by others in the same district.

The practice perceived by the average applicable respondent as next most dependent for its effectiveness on use by others was 'link native vegetation. The mean score for this practice is slightly above two, indicating that the average applicable respondent perceives its effectiveness as marginally less than 'possibly' depending (towards 'doesn't depend') on use by others. The practice perceived as next most dependent for its effectiveness on use by others was 'remove grazing pressure', followed by 'reduced or minimum tillage' and 'continuous cropping' (which share the same mean score), and, finally, by 'establish high water-use plants'. The mean scores for each of these four practices lie midway between two and three, indicating that the average applicable respondent perceives them as moderately less than 'possibly' depending (towards 'doesn't depend') for their effectiveness on use by others.

### 5.13 Perceived likelihood of other landholders using practices identified as dependent on others' use

Following on from the question covered in the preceding section, a further question was asked of respondents who answered that the effectiveness of a practice on their own property depended

‘certainly’ or ‘possibly’ on its use by other landholders. The follow-up question for this narrower set of applicable respondents was: “This question is concerned only with those practices for which you marked ‘possibly / certainly depends on others’. For each of these practices, how likely is it that other landholders in your district will use the practice sufficiently for it to work properly on your place?”. Frequency distributions of responses for each practice are presented in Table 5.32.

Table 5.32: Frequency distributions of responses from applicable Mallee dryland respondents to: How likely is it that other landholders in your district will use [each practice below] sufficiently for it to work properly on your place?”.

Practice	Proportion of applicable respondents (%)					Mean score*	n
	Highly likely	Likely	Neither likely or unlikely	Unlikely	Highly unlikely		
Reduced or minimum tillage	22.1	52.3	17.4	5.8	2.3	2.14	86
Continuous cropping	16.3	50.0	22.5	8.8	2.5	2.31	80
Establish high water-use plants	2.0	42.0	46.0	8.0	2.0	2.66	50
Control pest animals	27.4	49.3	11.4	9.5	2.5	2.10	201
Control environmental weeds	22.7	51.7	13.5	10.1	1.9	2.17	207
Remove grazing pressure from native vegetation	9.1	27.3	41.8	21.8	0	2.76	55
Link patches of native vegetation	8.8	24.5	38.2	23.5	4.9	2.91	102

\* Highly likely = 1; likely = 2; neither likely or unlikely = 3; unlikely = 4; and highly unlikely = 5.

Mean scores were assigned in this table to each practice, after scoring ‘highly likely’ responses as one, ‘likely’ responses as two, and so on until ‘highly unlikely’ responses were scored as five. The lower the mean score for a practice, therefore, the more the average applicable respondent thought it likely that other landholders would use that practice sufficiently for it to work properly on their own property. On this basis, the average applicable respondent perceived ‘control pest animals’ as the practice other landholders were most likely to use sufficiently for it to work effectively on their own property, followed by ‘reduced or minimum tillage’, ‘control environmental weeds’, ‘continuous cropping’, ‘establish high water-use plants’, ‘remove grazing pressure’, and, finally, ‘link native vegetation’.

With mean scores for all practices less than three, the average applicable respondent is more optimistic than pessimistic that other landholders will use each practice sufficiently to make its use effective on their own property. With the mean scores for ‘establish high water-use plants’, ‘remove grazing pressure’ and ‘link native vegetation’ closer to three than two, however, the average applicable respondent’s assessment of the likelihood of sufficient use of these practices by other landholders is closer to ambivalence than to ‘likely’. The mean scores for ‘control pest animals’, ‘reduced or minimum tillage’, ‘control environmental weeds’ and ‘continuous cropping’ indicate that the average applicable respondent’s assessments for these cases are nearer to ‘likely’ than to ambivalence.

## 5.14 Awareness of the regional model for NRM delivery

Respondents were provided with six statements describing the regional model for NRM delivery as it applies to them, and asked to indicate their degree of awareness of the information contained in each statement. Frequency distributions of responses for each statement are presented in Table 5.33.

Table 5.33: Frequency distributions of responses from Mallee dryland respondents to: Please indicate whether or not you have heard about the following (statements regarding the regional approach to natural resource management).

Statement	Proportion of respondents (%)			Mean score*	n
	Heard about it	Possibly heard about it	Haven't heard about it		
Much of the responsibility for deciding what on-ground NRM activities to fund now lies with regional bodies	34.3	36.4	29.3	1.95	341
The regional body for the region where your property is located is the Mallee Catchment Management Authority (CMA)	68.4	20.6	11.0	1.43	345
The board of the Mallee CMA consists mostly of community representatives	45.9	31.0	23.1	1.77	268
The Mallee Lands Committee (also known as Mallee Lands Implementation Committee) advises the CMA on NRM issues arising in dryland areas of the Mallee Region	25.5	35.1	39.3	2.14	333
The Mallee Lands Committee consists mostly of community representatives	26.2	33.8	40.0	2.14	260

\* Yes, I've heard about it = 1; possibly I heard about it = 2; and, haven't heard about it = 3.

Mean scores were assigned in this table to each practice, after scoring 'yes, I've heard about it' responses as one, 'possibly I heard about it' responses as two, and 'haven't heard about it' responses as three. The lower the mean score for a statement, therefore, the more the average respondent was aware of the information contained in that statement. On this basis, the average respondent was most aware that the Mallee CMA is the regional body for their NRM region. The mean score of 1.43 for this statement places it near midway between 'yes, I've heard about it' and 'possibly heard about it'. The mean score of 1.77 for 'the board of the Mallee CMA consists mostly of community representatives' situates the average respondent's view on this statement closer to 'possibly heard about it', while the mean score of 1.95 for the first statement (concerning the regional bodies' roles in allocating funds for on-ground activities) suggests that the average respondent's view on this statement corresponds closely with 'possibly I heard about it'.

The average respondent was least aware concerning the two statements about the Mallee Lands Committee. The mean scores of 2.14 for each of these statements place the average respondent's response in each case marginally on the 'haven't heard about it' side of 'possibly I heard about it'.

On the basis of the WSR2 test (Table F.7), we can conclude with at least 95 per cent confidence for each pairwise comparison that dryland farmers in the Mallee Region tended at the time of survey to be:

- more aware that the Mallee CMA is their regional NRM body than in respect of each other statement;
- more aware that ‘the Mallee CMA consists mostly of community representatives’ than in respect of each remaining statement; and
- more aware that ‘much of the responsibility for deciding what on-ground activities to fund now lies with regional bodies’ than in respect of each remaining statement.

However, we are unable to conclude on this basis with at least 95 per cent confidence that the awareness of applicable dryland farmers in this region tended to differ in respect of the two statements ‘the Mallee Lands Committee advises the CMA on NRM issues arising in dryland areas of the Mallee Region’ and ‘the Mallee Lands Committee consists mostly of community representatives’.

Nevertheless, we can be at least 95 per cent confident that Mallee Region dryland farmers tended to be more aware that:

- their regional NRM body is the Mallee CMA than aware that the Mallee Lands Committee advises the CMA concerning NRM issues in the Region’s dryland areas;
- the board of the Mallee CMA consists mostly of community representatives than aware that the Mallee Lands Committee consists mostly of community representatives; and
- the Mallee CMA is their regional NRM body than aware that regional NRM bodies have assumed much of the responsibility for deciding what on-ground NRM activities to fund.

## **5.15 Personal contact with the Mallee CMA and the Mallee Lands Committee**

Respondents were asked: “In the last few years, how much have you or others on your property had personal contact with the Mallee Catchment Management Authority and the Mallee Lands Implementation Committee?”. Frequency distributions of responses for each entity are presented in Table 5.34.

Mean scores were assigned in this table to each entity, after scoring ‘frequent’ responses as one, ‘fairly frequent’ responses as two, ‘occasional’ responses as three, and ‘none’ responses as four. The lower the mean score for an entity, therefore, the more frequent the average respondent’s personal contact with that entity. On this basis, the average

Table 5.34: Frequency distributions of responses from Mallee dryland respondents to: In the last few years, how much have you or others on your property had personal contact with the South West Catchments Council and the Blackwood Basin Group?

	Proportion of respondents (%)				Mean score*	n
	Frequent	Fairly frequent	Occasional	None		
Mallee Catchment Management Authority	4.3	5.4	38.8	51.5	3.37	299
Mallee Lands Committee	2.4	1.4	22.0	74.1	3.68	286

\* Frequent = 1; fairly frequent = 2; occasional = 3; and none = 4.

respondent's personal contact with the Mallee CMA over the previous few years was more frequent than with the Mallee Lands Implementation Committee. The mean score in each case lie between three and four, indicating that the average respondent rated their frequency of personal contact with each entity between 'occasional' and 'none'. According to the WSR2 test, we can conclude with more than 99 per cent confidence that Mallee Region dryland farmers tended over the previous few years to have more frequent personal contact with the Mallee CMA than with the Mallee Lands Implementation Committee.

## 5.16 Attitudes regarding the regional delivery model generally

Respondents were provided with seven attitudinal statements in respect of the regional delivery model as it applies to them generally, and asked to indicate their level of agreement or disagreement with each of those statements. Frequency distributions of responses for each statement are presented in Table 5.35.

Mean scores were assigned in this table to each statement, after scoring 'strongly agree' responses as one, 'agree' responses as two, 'disagree' responses as three, and 'strongly disagree' responses as four. Hence, the score for 'ambivalent' (or 'neither agree or disagree') would be 2.5. The lower the mean score for a statement, therefore, the more strongly the average respondent agreed with that statement. On this basis, the statement the average respondent agreed with most strongly was 'the regional approach is a way to transfer NRM costs onto volunteers', followed closely by 'the regional approach is a way for governments to 'pass the buck' on difficult issues'. The mean scores for these statements were 1.87 and 1.93, respectively, indicating that the average respondent's views on these statements were marginally on the 'strongly agree' side of 'agree'.

The statement the average respondent agreed with next most strongly was:

- 'the regional approach is part of a strategy to increase government regulation of rural land-use', followed by
- 'the regional approach is an improvement on previous approaches';

Table 5.35: Frequency distributions of responses from Mallee dryland respondents to: How strongly do you agree or disagree with each of the following statements about the regional approach to natural resource management?

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
The regional approach is an improvement on previous approaches	4.7	63.5	24.6	7.1	2.34	211
The regional approach has reduced the 'red tape' for landholders seeking NRM funds for on-ground activities	7.6	48.3	30.7	13.4	2.50	238
Federal Government is serious about empowering our community to solve our own NRM problems	9.4	52.6	31.2	6.8	2.35	234
The Victorian Government is serious about empowering our community to solve our own NRM problems	8.8	39.7	35.1	16.3	2.59	239
The regional approach is a way for governments to 'pass the buck' on difficult issues	26.1	56.3	15.5	2.0	1.93	245
The regional approach is part of a strategy to increase government regulation of rural land-use	17.2	55.9	22.5	4.4	2.14	227
The regional approach is a way to transfer NRM costs onto volunteers	30.6	54.1	13.1	2.2	1.87	229

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

- 'Federal Government is serious about empowering our community to solve our own NRM problems';
- 'the regional approach has reduced the 'red tape' for landholders seeking NRM funds for on-ground activities'; and, finally,
- 'the Victorian Government is serious about empowering our community to solve our own NRM problems'.

The mean score for the last of these statements slightly exceeds 2.5, indicating that the average respondent's view on this statement was marginally on the 'disagree' side of ambivalent. The mean scores for the preceding three statements lie on the 'agree' side of ambivalent, indicating that the average respondent feels very weakly that the regional approach to NRM is an improvement on previous approaches and has reduced the 'red tape' for farmers seeking on-ground funding, and that the Federal Government is serious about empowering their community in respect of NRM. The mean score for 'the regional approach is part of a strategy to increase government regulation of rural land-use' slightly exceeds two, indicating that the average respondent's view on this statement is marginally on the ambivalent side of 'agree'.

On the basis of the WSR2 test (Table F.8), we can conclude with at least 95 per cent confidence for each pairwise comparison that the wider population of Mallee Region dryland farmers tended to agree more strongly with:

- ‘the regional approach is a way to transfer NRM costs onto volunteers’ than with each other statement except ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’;
- ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’ than with each remaining statement;
- ‘the regional approach is part of a strategy to increase government regulation of rural land-use’ than with each remaining statement;
- ‘the regional approach is an improvement on previous approaches’ than with each remaining statement except ‘Federal Government is serious about empowering our community to solve our own NRM problems’;
- ‘Federal Government is serious about empowering our community to solve our own NRM problems’ than with each remaining statement;

However, we are unable to conclude on this basis with at least 95 per cent confidence that Mallee Region dryland farmers tended to differ in their strength of agreement with ‘the regional approach has reduced the ‘red tape’ for landholders seeking NRM funds for on-ground activities’ and ‘the Victorian Government is serious about empowering our community to solve our own NRM problems’.

Nevertheless, we can be 95 per cent confident given the foregoing results that Mallee Region dryland farmers tended to regard the Federal Government as more serious than the Victorian Government in trying to empower their communities to solve their own NRM problems.

### **5.17 Attitudes regarding the regional delivery model in the Mallee Region**

Respondents were provided with eight attitudinal statements in respect of the Mallee Catchment Management Authority (CMA, responsible for regional NRM delivery in their particular region – i.e., the Mallee Region), and asked to indicate their level of agreement or disagreement with each of those statements. Frequency distributions of responses for each statement are presented in Table 5.36.

Mean scores were assigned in this table to each statement, after scoring ‘strongly agree’ responses as one, ‘agree’ responses as two, ‘disagree’ responses as three, and ‘strongly disagree’ responses as four. The score for ‘ambivalent’ would be 2.5. The lower the mean score for a statement, therefore, the more strongly the average respondent agreed with that statement.

On this basis, the statement the average respondent agreed with most strongly was ‘staff of the Mallee CMA care about our community’. The mean score for this statement was 2.07, indicating that the average respondent’s view on this statement was marginally on the ambivalent side of ‘agree’.

Table 5.36: Frequency distributions of responses to: How strongly do you agree or disagree with each of the following statements about the Mallee Catchment Management Authority?

	Proportion of respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
Mallee CMA is less bureaucratic than government generally	5.1	67.3	20.3	7.4	2.30	217
Mallee CMA understands the issues faced in our district	8.6	68.1	16.8	6.5	2.21	232
Community members on the Mallee CMA can be trusted to argue forcefully for the best interests of the Mallee Region	10.4	67.4	17.6	4.5	2.16	221
Staff of the Mallee CMA care about our community	9.9	76.6	10.4	3.2	2.07	222
The Mallee CMA is serious about helping our community to solve our own NRM problems	8.2	75.8	12.3	3.7	2.11	219
Mallee CMA is just a 'rubber stamp' for decisions made by the Federal Government	8.1	38.9	49.8	3.3	2.48	211
Mallee CMA is just a 'rubber stamp' for decisions made by the Victorian Government	13.1	43.7	39.9	3.3	2.33	213
NRM at the scale of the Mallee Region is so remote that it discourages us from getting involved	9.0	51.0	38.1	1.9	2.33	210

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

The statement the average respondent agreed with next most strongly was 'staff of the Mallee CMA care about our community', followed by:

- 'the Mallee CMA is serious about helping our community to solve our own NRM problems';
- 'community members on the Mallee CMA can be trusted to argue forcefully for the best interests of the Mallee Region';
- 'Mallee CMA understands the issues faced in our district';
- 'Mallee CMA is less bureaucratic than government generally';
- 'NRM at the scale of the Mallee Region is so remote that it discourages us from getting involved' and 'Mallee CMA is just a 'rubber stamp' for decisions made by the Victorian Government' (mean scores equal for these two statements); and, finally,
- 'Mallee CMA is just a 'rubber stamp' for decisions made by the Federal Government'

The mean scores for the statements 'staff of the Mallee CMA care about our community', 'the Mallee CMA is serious about helping our community to solve our own NRM problems', 'community members on the Mallee CMA can be trusted to argue forcefully for the best interests

of the Mallee Region’ and ‘Mallee CMA understands the issues faced in our district’ are between two and 2.25, indicating that the average respondent’s views on each of these statements were closer to ‘agree’ than to ambivalence. In contrast, the mean scores for the remaining statements lie between 2.25 and 2.5, indicating that the average respondent’s views on each of these statements were closer to ambivalence than to ‘agree’.

On the basis of the WSR2 test (Table F.9), we can conclude with at least 95 per cent confidence for each pairwise comparison that the wider population of dryland farmers in the Mallee Region tended to agree more strongly with:

- ‘staff of the Mallee CMA care about our community’ than each other statement except ‘the Mallee CMA is serious about helping our community to solve our own NRM problems’;
- ‘the Mallee CMA is serious about helping our community to solve our own NRM problems’ than each other statement except ‘community members on the Mallee CMA can be trusted to argue forcefully for the best interests of the Mallee Region’;
- ‘community members on the Mallee CMA can be trusted to argue forcefully for the best interests of the Mallee Region’ than each other statement except ‘Mallee CMA understands the issues faced in our district’ and ‘NRM at the scale of the Mallee Region is so remote that it discourages us from getting involved’;
- ‘Mallee CMA understands the issues faced in our district’ than ‘Mallee CMA is just a ‘rubber stamp’ for decisions made by the Federal Government’;
- ‘Mallee CMA is less bureaucratic than government generally’ than ‘Mallee CMA is just a ‘rubber stamp’ for decisions made by the Federal Government’;
- ‘NRM at the scale of the Mallee Region is so remote that it discourages us from getting involved’ than ‘Mallee CMA is just a ‘rubber stamp’ for decisions made by the Federal Government’; and, finally,
- ‘Mallee CMA is just a ‘rubber stamp’ for decisions made by the Victorian Government’ than ‘Mallee CMA is just a ‘rubber stamp’ for decisions made by the Federal Government’;

We are unable to conclude on this basis that Mallee Region dryland farmers tended to rate ‘NRM at the scale of the Mallee Region is so remote that it discourages us from getting involved’ more or less strongly than ‘Mallee CMA is just a ‘rubber stamp’ for decisions made by the Victorian Government’, or vice versa. Nevertheless, we can be at least 95 per cent confident that Mallee Region dryland farmers tended to regard the Mallee CMA as more a ‘rubber stamp’ for Victorian Government decisions than for Federal Government decisions.

## 5.18 Farmers' involvement with local groups concerned with NRM issues

Respondents were asked the following: “We are also interested in local groups concerned with sustainable farming / grazing / irrigation issues, or natural resource or environmental issues, on or near your property. Please list any such groups that your property has been involved with over the last few years”. Responses were coded in the first instance according to whether or not at least one such group had been listed. The frequency distribution for these coded responses is presented in Table 5.37. We see that over half of respondents did not list involvement with a local group of this kind.

Table 5.37: Frequency distribution for whether Mallee dryland respondents listed recent involvement with at least one local group concerned with NRM issues

Proportion of respondents (%)		n
At least one local group nominated	No local group nominated	
58.8	41.3	320

From the local groups they had listed, each respondent was asked to “circle the one local group that your property has been most involved with over the last few years”. Each group identified in this way was subsequently coded according to whether it fitted best into one of the following four categories: (i) landcare group; (ii) production group; (iii) nature / environmental group; (iv) local branch of the Victorian Farmers Federation; and (v) other. Category (ii) includes groups established mainly with an agricultural focus, and concerned with NRM issues and practices relevant to this focus. Groups identified of this kind include ‘Birchip Cropping Group’, ‘Mallee Sustainable Farming Group’, ‘Top Crop’, ‘Victorian No Till Association’, ‘FM500 Group’, ‘Brim Technology Group’, ‘Lambcare’, ‘Crop Start’ and the like. Category (iii) includes groups established with a predominant focus on conserving aspects of the natural environment. Groups allocated to this category include ‘Greening Australia’, ‘Trust for Nature’, and ‘Buloke Bio Link’. Category (iv) includes local branches of the Victorian Farmers Federation, which is the main organisation of farmers in Victoria representing their interests and also a provider of various services to them. Category (v) comprises groups which could not be allocated to the other three categories.

The frequencies with which applicable respondents – i.e., the 58.8 per cent of respondents who indicated involvement with a local group engaged in NRM activities – identified greatest involvement with different categories of local group are shown in Table 5.38. Over 70 per cent of applicable respondents identified their greatest local involvement of this kind with a ‘landcare group’, and one-fifth with a ‘production group’. ‘Nature / environmental group’ was identified as such by 3.7 per cent of applicable respondents, whereas the corresponding proportion for ‘VFF branch’ was 2.7 per cent.

Table 5.38: Frequency distribution for categories of local NRM-related groups that respondents identified greatest involvement with

Proportion of respondents who listed involvement with a local group (%)					n
Landcare group	Production group	Nature / environmental group	VFF branch	Other	
71.1	20.3	3.7	2.7	2.1	187

Respondents who indicated involvement with at least one local group engaged in NRM activities (‘applicable respondents’) were requested, in respect of the group they had been most involved with, to “indicate your property’s level of involvement with this local group over the last few years”. The frequency distribution of responses is shown in Table 5.39. We see that one-quarter of respondents in this category recorded ‘active involvement’ over the previous few years with the particular group they had been most involved with, while the corresponding proportion indicating ‘occasional involvement’ was 44 per cent.

Table 5.39: Frequency distribution for level of involvement by Mallee dryland respondents with the local group they indicated greatest involvement with

Proportion of applicable respondents (%)			n
Active involvement	Fairly active involvement	Occasional involvement	
25.8	30.2	44.0	182

## 5.19 Attitudes regarding relationships of respondents’ highest-involvement local group with the Mallee CMA

In addition, respondents who indicated involvement with at least one local group engaged in NRM activities were asked to indicate how strongly they agreed or disagreed with two statements about relationships between the group they were most involved with and the Mallee CMA. Frequency distributions for responses to these two statements are presented in Table 5.40.

Table 5.40: Frequency distributions of Mallee dryland responses to: How strongly do you agree or disagree with each of these statements about this local group?

	Proportion of respondents who listed involvement with a local group (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
The Mallee CMA understands the issues faced by this group	10.0	66.0	20.0	4.0	2.18	150
The work of the Mallee CMA has helped make this group more effective	7.9	60.4	25.2	6.5	2.30	139

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

Mean scores were assigned in this table to each statement, after scoring ‘strongly agree’ responses as one, ‘agree’ responses as two, ‘disagree’ responses as three, and ‘strongly disagree’ responses as four. ‘Ambivalent’ would thus be scored as 2.5. The lower the mean score for a statement, therefore, the more strongly the average applicable respondent agreed with that statement.

On this basis, the statement the average applicable respondent agreed with most strongly was ‘the Mallee CMA understands the issues faced by this group’. The mean score for this statement was 2.18, indicating that the average applicable respondent’s view on this statement was on the ambivalent side of ‘agree’. The mean score for ‘the work of the Mallee CMA has helped make this group more effective’ was 2.30, revealing that the average applicable respondent’s view on this statement was also on the ambivalent side of ‘agree’, although closer to ambivalent than to ‘agree’. On the basis of the WSR2 test, we can be more than 99 per cent confident that a tendency did exist among Mallee Region dryland farmers at the time of survey to agree more strongly with ‘the Mallee CMA understands the issues faced by this group’ than with ‘the work of the Mallee CMA has helped make this group more effective’.

## 5.20 Attitudes regarding staff support of respondents’ highest-involvement local group

Respondents who indicated involvement with at least one local group engaged in NRM activities were asked also, in respect of the group they had been most involved with: “Does this group have paid staff to support it?”. The frequency distribution of responses from applicable respondents is presented in Table 5.41. Seventy per cent of applicable respondents answered this question affirmatively, and 12 per cent negatively, while the remainder were ‘unsure’.

Table 5.41: Frequency distribution of Mallee dryland responses to: Does this [highest-involvement local] group have paid staff to support it?

Proportion of respondents who listed involvement with a local group (%)			n
Yes	No	Unsure	
70.3	12.2	17.4	172

Respondents who answered affirmatively were asked to indicate how strongly they agreed or disagreed with four statements about paid staff supporting their highest-involvement local group. Frequency distributions of responses for each of these statements are presented in Table 5.42.

Mean scores were assigned in this table to each statement, after scoring ‘strongly agree’ responses as one, ‘agree’ responses as two, ‘disagree’ responses as three, and ‘strongly disagree’ responses as four. ‘Ambivalent’ would thus be scored as 2.5. The lower the mean score for a statement, therefore, the more strongly the average applicable respondent agreed with that statement.

On this basis, the statements the average applicable respondent agreed with most (and equally) strongly were ‘these staff care about our community’ and ‘paid staff supporting this group have

the experience and skills needed to do a good job’, followed closely by ‘these staff understand the issues faced in our district’. The mean scores of 1.78, 1.78 and 1.80, respectively, for these three statements indicate that levels of agreement with each were on the ‘strongly agree’ side of ‘agree’. The weakest agreement was with ‘these staff are too busy to give this group the support it really needs’. With a mean score of 2.83, the view of the average applicable respondent on this statement was on the ambivalent side of ‘disagree’.

Table 5.42: Frequency distributions of Mallee dryland responses to: How strongly do you agree or disagree with each of the following statements [about paid staff supporting your highest-involvement local group]?

	Proportion of applicable respondents (%)				Mean score*	n
	Strongly agree	Agree	Disagree	Strongly disagree		
Paid staff supporting this group have the experience and skills needed to do a good job	27.8	66.1	6.1	0.0	1.78	115
These staff understand the issues faced in our district	23.5	73.0	3.5	0.0	1.80	115
These staff care about our community	24.1	74.1	1.7	0.0	1.78	116
These staff are too busy to give this group the support it really needs	4.4	21.1	61.4	13.2	2.83	114

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

## 5.21 Key findings from the Mallee Region dryland case

The following findings from the Mallee Region dryland case are particularly relevant to the present project, given its focus on the role of community-based NRM under the regional delivery model in establishing farmers’ trust in this model and thereby increasing their adoption of conservation practices promoted under it:

- 70.0 per cent of respondents placed either a high or very high priority on the goal of maintaining or enhancing the condition of their natural resources and environment, compared with 93.3 per cent for the goal of maintaining or enhancing the profitability of their farm business;
- the proportion of respondents rating natural resource issues as at least a moderate threat to their farm businesses ranged from 58.3 per cent for ‘pest animals’ to 19.0 per cent for ‘fragmentation of habitat’;
- the proportion of respondents rating ‘government regulation’, ‘commodity prices’ and ‘drought’ as at least moderate threats to their farm businesses were 86.9 per cent, 98.4 per cent and 96.4 per cent, respectively;
- the proportion of respondents strongly agreeing they felt a bond with the Mallee NRM Region (28.1 per cent) was appreciably lower than the equivalent proportion in respect of

their district (44.2 per cent), and also somewhat lower than the equivalent proportion in respect of dryland areas of the NRM Region (34.3 per cent);

- the proportion of applicable respondents (i.e., respondents identifying a conservation practice as applicable to their property) answering that adoption of a conservation practice would ‘help greatly’ their property’s chances of achieving its goals ranged from 54.1 per cent for ‘reduced or minimum tillage’ to 8.7 per cent for link patches of native vegetation’;
- the proportion of applicable respondents expecting to increase their adoption of a conservation practice over the ensuing 10 years ranged from 25.9 per cent for ‘establish high water-use plants’ to 2.3 per cent for ‘control pest animals’;
- the proportion of applicable respondents perceiving that effectiveness of a practice on their property depends (either ‘certainly depends’ or ‘possibly depends’) on the actions of others ranged from 79.0 per cent for ‘control pest animals’ to 27.2 per cent for ‘establish high water-use plants’;
- 29.3 per cent of respondents were not aware that ‘much of the responsibility for deciding what on-ground activities to fund now lies with regional bodies’;
- the proportion of respondents not aware that their regional body is the Mallee Catchment Management Authority (CMA) was 11.0 per cent, while the proportion not aware that the ‘Mallee Lands Implementation Committee advises the CMA on NRM issues arising in dryland areas of the Mallee Region’ was substantially greater at 39.3 per cent;
- the proportion of respondents not aware that the board of the Mallee CMA consists mostly of community representatives was 23.1 per cent, while the proportion not aware that the Mallee Lands Implementation Committee consists mostly of community representatives was appreciably higher at 40.0 per cent;
- 68.2 per cent of answering respondents (i.e., excluding ‘don’t know’ responses<sup>22</sup>) agreed or strongly agreed that ‘the regional approach is an improvement on previous approaches’;
- 62.0 per cent of answering respondents agreed or strongly agreed that ‘Federal Government is serious about empowering our community to solve our own NRM problems’, while the equivalent proportion for the corresponding statement referring to the Victorian Government was 48.5 per cent;
- 82.4 per cent of answering respondents agreed or strongly agreed that ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’;

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<sup>22</sup> The vast majority of these ‘don’t know’ responses were from respondents who indicated they were unaware of the regional delivery model.

- 73.1 per cent of answering respondents agreed or strongly agreed that ‘the regional approach is part of a strategy to increase government regulation of rural land-use’;
- 84.0 per cent of answering respondents agreed or strongly agreed that ‘the Mallee CMA is serious about helping our community to solve our own NRM problems’;
- 56.8 per cent of answering respondents agreed or strongly agreed that ‘the Mallee CMA is just a ‘rubber stamp’ for decisions made by the Victorian Government’;
- 60.0 per cent of answering respondents agreed or strongly agreed that ‘NRM at the scale of the Mallee Region is so remote that it discourages us from getting involved’;
- 58.8 per cent of respondents indicated involvement over the previous few years with at least one local group concerned with NRM issues (henceforth referred to as ‘local NRM-related group’);
- 71.1 per cent of respondents indicating recent involvement with a local NRM-related group identified their greatest involvement as having been with a ‘landcare group’, compared with 20.3 per cent for ‘production group’; and
- 68.3 per cent of answering respondents indicating recent involvement with a local NRM-related group agreed or strongly agreed that ‘the work of the Mallee CMA has helped make this group more effective’.

## 6. Comparing the Cases

The previous three chapters analysed the data from the farmer surveys in each of the Blackwood Basin, Central Highlands, and Mallee Region dryland cases, respectively. In this chapter, the data from the three cases is compared to identify similarities and differences. A summary of key findings from comparing the cases is presented in section 6.16.

### 6.1 Personal characteristics

In each of the three cases, over 80 per cent of respondents to the full survey were male (Table 6.1). The proportion was highest for the Mallee Region, followed by the Blackwood Basin and the Central Highlands.

Table 6.1: Personal characteristics of respondents: comparing the three cases

Measure	Blackwood Basin	Central Highlands	Mallee dryland
Proportion of respondents who were male (%)	86.2	82.8	91.2
Respondents' mean age (years)	55.0	50.1	54.4
Respondents' mean no. of years living in same district as their property	41.7	32.9	49.2
Proportion of respondents thinking it 'likely' or 'very likely' their property will be passed on to the next generation (%)	66.1	70.6	51.0

The mean age of 55.0 years for Blackwood Basin respondents was marginally higher than that of Mallee dryland respondents (Table 6.1). The average Central Highlands respondent was some five years younger. On the basis of Mann-Whitney tests (two-tailed) (hereafter 'MW2 tests'), we can be at least 95 per cent confident for each pairwise comparison that that ages in the wider population of Central Highlands farmers tended to be less than those of Blackwood Basin farmers, and also less than those of Mallee dryland farmers (Table G.1)<sup>23</sup>.

On average, Mallee dryland respondents had resided longest in the same district as their property (49.2 years), followed by Blackwood Basin respondents (41.7 years) and Central Highlands respondents (32.9 years). We can conclude from MW2 tests with at least 99 per cent confidence for each pairwise comparison that the length of residence tended to be higher among: Mallee dryland farmers than among Blackwood Basin farmers; Blackwood Basin farmers than among Central Highlands farmers; and Mallee dryland farmers than among Central Highlands farmers (Table G.2).

The proportion of respondents considering it 'likely' or 'very likely' that their property will be passed on to the next generation was highest for the Central Highlands case (70.6 per cent), next highest for the Blackwood Basin case (66.1 per cent), and lowest for the Mallee case (51.0 per cent) (Table 6.1). We can conclude from MW2 tests with at least 99 per cent confidence for each

<sup>23</sup> Only population differences found to be significant with at least 95 per cent statistical confidence will be reported through chapter 6.

pairwise comparison that Central Highlands farmers were more likely to answer ‘likely’ or ‘very likely’ to this question than dryland Mallee farmers, and also that Blackwood Basin farmers were more likely to answer this way than dryland Mallee farmers (Table G.3).

## 6.2 Education and farming experience

On average, Mallee dryland respondents reported the most years of practical experience as an adult in agricultural or grazing pursuits (35.1 years), followed by Blackwood Basin respondents (33.4 years) and Central Highlands respondents (32.6 years) (Table 6.2). On the basis of MW2 tests, we can be at least 95 per cent confident that the duration of adult experience in the wider population of Mallee dryland farmers tended to be greater than was the case for Central Highlands farmers (Table G.4).

Table 6.2: Education and farming experience of respondents: comparing the three cases

Measure	Blackwood Basin	Central Highlands	Mallee dryland
Respondents' mean no. of adult years of agricultural/grazing experience	33.4	32.6	35.1
Proportion of respondents identifying their highest level of completed formal education as ‘primary’ or ‘part secondary’ school (%)	31.9	17.4	11.3

The proportion of respondents identifying their highest level of formal education as ‘primary’ or ‘part secondary’ was substantially higher for the Blackwood Basin case (31.9 per cent) than for the Central Highlands case (17.4 per cent) or the Mallee case (11.3 per cent) (Table 6.2). We can conclude from MW2 tests with at least 99 per cent confidence for each pairwise comparison that Blackwood Basin farmers were more likely to have answered ‘primary’ or ‘part secondary’ to this question than Central Highlands farmers, and Central Highlands farmers were more likely to answer this way than Mallee dryland farmers (Table G.5).

## 6.3 Property characteristics

The mean area of 8,782.0 hectares owned or managed by Central Highlands respondents was almost four times higher than the mean area for Mallee dryland respondents, and almost eight times higher than for Blackwood Basin respondents (Table 6.3). On the basis of MW2 tests, we can conclude with at least 99 per cent confidence for each pairwise comparison that the area of land owned or managed by: Central Highlands farmers tended to be higher than that for Mallee dryland farmers; Mallee dryland farmers tended to be higher than that for Blackwood Basin farmers; and Central Highlands farmers tended to be higher than that for Blackwood Basin farmers (Table G.6).

The proportion of respondents identifying ‘freehold’ as tenure under which their properties were mainly held was highest for the Mallee case (97.5 per cent), followed closely by the Blackwood Basin case (96.7 per cent), and fairly distantly by the Central Highlands case (77.6 per cent) (Table 6.3). We can conclude from MW2 tests with at least 99 per cent confidence for each pairwise comparison that the wider population of Central Highlands farmers were less likely to

identify ‘freehold’ as their main land tenure than Mallee dryland farmers, and also less likely to do so than Blackwood Basin farmers (Table G.7).

Table 6.3: Property characteristics: comparing the three cases

Measure	Blackwood Basin	Central Highlands	Mallee dryland
Respondents' mean area of land owned or managed in the relevant subregion (ha)	1,116.5	8,782.0	2,296.0
Proportion of respondents identifying ‘freehold’ as the tenure under which their property is mainly held (%)	96.7	77.6	97.5

## 6.4 Financial characteristics

In each of the three cases, at least 70 per cent of respondents reported a current equity ratio of 70 per cent or better (Table 6.4). The proportion was highest for the Blackwood Basin case (87.2 per cent), next highest for the Central Highlands (79.7 per cent), and lowest for the Mallee case (73.3 per cent). From MW2 tests we can conclude with at least 95 per cent confidence for each pairwise comparison that: Blackwood Basin farmers were more likely to report a current equity ratio of 70 per cent or better than Central Highlands farmers; Blackwood Basin farmers were more likely to report a current equity ratio in this range than Mallee dryland farmers; and Central Highlands farmers were more likely to report a current equity ratio in this range than Mallee dryland farmers (Table G.8).

Table 6.4: Financial characteristics: comparing the three cases

Measure	Blackwood Basin	Central Highlands	Mallee dryland
Proportion of respondents reporting a current equity ratio of 70 per cent or more (%)	87.2	79.7	73.3
Proportion of respondents reporting recent profitability as ‘breaking even’ or better (%)	88.6	78.6	83.1
Proportion of respondents reporting at least 70 per cent of recent household net income as coming from farming their property (%)	67.0	78.7	78.4
Respondents' mean percentage of recent net farm income derived from grazing enterprises (%)	61.0	65.0	23.3

The proportion of respondents reporting their profitability over recent years as ‘breaking even’ or better was highest for the Blackwood Basin (88.6 per cent), next highest for the Mallee case (83.1 per cent) and lowest for the Central Highlands (78.6 per cent). We can conclude from MW2 tests with at least 95 per cent confidence that the wider population of Blackwood Basin farmers were more likely to report profitability in this range than Mallee dryland farmers (Table G.9).

Across the three cases, the proportion of respondents reporting at least 70 per cent of their recent household income coming from farming their property was marginally higher for the Central Highlands (78.7 per cent) than for the Mallee case (78.4 per cent), while the corresponding

proportion for the Blackwood Basin (67.0 per cent) was appreciably less. On the basis of MW2 tests, we can conclude with at least 99 per cent confidence for each pairwise comparison that the wider population of Blackwood Basin farmers were less likely to report accordingly than Central Highlands farmers, and also less likely to report in this way than Mallee dryland farmers (Table G.10).

Central Highlands respondents derived on average 65.0 per cent of their net farm income over recent years from grazing enterprises, compared with 61.0 per cent for Blackwood Basin respondents, and only 23.3 per cent for Mallee dryland respondents (Table 6.4). From MW2 tests we can conclude with at least 99 per cent confidence for each pairwise comparison that: Central Highlands farmers tended to derive a higher proportion of their net farm income from grazing enterprises than Blackwood Basin farmers; Blackwood Basin farmers tended to derive a higher proportion of their net farm income from grazing enterprises than Mallee dryland farmers; and Central Highlands farmers tended to derive a higher proportion of their net farm income from grazing enterprises than Mallee dryland farmers (Table G.11).

## 6.5 Goals in farming

Mean scores calculated from respondents' ratings in each case of the priority for them of various goals are brought together for comparison in Table 6.5. Recall that a lower score indicates a higher priority (the scoring scheme is explained under the table).

Table 6.5: Comparing responses across the three cases to: People have many different goals they are aiming for in farming, depending on their own situation. Please indicate the priority you give to each goal listed below.

Goal: To maintain or enhance ...	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
Profitability of our farm business	1.67	1.49	1.48
Our family's income	1.77	1.69	1.61
Productivity of our land and other resources	1.66	1.48	1.54
Condition of our natural resources and environment	1.94	1.59	2.08
Attractiveness of our property	2.20	2.24	2.20
Our way of life	1.90	1.85	1.89
Our technical skills and innovation	2.13	2.07	2.09
Our standing in the community	2.79	2.76	2.51

\* Very high priority = 1, high = 2, moderate = 3, low = 4, and very low priority = 5.

We observe accordingly that the average respondents in the Mallee and Central Highlands cases rated the 'profitability' goal as a similarly high priority, whereas the average Blackwood Basin respondent rated this goal a lesser priority. From MW2 tests, we can conclude with at least 99 per cent confidence for each pairwise comparison that Blackwood Basin farmers tended to rate this

goal less highly than Central Highlands farmers, and also less highly than Mallee dryland farmers (Table G.12).

The 'family income' goal was a higher priority for the average Mallee dryland respondent than it was for the average Central Highlands respondent, and a lower priority again for the average Blackwood Basin respondent. However, we are unable to conclude with at least 95 per cent confidence from MW2 tests for each pairwise comparison that these priority differences between respondents from the different cases reflect differences between the wider populations of farmers associated with these cases (Table G.13).

The 'productivity' goal was a higher priority for the average Central Highlands respondent than for the average Mallee dryland respondent, and a lower priority again for the average Blackwood Basin respondent. We can conclude from MW2 tests with at least 95 per cent confidence that the wider population of Central Highlands farmers tended to rate the 'productivity' goal a higher priority than did Blackwood Basin farmers (Table G.14).

The 'resource condition' goal was also a higher priority for the average Central Highlands respondent than it was for the average respondents from the other two cases, but much more markedly so in this instance. In turn, this goal was a higher priority for the average Blackwood Basin respondent than it was for the average Mallee dryland respondent. On the basis of MW2 tests, we are able to conclude with at least 95 per cent confidence for each pairwise comparison that Central Highlands farmers tended to rate this goal a higher priority than Blackwood Basin farmers, Blackwood Basin farmers tended to rate it a higher priority than Mallee dryland farmers, and Central Highlands farmers tended to rate it a higher priority than Mallee dryland farmers (Table G.15).

The 'property attractiveness' goal was a similar level of priority for the average respondents from each of the three cases. We are unable to conclude with at least 95 per cent confidence from MW2 tests for each pairwise comparison that priority differences in respect of this goal exist between the wider populations of farmers associated with these cases (Table G.16).

The 'way of life' goal was also a similar level of priority for the average respondents from each of the three cases. Similarly too, we cannot conclude with at least 95 per cent confidence from MW2 tests for each pairwise comparison that priority differences in respect of this goal exist between the wider populations of farmers associated with these cases (Table G.17).

Again, the 'skills and innovation' goal was a similar level of priority for the average respondents from the three different cases. Again also, it is not possible to conclude with at least 95 per cent confidence from MW2 tests for each pairwise comparison that priority differences in respect of this goal exist between the wider populations of farmers associated with these cases (Table G.18).

The 'community standing' goal was a higher priority for the average Mallee dryland respondent than it was for the average Central Highlands respondent, and a slightly lower priority again for the average Blackwood Basin respondent. For this goal, we can conclude from MW2 tests with at least 95 per cent confidence for each pairwise comparison that Mallee dryland farmers tended to rate it a higher priority than did Central Highlands farmers, and also to rate it a higher priority than did Blackwood Basin farmers (Table G.19).

## 6.6 Farm business threats

Of the issues listed as possible farm business threats in the full questionnaires for the three cases, three were worded identically across the questionnaires. These were ‘government regulation’, ‘commodity prices’ and ‘drought’.

A further four issues were worded similarly enough across the three cases that scores across the cases can be compared validly. The first concerns salinity, which was worded as ‘dryland salinity’ for the Blackwood Basin case, as ‘salinity’ for the Central Highlands case, and as ‘soil salinisation’ for the Mallee case. The second concerns soil erosion, which was worded as such for the Blackwood Basin and Central Highlands cases, and as ‘wind erosion’ for the Mallee case. The third concerns loss of native vegetation, which was worded as ‘loss of native vegetation’ for the Blackwood Basin and Mallee cases, and as ‘over-clearing and biodiversity loss’ for the Central Highlands case. The last of these issues concerns fragmentation of habitat, which was worded as ‘loss and fragmentation of habitat’ for the Blackwood Basin case and as ‘fragmentation of habitat’ for the Mallee case. (An item for this issue was not included for the Central Highlands case.)

Mean scores calculated from respondents’ ratings in each case of the threat to their farm business posed by these seven issues are compiled for comparison in Table 6.6. Again, a lower score indicates a higher degree of perceived threat (the scoring scheme is detailed below the table).

Table 6.6: Comparing responses across the three cases to: How much does each issue below pose a threat to the future of your farm business?

Issue	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
Government regulation	2.66	1.97	2.42
Commodity prices	1.84	2.06	1.64
Drought	2.75	1.71	1.59
Salinity	3.50	4.37	3.70
Soil erosion	3.76	3.41	3.46
Loss of native vegetation	3.91	4.30	4.02
Fragmentation of habitat	3.92	n.a.	4.09

\* Very large threat = 1, large threat = 2, moderate threat = 3, minor threat = 4, and no threat = 5.

On this basis, ‘government regulation’ was rated a substantially greater threat to their farm business by the average Central Highlands respondent than by the average Mallee dryland respondent, and a lesser threat again by the average Blackwood Basin respondent. From MW2 tests we are able to conclude with at least 99 per cent confidence for each pairwise comparison that the wider population of Central Highlands farmers tended to rate ‘government regulation’ a greater threat to their farm business than did Mallee dryland farmers, Mallee dryland farmers

tended to rate it a greater threat than Blackwood Basin farmers, and Central Highlands farmers tended to rate it a greater threat than Blackwood Basin farmers (Table G.20).

‘Commodity prices’ was perceived a greater threat to their farm business by the average Mallee dryland respondent than by the average Blackwood Basin respondent, and a lesser threat again by the average Central Highlands respondent. We can conclude from MW2 tests with at least 95 per cent confidence for each pairwise comparison that Mallee dryland farmers tended to rate this issue a greater threat to their farm business than Blackwood Basin farmers, Blackwood Basin farmers tended to rate it a greater threat than Central Highlands farmers, and Mallee dryland farmers tended to rate it a greater threat than Central Highlands farmers (Table G.21).

‘Drought’ was considered a greater threat to their farm business by the average Mallee dryland respondent than it was by the average Central Highlands respondent, and a lesser threat again by the average Blackwood Basin respondent. MW2 tests indicate we can be at least 99 per cent confident for each pairwise comparison that the wider population of Mallee dryland farmers tended to rate ‘drought’ a greater threat than did Blackwood Basin farmers, and also that Central Highlands farmers tended to rate it a greater threat than Blackwood Basin farmers (Table G.22).

Salinity as an issue was rated a greater threat by the average Blackwood Basin respondent than by the average Mallee dryland respondent, and a lesser threat again by the average Central Highlands respondent. From MW2 tests we can conclude with at least 99 per cent confidence for each pairwise comparison that the wider population of Blackwood Basin farmers tended to perceive salinity as a greater threat to their farm business than did Central Highlands farmers, and also that Mallee dryland farmers tended to perceive salinity as a greater threat than Central Highlands farmers (Table G.23).

Soil erosion was perceived a greater threat to their farm business by the average Central Highlands respondent than by the average Mallee dryland respondent, and a lesser threat again by the Blackwood Basin respondent. We can conclude from MW2 tests with at least 99 per cent confidence for each pairwise comparison that the wider population of Central Highlands farmers tended to rate soil erosion a greater threat than Blackwood Basin farmers, and that Mallee dryland farmers tended also to rate it a greater threat than Blackwood Basin farmers (Table G.24).

Loss of native vegetation was rated a greater threat to their farm business by the average Blackwood Basin respondent than by the average Mallee dryland respondent, and a lesser threat again by the average Central Highlands respondent. MW2 tests indicate we can conclude with at least 99 per cent confidence for each pairwise comparison that the wider population of Blackwood Basin farmers tended to view loss of native vegetation as a greater threat to their farm business than did Central Highlands farmers, and that Mallee dryland farmers tended also to regard it as a greater threat than did Central Highlands farmers (Table G.25).

Fragmentation of habitat was considered a greater threat to their farm business by the average Blackwood Basin respondent than by the average Mallee dryland respondent. (This issue was not listed as a possible threat in the Central Highlands questionnaire.) The MW2 test indicates we can conclude with at least 99 per cent confidence that the wider population of Blackwood Basin

farmers tended to rate habitat fragmentation a greater threat to their farm business than did Mallee dryland farmers (Table G.26).

## 6.7 Attachment to place

Mean scores calculated from respondents' ratings in each case of how strongly they agreed or disagreed with various statements concerning their attachment to place are listed for cross-case comparison in Table 6.7. A lower score indicates greater agreement with the relevant statement (the scoring scheme is explained below the table).

Table 6.7: Comparing responses across the three cases to statements concerning attachment to place

Statement	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
I feel a bond with our property	1.41	1.38	1.44
I feel a bond with our district	1.67	1.62	1.61
I feel a bond with the (relevant NRM subregion)	2.46	1.70	1.74
I feel a bond with the (relevant NRM region)	2.76	2.38	1.85

\* Strongly agree = 1; agree = 2; disagree = 3; and strongly disagree = 4.

We see the average respondent in each of the three cases felt a stronger bond with their property than with their district, a stronger bond with their district than with their subregion (which in the Mallee case is considered for our present purposes to comprise dryland areas of the Mallee NRM region), and a stronger bond with their subregion than with their NRM region. Mean scores for 'bond with our property' are fairly similar across the three cases, and the same is true of mean scores for 'bond with our district'. Hence, the strength of bond felt weakened by roughly the same degree when respondents across each of the three cases were required to think of their district instead of their own property.

When respondents were required to think of their bond with their subregion instead of with their district, the mean scores for the Central Highlands and Mallee cases each increased by fairly small proportions (5 and 8 per cent, respectively). In contrast, the mean score for the Blackwood Basin case increased by 47 per cent. Hence, the average Blackwood Basin respondent felt bonded less closely to their subregion compared with their district to a considerably greater degree than was true for the average Central Highlands respondent or the average Mallee dryland respondent.

When respondents were required to consider their bond with their NRM region instead of with their subregion, the mean scores for the average respondents in the Blackwood Basin, Central Highlands and Mallee cases increased by 12 per cent, 40 per cent and six per cent, respectively. Hence, the average Central Highlands respondent felt bonded more closely to their subregion compared with their region to a substantially greater degree than was true for the average Mallee dryland respondent and also (by a lesser degree) for the average Blackwood Basin respondent. It is noteworthy, however, that the average Central Highlands respondent felt a stronger bond with their entire NRM region than the average Blackwood Basin respondent did with their NRM

subregion. Likewise, the average Mallee dryland respondent felt a stronger bond with their NRM region than the average Blackwood Basin respondent did with their NRM subregion.

The average Central Highlands respondent felt a stronger bond with their property than did the average Blackwood Basin respondent, while the average Mallee dryland respondent felt the weakest bond with their property. However, we are unable to conclude with at least 95 per cent confidence from MW2 tests that the wider populations of farmers in the three cases differed in how strongly they felt a bond with their own properties (Table G.27).

The average Mallee dryland respondent felt a slightly stronger bond with their district than did the average Central Highlands respondent, while the average Blackwood Basin respondent felt the weakest bond with their district. However, we are unable to conclude with at least 95 per cent confidence from MW2 tests that the wider populations of farmers in the three cases differed in how strongly they felt a bond with their respective districts (Table G.28).

The average Central Highlands respondent felt a stronger bond with their subregion than did the average Mallee dryland respondent, while (as alluded to previously) the average Blackwood Basin respondent felt a bond with their subregion that was considerably weaker again. From WSR2 tests we can conclude with at least 99 per cent confidence for each pairwise comparison that the wider population of Central Highlands farmers tended to feel a stronger bond with their subregion than Blackwood Basin farmers did, and that Mallee dryland farmers tended also to feel a stronger bond with their subregion than Blackwood Basin farmers did (Table G.29).

The average Mallee dryland respondent felt a stronger bond with their NRM region than the average Central Highlands respondent did, while the average Blackwood Basin respondent felt a bond of this kind that was weaker again. MW2 tests justify us concluding with at least 99 per cent confidence for each pairwise comparison that the wider population of Mallee dryland farmers tended to feel a stronger bond with their NRM region than Central Highlands farmers did, Central Highlands farmers tended to feel a stronger bond with their NRM region than Blackwood Basin farmers did, and Mallee dryland farmers tended to feel a stronger bond with their NRM region than Blackwood Basin farmers did (Table G.30).

## **6.8 Awareness of the regional model of NRM delivery**

Mean scores calculated from respondents' ratings in each case of how aware they were of various details of the regional NRM model are listed for cross-case comparison in Table 6.8. A lower score indicates greater awareness of the information presented in the relevant statement (the scoring scheme is detailed under the table).

The average Central Highlands respondent was more aware that 'much of the responsibility for deciding what on-ground NRM activities to fund now lies with regional bodies' than was the average Mallee dryland respondent, while the average Blackwood Basin respondent was less aware again. However, we are unable to conclude with at least 95 per cent confidence from MW2 tests that the wider populations of farmers in the three cases tended to differ in the awareness of the information presented in this statement (Table G.35).

Table 6.8: Comparing responses across the three cases to: Please indicate whether or not you have heard about the following (statements concerning the regional approach to natural resource management).

Statement	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
Much of the responsibility for deciding what on-ground NRM activities to fund now lies with regional bodies	2.01	1.89	1.95
The regional body for the region where your property is located is the (relevant regional NRM body)	1.93	1.39	1.43
The board of (relevant regional NRM body) consists mostly of community representatives	2.18	1.88	1.77
The part of this region where your property lies has its own NRM body called the (relevant subregional NRM body)	1.37	1.33	n.a.
The board/committee of the (relevant subregional NRM body) consists mostly of community representatives	1.72	1.81	2.14
The (relevant subregional NRM body) advises (the relevant regional NRM body) on NRM funding decisions concerned with the (relevant subregion)	2.02	1.77	n.a.

\* Yes, I've heard about it = 1; possibly I heard about it = 2; and haven't heard about it = 3.

The same cross-case patterns are evident for awareness that ‘the regional body for the region where your property is located is the (relevant regional NRM body)’. The average Central Highlands respondent was more aware of this information than was the average Mallee dryland respondent, while the average Blackwood Basin respondent was less aware again. In this instance, however, we can conclude with at least 99 per cent confidence from MW2 tests for each pairwise comparison that the wider population of Central Highlands farmers tended to be more aware of this information than were Blackwood Basin farmers, and also that Mallee dryland farmers tended to be more aware of this information than were Blackwood Basin farmers (Table G.36).

The average Mallee dryland respondent was more aware that ‘the board of (relevant regional NRM body) consists mostly of community representatives’ than was the average Central Highlands respondent, while the average Blackwood Basin respondent was less aware again. MW2 tests justify us concluding with at least 99 per cent confidence for each pairwise comparison that the wider population of Mallee dryland farmers tended to be more aware of this information than Blackwood Basin farmers, and also that Central Highlands farmers tended to be more aware of this information than Blackwood Basin farmers (Table G.37).

The average Central Highlands respondent was slightly more aware that ‘the part of this region where your property lies has its own NRM body called the (relevant subregional NRM body)’ than was the average Blackwood Basin respondent. (This statement was not included in the questionnaire for Mallee dryland farmers.) However, we are unable to conclude with 95 per cent confidence from MW2 tests that Central Highlands and Blackwood Basin farmers tended to differ in respect of their awareness of this information (Table G.38).

The average Blackwood Basin respondent was more aware that ‘the board/committee of the (relevant subregional NRM body) consists mostly of community representatives’ than was the average Central Highlands respondent, while the average Mallee dryland respondent was less aware again<sup>24</sup>. We can conclude from MW2 tests with at least 99 per cent confidence for each pairwise comparison that the wider population of Blackwood Basin farmers tended to be more aware of this information than Mallee dryland farmers, and also that Central Highlands farmers tended to be more aware of this information than Mallee dryland farmers (Table G.39).

The average Central Highlands respondent was more aware that ‘the (relevant subregional NRM body) advises (the relevant regional NRM body) on NRM funding decisions concerned with the (relevant subregion)’ than was the average Central Highlands respondent. (This statement was not included in the questionnaire for Mallee dryland farmers.) MW2 tests justify us concluding with at least 99 per cent confidence that the wider population of Central Highlands farmers tended to be more aware of this information than Blackwood Basin farmers (Table G.40).

## 6.9 Personal contact with regional and subregional NRM bodies

Mean scores calculated from respondents’ ratings in each case of their degree of personal contact with their relevant regional and subregional NRM bodies are listed for cross-case comparison in Table 6.9. A lower score indicates a greater frequency of personal contact (the scoring scheme is detailed under the table).

Table 6.9: Comparing responses across the three cases to: In the last few years, how much have you or others on your property had personal contact with the (relevant regional NRM body) and the (relevant subregional NRM body)?

	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
Relevant regional NRM body	3.74	3.55	3.37
Relevant subregional NRM body	3.32	3.21	3.68

\* Frequent = 1; fairly frequent = 2; occasional = 3; and none = 4.

The average Mallee dryland respondent reported more frequent personal contact with their relevant regional NRM body than did the average Central Highlands respondent, while the frequency reported by the average Blackwood Basin respondent was lower again. From MW2 tests we can conclude with at least 99 per cent confidence for each pairwise comparison that the wider population of Mallee dryland farmers tended to report more frequent personal contact with their relevant regional NRM body than did Central Highlands farmers, Central Highlands farmers tended to report more frequent personal contact with this body than did Blackwood Basin farmers, and Mallee dryland farmers tended to report more frequent personal contact with this body than Blackwood Basin farmers (Table G.41).

<sup>24</sup> The statement included in the questionnaire for Mallee dryland farmers differed slightly from that presented above, taking the form: ‘The Mallee Lands Committee consists mostly of community representatives’.

The average Central Highlands respondent reported more frequent personal contact with their relevant subregional body than the average Blackwood Basin respondent did, while the frequency reported by the average Mallee dryland respondent was lower again. MW2 tests justify us concluding with at least 99 per cent confidence for each pairwise comparison that the wider population of Central Highlands farmers tended to report more frequent personal contact with this body than did Mallee dryland farmers, and also that Blackwood Basin farmers tended to report more frequent personal contact with this body than did Mallee dryland farmers (Table G.42).

## 6.10 Attitudes regarding the regional delivery model generally

Mean scores calculated from respondents' ratings in each case of how strongly they agreed or disagreed with various statements concerning the regional delivery model are brought together for cross-case comparison in Table 6.10. A lower score indicates stronger agreement (the scoring scheme is detailed below the table).

Table 6.10: Comparing responses across the three cases to: How strongly do you agree or disagree with each of the following statements about the regional approach to natural resource management?

Statement	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
The regional approach is an improvement on previous approaches	2.39	2.24	2.34
The regional approach has reduced the 'red tape' for landholders seeking NRM funds for on-ground activities	2.61	2.47	2.50
Federal Government is serious about empowering our community to solve our own NRM problems	2.56	2.57	2.35
The (relevant state) Government is serious about empowering our community to solve our own NRM problems	2.76	2.89	2.59
The regional approach is a way for governments to 'pass the buck' on difficult issues	2.10	2.07	1.93
The regional approach is part of a strategy to increase government regulation of rural land-use	2.08	1.99	2.14
The regional approach is a way to transfer NRM costs onto volunteers	2.13	2.18	1.87

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

The average Central Highlands respondent agreed more strongly with 'the regional approach is an improvement on previous approaches' than did the average Mallee dryland respondent, while average Blackwood Basin respondent agreed less strongly again. However, we are unable to conclude from MW2 tests with at least 95 per cent confidence that the wider populations of farmers in the three cases tended to differ in how strongly they agreed with this statement (Table G.43).

Similarly, the average Central Highlands respondent agreed more strongly with 'the regional approach has reduced the 'red tape' for landholders seeking NRM funds for on-ground activities' than did the average Mallee dryland respondent, while average Blackwood Basin respondent

agreed less strongly again. Similarly too, we are unable to conclude from MW2 tests with at least 95 per cent confidence that the wider populations of farmers in the three cases tended to differ in how strongly they agreed with this statement (Table G.44).

The average Mallee dryland respondent agreed more strongly with ‘Federal Government is serious about empowering our community to solve our own NRM problems’ than did the average Blackwood Basin respondent, while the average Central Highlands respondent agreed slightly less strongly again. MW2 tests justify us concluding with at least 99 per cent confidence for each pairwise comparison that the wider population of Mallee dryland farmers tended to agree more strongly with this statement than Blackwood Basin farmers, and also to agree more strongly than Central Highlands farmers (Table G.45).

Similarly, the average Mallee dryland respondent agreed more strongly with ‘the (relevant state) Government is serious about empowering our community to solve our own NRM problems’ than did the average Blackwood Basin respondent, while the average Central Highlands respondent agreed less strongly again. Similarly too, from MW2 tests we are able to conclude with at least 95 per cent confidence for each pairwise comparison that the wider population of Mallee dryland farmers tended to agree more strongly with this statement than Blackwood Basin farmers, and also to agree more strongly than Central Highlands farmers (Table G.46).

The average Mallee dryland respondent agreed more strongly with ‘the regional approach is a way for governments to ‘pass the buck’ on difficult issues’ than did the average Central Highlands respondent, while the average Blackwood Basin respondent agreed slightly less strongly again. We can conclude from MW2 testing with at least 95 per cent confidence that the wider population of Mallee dryland farmers tended to agree more strongly with this statement than Blackwood Basin farmers (Table G.47).

The average Central Highlands respondent agreed more strongly with ‘the regional approach is part of a strategy to increase government regulation of rural land-use’ than did the average Blackwood Basin respondent, while the average Mallee dryland respondent agreed less strongly again. However, we are unable to conclude with at least 95 per cent confidence from MW2 tests that the wider populations of farmers in the three cases tended to differ in how strongly they agreed with this statement (Table G.48).

The average Mallee dryland respondent agreed more strongly with ‘the regional approach is a way to transfer NRM costs onto volunteers’ than did the average Blackwood Basin respondent, while the average Central Highlands respondent agreed less strongly again. MW2 tests justify us concluding with at least 99 per cent confidence for each pairwise comparison that the wider population of Mallee dryland farmers tended to agree more strongly with this statement than Blackwood Basin farmers, and also more strongly than Central Highlands farmers (Table G.49).

## **6.11 Attitudes regarding the regional delivery model in the relevant NRM region**

Mean scores calculated from respondents’ ratings in each case of how strongly they agreed or disagreed with various statements concerning how the regional delivery model is operating in

their relevant NRM region are compiled for cross-case comparison in Table 6.11. A lower score indicates stronger agreement (the scoring scheme is detailed under the table).

Table 6.11: Comparing responses across the three cases to: How strongly do you agree or disagree with each of the following statements about the (relevant regional NRM body)?

Statement	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
(The relevant regional NRM body) is less bureaucratic than government generally	2.49	2.26	2.30
(The relevant regional NRM body) understands the issues faced in our district	2.44	2.27	2.21
Community members on (relevant regional NRM body) can be trusted to argue forcefully for the best interests of the (relevant NRM Region)	2.41	2.33	2.16
Staff of (relevant regional NRM body) care about our community	2.22	2.17	2.07
(The relevant regional NRM body) is serious about helping our community to solve our own NRM problems	2.28	2.18	2.11
(The relevant regional NRM body) is just a 'rubber stamp' for decisions made by the Federal Government	2.44	2.53	2.48
(The relevant regional NRM body) is just a 'rubber stamp' for decisions made by the (relevant state) Government	2.36	2.43	2.33
NRM at the scale of the (relevant NRM Region) is so remote that it discourages us from getting involved	2.26	2.46	2.33

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

The average Central Highlands respondent agreed more strongly with '(the relevant regional NRM body) is less bureaucratic than government generally' than did the average Mallee dryland respondent, while the average Blackwood Basin respondent agreed less strongly again. MW2 tests justify us concluding with at least 99 per cent confidence for each pairwise comparison that the wider population of Central Highlands farmers tended to agree more strongly with this statement than Blackwood Basin farmers, and Mallee dryland farmers also tended to agree more strongly with this statement than Blackwood Basin farmers (Table G.50).

The average Mallee dryland respondent agreed more strongly with '(the relevant regional NRM body) understands the issues faced in our district' than did the average Central Highlands respondent, while the average Blackwood Basin respondent agreed less strongly again. From MW2 testing we can conclude with at least 99 per cent confidence that the wider population of Mallee dryland farmers tended to agree more strongly with this statement than Blackwood Basin farmers (Table G.51).

Similarly, the average Mallee dryland respondent agreed more strongly with 'community members on (relevant regional NRM body) can be trusted to argue forcefully for the best interests of the (relevant NRM Region)' than did the average Central Highlands respondent, while the average Blackwood Basin respondent agreed less strongly again. MW2 tests justify us concluding with at least 95 per cent confidence for each pairwise comparison that the wider population of Mallee dryland farmers tended to agree with this statement more strongly than Central Highlands farmers, and also more strongly than Blackwood Basin farmers (Table G.52).

Similarly again, the average Mallee dryland respondent agreed more strongly with ‘staff of (relevant regional NRM body) care about our community’ than did the average Central Highlands respondent, while the average Blackwood Basin respondent agreed less strongly again. From MW2 testing we can conclude with at least 95 per cent confidence that the wider population of Mallee dryland farmers tended to agree more strongly with this statement than Blackwood Basin farmers (Table G.53).

Once more similarly, the average Mallee dryland respondent agreed more strongly with ‘(the relevant regional NRM body) is serious about helping our community to solve our own NRM problems’ than did the average Central Highlands respondent, while the average Blackwood Basin respondent agreed less strongly again. From MW2 testing we can conclude with at least 99 per cent confidence that the wider population of Mallee dryland farmers tended to agree more strongly with this statement than Blackwood Basin farmers (Table G.54).

The average Blackwood Basin respondent agreed more strongly with ‘(the relevant regional NRM body) is just a ‘rubber stamp’ for decisions made by the Federal Government’ than did the average Mallee dryland respondent, while the average Central Highlands respondent agreed less strongly again. However, we are unable to conclude with at least 95 per cent confidence from MW2 tests that the wider populations of farmers in the three cases tended to differ in how strongly they agreed with this statement (Table G.55).

The average Mallee dryland respondent agreed more strongly with ‘(the relevant regional NRM body) is just a ‘rubber stamp’ for decisions made by the (relevant state) Government’ than did the average Blackwood Basin respondent, while the average Central Highlands respondent agreed less strongly again. As for the previous statement concerned with the Federal Government, however, we are unable to conclude with at least 95 per cent confidence from MW2 tests that the wider populations of farmers in the three cases tended to differ in how strongly they agreed with this statement concerned instead with the relevant state government (Table G.56).

The average Blackwood Basin respondent agreed more strongly with ‘NRM at the scale of the (relevant NRM Region) is so remote that it discourages us from getting involved’ than did the average Mallee dryland respondent, while the average Central Highlands respondent agreed less strongly again. From MW2 tests we can conclude with at least 95 per cent confidence that the wider population of Blackwood Basin farmers tended to agree with this statement more strongly than Central Highlands farmers, and that Mallee dryland farmers also tended to agree more strongly than Central Highlands farmers (Table G.57).

The first five statements were designed to measure positive attitudes towards how the regional delivery model was operating in the relevant NRM region, whereas the remaining three statements were designed to measure negative attitudes. Once the cross-case patterns reported above for the last three statements are reversed to make them comparable with the patterns for first five statements, we find that responses to all statements except one indicate consistently that the average Blackwood Basin respondent felt less positive about how the regional delivery model was operating in their NRM region than did the average Central Highlands respondent and the average Mallee dryland respondent. The statement ‘(the relevant regional NRM body) is just a ‘rubber stamp’ for decisions made by the (relevant state) Government’ was the exception.

For only one of the seven ‘non-exception’ statements, however, does MW2 testing justify us concluding with at least 95 per cent confidence that Blackwood Basin farmers tended to feel less positive about how the regional delivery model was operating in their NRM region than both Central Highlands farmers and Mallee dryland farmers.

The average Mallee dryland respondent agreed more strongly with four of the five positive attitude statements than did the average Central Highlands respondent. The statement ‘(the relevant regional NRM body) is less bureaucratic than government generally’ was the exception where the average Central Highlands respondent agreed most strongly. In contrast, the average Central Highlands respondent disagreed more strongly with each of the three negative attitude statements than did the average Mallee dryland respondent. In relation to autonomy of the relevant regional body (i.e., not acting as a ‘rubber stamp’ for state and federal governments) and a sense of connection with the relevant NRM region, in other words, the average Central Highlands respondent felt more positive than the average Mallee dryland respondent regarding how the regional delivery model was operating.

For only two of the eight statements, however, do MW2 tests justify us concluding with at least 95 per cent confidence that the wider populations of Mallee dryland farmers and Central Highlands farmers tended to differ in respect of how strongly they agreed or disagreed with these statements. These statements are ‘community members on (relevant regional NRM body) can be trusted to argue forcefully for the best interests of the (relevant NRM Region)’ and ‘NRM at the scale of the (relevant NRM Region) is so remote that it discourages us from getting involved’.

## **6.12 Attitudes regarding the regional delivery model in the relevant NRM subregion**

Mean scores calculated from respondents’ ratings in each case of how strongly they agreed or disagreed with various statements concerning how the regional delivery model is operating in their relevant NRM subregion are listed for cross-case comparison in Table 6.12. A lower score indicates stronger agreement (the scoring scheme is detailed under the table). Note that these statements were not included in the questionnaire for Mallee dryland farmers, and therefore this section involves comparisons only between the Central Highlands and Mallee cases.

The average Blackwood Basin respondent agreed more strongly with ‘(the relevant subregional NRM body) is less bureaucratic than government generally’ than did the average Mallee dryland respondent. However, we are unable to conclude from MW2 testing with at least 95 per cent confidence that the wider populations of Blackwood Basin farmers and Central Highlands farmers tended to differ in their level of agreement with this statement (Table G.58).

The average Blackwood Basin respondent also agreed more strongly with ‘(the relevant subregional NRM body) understands the issues faced in our district’ than did the average Central Highlands respondent. From MW2 testing, however, we cannot conclude with at least 95 per cent confidence that the wider populations of Blackwood Basin farmers and Central Highlands farmers tended to differ in their level of agreement with this statement (Table G.59).

Table 6.12: Comparing responses across the three cases to: How strongly do you agree or disagree with each of the following statements about the (relevant subregional NRM body)?

Statement	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
(The relevant subregional NRM body) is less bureaucratic than government generally	2.12	2.14	n.a.
(The relevant subregional NRM body) understands the issues faced in our district	2.08	2.14	n.a.
Community members on (relevant subregional NRM body) can be trusted to argue forcefully for the best interests of the (relevant NRM subregion)	2.11	2.22	n.a.
Staff of (relevant subregional NRM body) care about our community	1.97	2.01	n.a.
(The relevant subregional NRM body) is serious about helping our community to solve our own NRM problems	2.07	2.07	n.a.
(The relevant subregional NRM body) is just a 'rubber stamp' for decisions made by the Federal Government	2.69	2.56	n.a.
(The relevant subregional NRM body) is just a 'rubber stamp' for decisions made by the (relevant state) Government	2.67	2.49	n.a.
(The relevant subregional NRM body) is just a 'rubber stamp' for decisions made by (relevant regional NRM body)	2.60	2.48	n.a.
NRM at the scale of the (relevant NRM subregion) is so remote that it discourages us from getting involved	2.50	2.59	n.a.

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

The average Blackwood Basin respondent also agreed more strongly with 'community members on (relevant subregional NRM body) can be trusted to argue forcefully for the best interests of the (relevant NRM subregion)' than did the average Central Highlands respondent. MW2 tests justify us concluding with at least 95 per cent confidence that the wider population of Blackwood Basin farmers tended to agree with this statement more strongly than Central Highlands farmers (Table G.60).

The average Blackwood Basin respondent also agreed more strongly with 'staff of (relevant subregional NRM body) care about our community' than did the average Central Highlands respondent. From MW2 testing, however, we cannot conclude with at least 95 per cent confidence that the wider populations of Blackwood Basin farmers and Central Highlands farmers tended to differ in their level of agreement with this statement (Table G.61).

The average Central Highlands respondent and the average Blackwood Basin respondent agreed equally strongly with '(the relevant regional NRM body) is serious about helping our community to solve our own NRM problems'. MW2 testing confirmed that we are unable to conclude with at least 95 per cent confidence that the wider populations of Blackwood Basin farmers and Central Highlands farmers tended to differ in their level of agreement with this statement (Table G.62).

The average Central Highlands respondent agreed more strongly with '(the relevant subregional NRM body) is just a 'rubber stamp' for decisions made by the Federal Government' than did the average Blackwood Basin respondent. However, we are unable to conclude with at least 95 per

cent confidence from MW2 tests that the wider populations of Central Highlands farmers and Blackwood Basin farmers tended to differ in how strongly they agreed with this statement (Table G.63).

The average Central Highlands respondent also agreed more strongly with ‘(the relevant subregional NRM body) is just a ‘rubber stamp’ for decisions made by the (relevant state) Government’ than did the average Blackwood Basin respondent. Unlike with the previous statement concerned with the Federal Government, we are able to conclude with at least 95 per cent confidence from MW2 tests that the wider population of Central Highlands farmers agreed more strongly with this statement than did Blackwood Basin farmers (Table G.64).

The average Central Highlands respondent also agreed more strongly with ‘(the relevant subregional NRM body) is just a ‘rubber stamp’ for decisions made by the (relevant regional NRM body)’ than did the average Blackwood Basin respondent. However, we are unable to conclude with at least 95 per cent confidence from MW2 tests that the wider populations of Central highlands farmers and Blackwood Basin farmers tended to differ in how strongly they agreed with this statement (Table G.65).

The average Blackwood Basin respondent agreed more strongly with ‘NRM at the scale of the (relevant NRM subregion) is so remote that it discourages us from getting involved’ than did the average Central Highlands respondent. However, we are unable to conclude with at least 95 per cent confidence from MW2 tests that the wider populations of Blackwood Basin farmers and Central Highlands farmers tended to differ in how strongly they agreed with this statement (Table G.66).

The first five statements were designed to measure positive attitudes towards how the regional delivery model was operating in the relevant NRM region, whereas the remaining four statements were designed to measure negative attitudes. Once the cross-case patterns reported above for the last four statements are reversed to make them comparable with the patterns for first five statements, we find that responses to all statements except two indicate consistently that the average Blackwood Basin respondent felt more positive about how the regional delivery model was operating in their NRM subregion than did the average Central Highlands respondent. The statements ‘(the relevant subregional NRM body) is serious about helping our community to solve our own NRM problems’ and ‘NRM at the scale of the (relevant NRM subregion) is so remote that it discourages us from getting involved’ were the two exceptions. The average Central Highlands respondent felt just as positive as the average Blackwood Basin respondent in respect of the first of these, and more positive in respect of the second.

For only two of the seven ‘non-exception’ statements, however, does MW2 testing justify us concluding with at least 95 per cent confidence that Blackwood Basin farmers tended to feel more positive about how the regional delivery model was operating in their NRM region than Central Highlands farmers. These two statements were ‘community members on (relevant subregional NRM body) can be trusted to argue forcefully for the best interests of the (relevant NRM subregion)’ and ‘(the relevant subregional NRM body) is just a ‘rubber stamp’ for decisions made by the (relevant state) Government’.

## 6.13 Farmers' involvement with local groups concerned with NRM issues

The proportion of respondents indicating they had been involved over the previous few years with at least one local group concerned with NRM issues was highest for the Mallee case (58.8 per cent), next highest for the Blackwood Basin case (41.9 per cent), and lowest for the Central Highlands case (35.0 per cent) (Table 6.13).

Table 6.13: Whether respondents listed recent involvement with at least one local group concerned with NRM issues: comparing the three cases

Proportion of respondents listing involvement with at least one local NRM-related group (%)		
Blackwood Basin	Central Highlands	Mallee dryland
41.9	35.0	58.8

We are able to conclude from MW2 tests with at least 99 per cent confidence for each pairwise comparison that the wider population of Mallee dryland farmers were more likely to have been involved with such a local group than Blackwood Basin farmers, Blackwood Basin farmers were more likely to have done so than Central Highlands farmers, and Mallee dryland farmers were more likely to have done so than Central Highlands farmers (Table G.67).

Of those respondents who had indicated involvement over the previous few years with at least one NRM-related local group, the proportion who indicated that their greatest level of involvement was with a landcare or catchment group (or Land Conservation District Committee, LCDC, in the Blackwood Basin case) was highest for the Mallee case (71.1 per cent), next highest for the Blackwood Basin case (66.2 per cent), and lowest for the Central Highlands case (24.0 per cent) (Table 6.14).

Table 6.14: Whether respondents identified their greatest involvement with a NRM-related local group as being with a landcare or catchment group: comparing the three cases

Proportion of respondents who identified involvement with a local group that identified their greatest involvement with a landcare/catchment group (%)		
Blackwood Basin	Central Highlands	Mallee dryland
66.2	24.0	71.1

From MW2 tests we can conclude with at least 99 per cent confidence for each pairwise comparison that applicable Mallee dryland farmers (i.e., involved recently with at least one local NRM-related group) were more likely to have had their greatest such involvement with a landcare or catchment group than applicable Central Highlands farmers, and also that applicable Blackwood Basin farmers were more likely than applicable Central Highlands farmers to have had their greatest such involvement with a landcare or catchment group (Table G.68).

Of those respondents who indicated involvement over the previous few years with at least one NRM-related local group, the proportion who reported their involvement had been ‘active’ or ‘fairly active’ (as against ‘occasional’) was highest for the Central Highlands case (67.8 per cent), next highest for the Mallee case (56.0 per cent), and slightly lower again for the Blackwood Basin case (54.6 per cent) (Table 6.15).

Table 6.15: Level of involvement by respondents with the local group they indicated greatest involvement with: comparing responses across the three cases

Proportion of respondents listing involvement with at least one local NRM-related group who reported ‘active’ or ‘fairly active’ involvement’ with their highest-involvement group (%)		
Blackwood Basin	Central Highlands	Mallee dryland
54.6	67.8	56.0

However, we are unable to conclude from MW2 tests with at least 95 per cent confidence for any of the comparisons that the populations of applicable farmers in the three cases (i.e., involved recently with at least one local NRM-related group) tended to differ in respect of likelihood that their greatest such involvement had been ‘active’ or ‘fairly active’ (Table G.69).

## 6.14 Attitudes regarding relationships of respondents’ highest involvement local group with the relevant regional and subregional NRM bodies

Mean scores calculated from applicable respondents’ (i.e., involved recently with at least one local NRM-related group) ratings in each case of how strongly they agreed or disagreed with three statements concerning the relationship of their highest-involvement group and their relevant regional NRM body are brought together for cross-case comparison in Table 6.16. A lower score indicates stronger agreement (the scoring scheme is described below the table).

Table 6.16: Comparing responses across the three cases to: How strongly do you agree or disagree with each of these statements (concerning the relevant regional NRM body) about this local group?

Statement	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
(The relevant regional NRM body) understands the issues faced by this group	2.80	2.44	2.18
The work of (the relevant regional NRM body) has helped make this group more effective	2.81	2.45	2.30
This group should work wherever possible with (the relevant regional NRM body) on issues of common interest	2.10	2.06	n.a.

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

The average applicable Mallee dryland respondent agreed more strongly with ‘(the relevant regional NRM body) understands the issues faced by this group’ than did the average applicable

Central Highlands respondent, while the average applicable Blackwood Basin respondent agreed less strongly again. MW2 tests justify us concluding with at least 95 per cent confidence for each pairwise comparison that applicable Mallee dryland farmers (i.e., involved recently with at least one local NRM-related group) tended to agree more strongly with this statement than applicable Central Highlands farmers, applicable Central Highlands farmers tended to agree more strongly than applicable Blackwood Basin farmers, and applicable Mallee dryland farmers tended to agree more strongly than applicable Blackwood Basin farmers (Table G.70).

Similarly, the average applicable Mallee dryland respondent agreed more strongly with ‘the work of (the relevant regional NRM body) has helped make this group more effective’ than did the average applicable Central Highlands respondent, while the average applicable Blackwood Basin respondent agreed less strongly again. From MW2 tests we are able to conclude with at least 99 per cent confidence for each pairwise comparison that applicable Mallee dryland farmers tended to agree more strongly with this statement than applicable Blackwood Basin farmers, and applicable Central Highlands farmers also tended to agree more strongly than applicable Blackwood Basin farmers (Table G.71).

The average applicable Central Highlands respondent agreed more strongly with ‘this group should work wherever possible with (the relevant regional NRM body) on issues of common interest’ than did the average applicable Blackwood Basin respondent. (This statement was not included in the questionnaire for the Mallee case.) However, we are unable to conclude with at least 95 per cent confidence that applicable Central Highlands farmers tended to agree more strongly with this statement than did applicable Blackwood Basin farmers (Table G.72).

Mean scores calculated from applicable respondents’ ratings in the Blackwood Basin and central Highlands cases of how strongly they agreed or disagreed with three statements concerning the relationship of their highest-involvement group and their relevant subregional NRM body are compiled for cross-case comparison in Table 6.17. (These statements were not included in the questionnaire for the Mallee case.) Again, a lower score indicates stronger agreement (the scoring scheme is detailed under the table).

Table 6.17: Comparing responses across the three cases to: How strongly do you agree or disagree with each of these statements (concerning the relevant subregional NRM body) about this local group?

Statement	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
(The relevant subregional NRM body) understands the issues faced by this group	2.17	2.08	n.a.
The work of (the relevant subregional NRM body) has helped make this group more effective	2.38	2.11	n.a.
This group should work wherever possible with (the relevant subregional NRM body) on issues of common interest	1.92	1.96	n.a.

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

The average applicable Central Highlands respondent agreed more strongly with ‘(the relevant subregional NRM body) understands the issues faced by this group’ than did the average applicable Blackwood Basin respondent. However, we are unable to conclude with at least 95 per cent confidence from MW2 testing that applicable Central Highlands farmers tended to agree more strongly with this statement than applicable Blackwood Basin farmers (Table G.73).

The average applicable Central Highlands respondent also agreed more strongly with ‘the work of (the relevant subregional NRM body) has helped make this group more effective’ than did the average applicable Blackwood Basin respondent. However, we are unable to conclude with at least 95 per cent confidence from MW2 testing that applicable Central Highlands farmers tended to agree more strongly with this statement than applicable Blackwood Basin farmers (Table G.74).

The average applicable Blackwood Basin respondent agreed more strongly with ‘this group should work wherever possible with (the relevant subregional NRM body) on issues of common interest’ than did the average applicable Blackwood Basin respondent. However, we are unable to conclude with at least 95 per cent confidence from MW2 testing that applicable Blackwood Basin farmers tended to agree more strongly with this statement than applicable Central Highlands farmers (Table G.75).

## 6.15 Attitudes regarding staff support of respondents’ highest-involvement local group

Of those respondents who indicated involvement over the previous few years with at least one NRM-related local group, the proportion who indicated that their highest-involvement group was supported by paid staff was higher for the Mallee case (70.3 per cent) than it was for the Blackwood Basin case (54.6 per cent) (Table 6.18). (This question was not included in the questionnaire for the Central Highlands case.)

Table 6.18: Comparing responses across the three cases to: Does this (highest-involvement local) group have paid staff to support it?

Proportion of respondents who identified involvement with a local group that answered ‘yes’ (%)		
Blackwood Basin	Central Highlands	Mallee dryland
54.6	n.a.	70.3

We are able to conclude with at least 99 per cent confidence from MW2 testing that applicable Mallee dryland farmers (i.e., involved recently with at least one local NRM-related group) tended to be more likely to indicate that their highest-involvement local group was supported by paid staff than applicable Blackwood Basin farmers (Table G.76).

Mean scores calculated from applicable respondents’ (i.e., involved recently with at least one local NRM-related group) ratings in the Blackwood Basin and Mallee cases of how strongly they agreed or disagreed with four statements concerning quality of staff support to their highest-involvement group and their relevant regional NRM body are brought together for cross-case

comparison in Table 6.19. (These statements were not included in the questionnaire for the Central Highlands case.) A lower score indicates stronger agreement (the scoring scheme is described below the table).

Table 6.19: Comparing responses across the three cases to: How strongly do you agree or disagree with each of the following statements (about paid staff supporting your highest-involvement local group)?

Statement	Mean score*		
	Blackwood Basin	Central Highlands	Mallee dryland
Paid staff supporting this group have the experience and skills needed to do a good job	1.87	n.a.	1.78
These staff understand the issues faced in our district	1.85	n.a.	1.80
These staff care about our community	1.78	n.a.	1.78
These staff are too busy to give this group the support it really needs	2.91	n.a.	2.83

\* Strongly agree = 1; agree =2; disagree = 3; and strongly disagree = 4.

The average applicable Mallee dryland respondent agreed more strongly with ‘paid staff supporting this group have the experience and skills needed to do a good job’ than did the average applicable Blackwood Basin respondent. However, we cannot conclude with at least 95 per cent confidence from MW2 testing that applicable Mallee dryland farmers tended to agree more strongly with this statement than applicable Blackwood Basin farmers (Table G.77).

The average applicable Mallee dryland respondent also agreed more strongly with ‘these staff understand the issues faced in our district’ than did the average applicable Blackwood Basin respondent. However, we are unable to conclude with at least 95 per cent confidence from MW2 testing that applicable Mallee dryland farmers tended to agree more strongly with this statement than applicable Blackwood Basin farmers (Table G.78).

The average applicable Blackwood Basin respondent and the average applicable Mallee dryland respondent agreed equally strongly with ‘these staff care about our community’. MW2 testing confirmed we are unable to conclude with at least 95 per cent confidence that applicable Blackwood Basin farmers and applicable Central Highlands farmers differ in respect of how strongly they agree with this statement (Table G.79).

The average applicable Mallee dryland respondent agreed more strongly with ‘these staff are too busy to give this group the support it really needs’ than did the average applicable Blackwood Basin respondent. However, we are unable to conclude with at least 95 per cent confidence from MW2 testing that applicable Mallee dryland farmers tended to agree more strongly with this statement than applicable Blackwood Basin farmers (Table G.80).

## 6.16 Key findings from comparing the cases

An extensive array of results from comparing the three cases was presented in this chapter. Although it is not possible to summarise all these results in this section, the selection of key comparisons presented in Table 6.20 highlights some interesting patterns which are discussed briefly below.

From measure 1 we can see that the vast majority of respondents in each case placed either a high or very high priority on the goal of maintaining or enhancing the condition of their natural resources and environment. Comparison with measure 2 reveals that a smaller proportion in two of the cases placed a high or very high priority on this goal than on the goal of maintaining or enhancing the profitability of their farm business. In the remaining case (Central Highlands), the proportions in respect of the two goals were very close.

Comparison of measures 3 and 4 reveals that in each of the three cases the proportions of respondents who rated natural resource issues as at least a moderate threat to their farm business were less than the proportions who rated government regulation, commodity prices and drought as at least a moderate threat.

Perusal of measures 5, 6 and 7 reveals a consistent trend across the three cases for respondents to be more likely to strongly agree they felt a bond with their district than with their NRM subregion, and more likely to strongly agree they felt a bond with their NRM subregion than with their NRM region. However, the nature of the trend differs between the cases. The proportions of respondents strongly agreeing they felt a bond with their district were similar across the cases (around 40 per cent). For one of the cases (Blackwood Basin), the proportion of respondents strongly agreeing they felt a bond with their NRM subregion was dramatically less (eight per cent), whereas for the other two cases the decline was much less marked (to 34-37 per cent). For one of these two regions (Central Highlands), the proportion of respondents strongly agreeing they felt a bond with their NRM region (six per cent) was much less than in respect of their subregion, but in the other case (Mallee dryland) the decline was much less marked (to 28 per cent).

In the Blackwood Basin case, therefore, a major 'breakdown' occurs in respondents' attachment to place when the place at issue becomes their NRM subregion rather than their district. It seems in this case that their subregion defined for NRM purposes is not a place with which most of them feel affinity. In the Central Highlands case, in comparison, a major breakdown occurs in respondents' attachment to place when the place at issue becomes their NRM region rather than their subregion. It seems in this case that respondents do already feel affinity with their NRM subregion, but that this does not extend to their NRM region. In the Mallee dryland case, in contrast to the other two cases, no major breakdown occurs in respondents' attachment to place as the place at issue widens from district to subregion to region. It seems in this case that respondents do already feel affinity with each of these differently-scaled places, even though the affinity strengthens somewhat as the scale becomes 'closer to home'.

From measure 8 we see that upwards of around half the respondents in each case who answered the question ('answering respondents') agreed or strongly agreed that NRM at the scale of their

Table 6.20: Key comparisons of results across the three cases

	Measure	Case		
		Blackwood Basin	Central Highlands	Mallee Region dryland
1	% of respondents who placed high or very high priority on the goal of maintaining/ enhancing the condition of their natural resources and environment	77.5	91.3	70.0
2	% of respondents who placed high or very high priority on the goal of maintaining/ enhancing the profitability of their farm business	86.3	90.6	93.3
3	% of respondents who rated natural resource issues as at least a moderate threat to their farm business	From 53.4% (soil-acidity/acid sulphate soils) to 25.1% (loss of native vegetation)	From 69.5% (pest plants and animals) to 11.9% (salinity)	From 58.3% (pest animals) to 19.0% (fragmentation of habitat)
4	% of respondents who rated 'government regulation', 'commodity prices' and 'drought' as at least a moderate threat to their farm business	From 95.4% (commodity prices) to 69.9% (drought)	From 96.5% (drought) to 88.6% (government regulation)	From 98.4% (commodity prices) to 86.9% (government regulation)
5	% of respondents who strongly agreed they felt a bond with their NRM region	4.9	6.2	28.1
6	% of respondents who strongly agreed they felt a bond with their NRM subregion	7.5	37.3	34.3
7	% of respondents who strongly agreed they felt a bond with their district	39.1	43.9	44.2
8	% of answering respondents (i.e., excluding 'don't know' responses) who agreed or strongly agreed that 'NRM at the scale of (their NRM region) is so remote that it discourages us from getting involved'	60.7	46.0	60.0
9	% of applicable respondents who felt that adoption of conservation practices would 'help greatly' their property's chances of achieving its goals	From 52.9% (zero or minimum tillage cropping) to 24.3% (revegetation and protective fencing)	From 74.4% (maintain groundcover on grazing land) to 22.1% (property management planning)	From 54.1% (reduced or minimum tillage) to 8.7% (link patches of native vegetation)
10	% of applicable respondents who expected to increase their adoption of conservation practices in the ensuing 10 years	From 45.5% (establish perennial pastures) to 11.5% (pest and weed control)	From 33.4% (fence to land type for grazing) to 13.4% (minimum or zero tillage cropping)	From 25.9% (establish high water-use plants) to 2.3% (control pest animals)
11	% of applicable respondents who perceived that effectiveness of a practice on their property depends on the actions of others	From 79.2% (pest and weed control) to 27.8% (zero or minimum tillage cropping)	From 82.0% (environmental weeds control) to 20.3% (fencing to land type for grazing)	From 79.0% (control pest animals) to 27.2% (establish high water-use plants)

Table 6.20: Key comparisons of results across the three cases (continued)

	Measure	Case		
		Blackwood Basin	Central Highlands	Mallee Region dryland
12	% of respondents <i>not</i> aware that 'much of the responsibility for deciding what on-ground activities to fund now lies with regional bodies'	39.1	31.9	29.3
13	% of respondents <i>not</i> aware of their regional NRM body	36.1	11.6	11.0
14	% of respondents <i>not</i> aware of their subregional NRM body (or, for the Mallee dryland case, of the Mallee Lands Implementation Committee)	10.7	8.8	39.3
15	% of respondents <i>not</i> aware that the board of their regional body consists mostly of community representatives	45.7	32.7	23.1
16	% of respondents <i>not</i> aware that the board/ committee of their subregional body (or, for the Mallee dryland case, that the Mallee Lands Implementation Committee) consists mostly of community representatives	23.8	26.4	40.0
17	% of answering respondents (i.e., excluding 'don't know' responses) who agreed or strongly agreed that 'the regional approach is an improvement on previous approaches'	66.1	71.9	68.2
18	% of answering respondents who agreed or strongly agreed that 'Federal Government is serious about empowering our community to solve our own NRM problems'	50.4	50.0	62.0
19	% of answering respondents who agreed or strongly agreed that '(their state) Government is serious about empowering our community to solve our own NRM problems'	38.5	34.6	48.5
20	% of answering respondents who agreed or strongly agreed that '(their regional NRM body) is serious about helping our community to solve our own NRM problems'	72.8	76.1	84.0
21	% of answering respondents who agreed or strongly agreed that '(their subregional NRM body) is serious about helping our community to solve our own NRM problems'	83.3	78.3	n.a.
22	% of answering respondents who agreed or strongly agreed that 'the regional approach is a way for governments to 'pass the buck' on difficult issues'	69.5	71.3	82.4
23	% of answering respondents who agreed or strongly agreed that 'the regional approach is part of a strategy to increase government regulation of rural land-use'	73.0	77.8	73.1
24	% of answering respondents who agreed or strongly agreed that '(their regional NRM body) is just a 'rubber stamp' for decisions made by (their state government)'	54.0	49.0	56.8

Table 6.20: Key comparisons of results across the three cases (continued)

	Measure	Case		
		Blackwood Basin	Central Highlands	Mallee Region dryland
25	% of answering respondents who agreed or strongly agreed that '(their subregional NRM body) is just a 'rubber stamp' for decisions made by (their state government)'	33.9	44.7	n.a.
26	% of answering respondents who agreed or strongly agreed that their subregional NRM body 'is just a 'rubber stamp' for their regional NRM body'	39.3	47.0	n.a.
27	% of respondents who indicated involvement over the previous few years with at least one local NRM-related group	41.9	35.0	58.8
28	% of respondents indicating recent involvement with a local NRM-related group who were most involved with a landcare- or catchment- type group	66.2	24.0	71.1
29	% of respondents indicating recent involvement with a local NRM-related group who were most involved with a production group	19.4	62.5	20.3
30	% of respondents indicating recent involvement with a local NRM-related group who agreed or strongly agreed that 'the work of (their regional NRM body) has helped make this group more effective'	35.5	55.8	68.3
31	% of respondents indicating recent involvement with a local NRM-related group who agreed or strongly agreed that 'the work of (their subregional NRM body) has helped make this group more effective'	62.1	80.5	n.a.

region 'is so remote that it discourages us from getting involved'. The proportion was lowest for the Central Highlands case (46.0 per cent) and similarly higher for the Blackwood Basin and Mallee dryland cases (60.7 per cent and 60.0 per cent, respectively).

Comparison of measures 5 and 8 suggests there is no association between respondents' attachment to their region and their perceptions that NRM at the scale of their region 'is so remote that it discourages us from getting involved'. The proportion of respondents strongly agreeing they felt a bond with their NRM region was much higher for the Mallee dryland case than for the other two cases, for instance, but the proportion of answering respondents in this case agreeing or strongly agreeing that their involvement in NRM was discouraged by the scale of their region was not lower than that for the Blackwood Basin case, and it was markedly higher than for the Central Highlands case.

Examination of measure 9 highlights the considerable variation between different conservation practices for a case in respect of how respondents perceived their adoption as helping fulfil their goals. Note how for two of the cases the practice least likely to be perceived as 'help(ing) greatly' was a biodiversity conservation practice ('revegetation and protective fencing' and 'link patches of native vegetation', respectively) from which resulting benefits would likely extend considerably beyond the boundaries of the adopter's property.

Perusal of measure 10 similarly highlights the marked variation between conservation practices for a case in respect of the proportion of respondents expecting to increase their adoption over the ensuing 10 years.

Examination of measure 11 reveals considerable differences between conservation practices in how respondents perceived the effectiveness of their adoption as depending (either ‘certainly’ or ‘possibly’ depending) on the actions of others. For each of the cases, the practice most likely to be perceived as depending on others’ actions (by around 80 per cent of respondents in each case) involved control of pest animals, weeds or both (‘pest and weed control’, ‘environmental weeds control’ and ‘control pest animals’, respectively).

It is evident from measure 12 that a substantial proportion of respondents in each case (from 29 per cent to 39 per cent) were unaware that regional bodies had been decentralised considerable responsibility for deciding how funds for on-ground NRM activities should be allocated within their region. From measure 13 it is evident that non-trivial proportions of respondents in the Central Highlands and Mallee dryland cases (around 11 per cent in each case) were unaware of their respective regional NRM bodies, but that the corresponding proportion was appreciably higher for the Blackwood Basin case (36.1 per cent).

Comparison of measures 13 and 14 reveals for the Blackwood Basin and Central Highlands cases that respondents were less likely to be unaware of their subregional NRM body than unaware of their regional body. The difference was appreciably larger for the former case, where respondents were markedly more likely to be unaware of their regional body compared with the latter case. For the Mallee dryland case, in contrast, respondents were much more likely to be unaware of the Mallee Lands Implementation Committee (consulted by the Mallee CMA in respect of decisions regarding that region’s dryland ‘subregion’) than unaware of the CMA. The difference here is that the Implementation Committee tends to operate much more in the background than is true for the subregional bodies in the other two cases, which each devote considerable efforts to maintaining a public profile within their subregions.

Perusal of measure 15 highlights that a sizeable proportion of respondents in each case were unaware that the board of their regional body consists mostly of community representatives. The proportion for the Blackwood Basin case was about double that for the Mallee dryland case, while the proportion for the Central Highlands case was about midway between those of the other two cases.

Comparison of measures 15 and 16 reveals for the Blackwood Basin and Central Highlands cases that respondents were less likely to be unaware that that the board/committee of their subregional body consists mostly of community representatives than unaware that the board of their regional body consists mostly of community representatives. The difference was more pronounced for the former case, where the likelihood of being unaware was reduced by about half. For the Mallee dryland case, in contrast, respondents were much more likely to be unaware that the Mallee Lands Implementation Committee consists mostly of community representatives than similarly unaware in respect of their regional body. Again, this is explained by the predominantly background role played by the Implementation Committee.

Examination of measure 17 reveals that around two-thirds of answering respondents (i.e., excluding 'don't know' respondents) in each case perceived the regional model of NRM delivery as an improvement on previous approaches.

Measure 18 reveals that at least half the answering respondents in each case perceived the Federal Government to be serious about empowering their community to solve its own NRM problems. Comparison of measures 18 and 19 shows that answering respondents in each case were appreciably less likely to perceive their state government as serious in the same respect. It is evident from these measures also that answering respondents from the Mallee dryland case were appreciably more likely to perceive the Federal Government and their state government as serious in this respect compared with respondents from the other two cases.

Perusal of measure 20 shows that over 70 per cent of answering respondents in each case perceived their regional body as serious about empowering their community to solve its own NRM problems. Hence, answering respondents in each case were markedly more likely to perceive their regional body to be serious in this respect than either the Federal Government or their state government. Comparison of measures 20 and 21 reveals that answering respondents in each of the two relevant cases (since the Mallee dryland case lacks a subregional body) were more likely to perceive their subregional body as serious in this respect than their regional body (although the difference was slight for the Central Highlands case). Comparison of measures 19 and 21 for the two relevant cases reveals that answering respondents in each of these cases were more than twice as likely to perceive their subregional body as serious in this respect compared with their state government.

Examination of measures 22 and 23 reveals that answering respondents were likely to feel some scepticism regarding government motivations for introducing the regional delivery model. Measure 22 shows that upwards of 69.5 per cent of answering respondents in each of the three cases perceived the model to be 'a way for governments to 'pass the buck' on difficult issues'. Measure 23 reveals that upwards of 73.0 per cent of answering respondents in each of the three cases perceived the model to be 'part of a strategy to increase government regulation of rural land-use'. It is interesting in the face of this quite prevalent scepticism that a clear majority of respondents in each case rated the model as an improvement on previous approaches. This suggests previous approaches were regarded with even greater scepticism.

Measure 24 indicates that around half the answering respondents in each case tended to perceive their regional NRM body as just a 'rubber stamp' for decisions made by their state government. Comparison of measures 24 and 25 reveals that answering respondents were less likely in each of the two relevant cases to tend towards such a perception in respect of their subregional body; i.e., that their subregional body is just a rubber stamp for decisions made by their state government. Comparison of measures 25 and 26 shows that answering respondents in each of the two relevant cases were more likely to perceive their subregional body as a rubber stamp for their regional body than to perceive it as a rubber stamp for their state government.

It is evident from measure 27 that the proportions of respondents in the three cases involved with a local NRM-related group over the previous few years ('locally-involved respondents') differed to a substantial degree, from 58.8 per cent in the Mallee dryland case to 41.9 per cent in the Blackwood Basin case and 35.0 per cent in the Central Highlands case.

Measures 28 and 29 reveal substantial variation between the cases also in terms of the type of local NRM-related group respondents had been most involved with (their 'main local group'). In the Blackwood Basin and Mallee dryland cases, around two-thirds of locally-involved respondents had been most involved in a landcare- or catchment- type group. In the Central Highlands case, about one-quarter of locally-involved respondents had been most involved with such a group. We see from measure 29 that almost two-thirds of locally-involved respondents in this case had been most involved with a production-type (e.g., sustainable cropping) group. In the Blackwood Basin and Mallee dryland cases, only around one-fifth of locally-involved respondents had been most involved with such a group.

Measure 30 also reveals substantial variation between the cases, this time in terms of perceptions of locally-involved respondents about whether their regional NRM body had helped make their main local group work more effectively. The proportion of locally-involved respondents perceiving their regional body to have increased the effectiveness of their main local group ranged from 68.3 per cent in the Mallee dryland case, to 55.8 per cent in the Central Highlands case, to 35.5 per cent in the Blackwood Basin case. A likely reason for the higher proportion in the Mallee dryland case is that the regional body in that case, the Mallee CMA, directly supports the running of networks of landcare groups within its region.

Comparison of measures 30 and 31 in the two relevant cases shows that locally-involved respondents were considerably more likely to perceive the effectiveness of their main local group had been enhanced by the work of their subregional body than by the work of their regional body.

## 7. Summary

In this report, results from descriptive and comparative analyses of data from a survey of farmers in three case-study NRM subregions were presented. The survey was undertaken as part of the project ‘Nesting community-based NRM for regional accountability and grassroots cooperation’. It was concerned primarily with providing quantitative evidence regarding farmers’ awareness of, and perceptions regarding, the regional delivery model for NRM, and also on factors potentially associated with their decisions to adopt the kinds of on-farm conservation practices promoted to them under this model. The three NRM subregions used as case studies were: the Blackwood Basin, located within the South West Catchments NRM Region (in Western Australia); the Central Highlands, located within the Fitzroy Basin NRM Region (in Queensland); and dryland areas of the Mallee NRM Region (in Victoria).

The survey was conducted through postal delivery and return of questionnaires. Questionnaires were posted to a sample of farmers in each case-study subregion. For the Blackwood Basin case, 333 full questionnaires were completed and returned, yielding a 29.3 per cent response rate. For the Central Highlands case, 170 full questionnaires were completed and returned, yielding a response rate of 19.6 per cent. For the Mallee Region dryland case, 318 full questionnaires were completed and returned, yielding a 40.2 per cent response rate. The questionnaires were returned between September 2006 and February 2007.

A wide range of results were presented and discussed in this report. Some key findings were:

- the vast majority of respondents in each case placed either a high or very high priority on the goal of maintaining or enhancing the condition of their natural resources and environment;
- in each of the three cases, smaller proportions of respondents rated natural resource issues as at least a moderate threat to their farm business than rated government regulation, commodity prices and drought as at least a moderate threat;
- there was a consistent trend across the three cases for respondents to be more likely to strongly agree they felt a bond with their district than with their NRM subregion, and more likely to strongly agree they felt a bond with their NRM subregion than with their NRM region;
- upwards of around half the respondents in each case who answered the question (‘answering respondents’) agreed or strongly agreed that NRM at the scale of their region ‘is so remote that it discourages us from getting involved’;
- a substantial proportion of respondents in each case (upwards of 29 per cent) were unaware that regional bodies had been decentralised considerable responsibility for deciding how funds for on-ground NRM activities should be allocated within their region.
- non-trivial proportions of respondents in the Central Highlands and Mallee dryland cases (around 11 per cent in each case) were unaware of their respective regional NRM bodies,

while the corresponding proportion for the Blackwood Basin case was appreciably higher (36.1 per cent);

- a sizeable proportion of respondents in each case (from 23.1 per cent to 45.7 per cent) were unaware that the board of their regional body consists mostly of community representatives;
- around two-thirds of answering respondents in each case perceived the regional model of NRM delivery as an improvement on previous approaches;
- at least half the answering respondents in each case perceived the Federal Government to be serious about empowering their community to solve its own NRM problems;
- answering respondents in each case were appreciably less likely to perceive their state government, compared with the Federal Government, as serious about empowering their community to solve its own NRM problems;
- over 70 per cent of answering respondents in each case perceived their regional body to be serious about empowering their community to solve its own NRM problems;
- answering respondents in each of the two relevant cases (given the absence of a subregional body in the Mallee dryland case) were more likely to perceive their subregional body, compared with their regional body, as serious about empowering their community to solve its own NRM problems;
- answering respondents for these two relevant cases were more than twice as likely to perceive their subregional body, compared with their state government, as serious about empowering their community to solve its own NRM problems;
- upwards of 69.5 per cent of answering respondents in each of the three cases tended to perceive the regional delivery model as ‘a way for governments to ‘pass the buck’ on difficult issues’;
- upwards of 73.0 per cent of answering respondents in each of the three cases tended to perceive the regional delivery model as ‘part of a strategy to increase government regulation of rural land-use’;
- given this prevalent scepticism of governmental motives for introducing the regional delivery model, and the clear majority of respondents who rated the model as an improvement on previous approaches (see above), the implication seems to be that the regional delivery model is perceived by farmers less sceptically than was the case with previous NRM models;
- around half the answering respondents in each case tended to perceive their regional NRM body as just a ‘rubber stamp’ for decisions made by their state government;

- answering respondents in each of the two relevant cases were more likely to perceive their subregional body as a ‘rubber stamp’ for their regional body than to perceive it as a ‘rubber stamp’ for their state government;
- proportions of respondents in the three cases involved with a local NRM-related group over the previous few years (‘locally-involved respondents’) ranged from 58.8 per cent in the Mallee dryland case, to 41.9 per cent in the Blackwood Basin case, and to 35.0 per cent in the Central Highlands case;
- in the Blackwood Basin and Mallee dryland cases, around two-thirds of locally-involved respondents had been most involved with a landcare- or catchment- type group, while in the Central Highlands case about one-quarter of locally-involved respondents had been most involved with such a group;
- almost two-thirds of locally-involved respondents in the Central Highlands case had been most involved with a production-type group (e.g., sustainable cropping group), while in the Blackwood Basin and Mallee dryland cases around one-fifth of locally-involved respondents had been most involved with such a group;
- the proportion of locally-involved respondents perceiving their regional body to have increased the effectiveness of their highest-involvement local group ranged from 68.3 per cent in the Mallee dryland case, to 55.8 per cent in the Central Highlands case, to 35.5 per cent in the Blackwood Basin case; and
- locally-involved respondents were considerably more likely to perceive the effectiveness of their highest-involvement local group had been boosted by the work of their subregional body (except in the Mallee dryland case which lacks such a group) than by the work of their regional body.

These findings confirm that pursuit of community-based NRM at the scale of large regions is no simple matter. Barriers to this pursuit that were identified include lack of awareness of the regional delivery model and its community-based elements, scepticism of government motives for introducing the model, and perceptions that regional and subregional NRM bodies are merely ‘rubber stamps’ for decisions made by higher-level authorities.

Although these findings identified some important commonalities across the cases, they also highlighted some important differences. They serve as a useful reminder that each setting where community-based NRM is attempted is likely to have unique characteristics, and that institutional arrangements for community-based NRM that work in one setting may require significant adaptation to work in another setting. Hence, local participation in designing and revising institutional arrangements for community-based NRM is vital if the benefits sought from this approach (particularly in promoting voluntary adoption of conservation practices) are to be realised from one region to the next.

This report should be read in conjunction with the final report of the project ‘Nesting community-based NRM for regional accountability and grassroots cooperation’ (Marshall under review). The final report: reviews the evolution of community-based NRM in Australia, as presently pursued

under the regional delivery model; draws on collective action theory and complexity theory to illuminate the challenges ahead in scaling up community-based NRM to the size of the regions defined for this model (see also Marshall 2005; 2008); considers the potential of nested (or 'polycentric') multi-level systems of intra-regional governance as a solution to these challenges; and presents the results of econometric analyses designed to test whether farmers' trust in the regional delivery model (including in their regional and subregional NRM bodies) is associated with their plans to voluntarily adopt conservation practices promoted to them under this model.

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