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Rural Futures

Order with and without the law:

Understanding perceptions and attitudes towards formal and informal controls of natural resources.

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by

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Contents

ABOUT THE AUTHORS.....	3
ACKNOWLEDGEMENTS	4
CONTENTS	5
EXECUTIVE SUMMARY	10
1 INTRODUCTION	17
1.1.1 <i>Agriculture in Australia</i>	17
1.1.2 <i>Agriculture and the environment.....</i>	18
1.2 RESEARCH OBJECTIVES.....	19
1.3 STRUCTURE OF THE REPORT.....	20
PART ONE: NATIONAL MAIL SURVEY OF FARMERS	21
2 PART 1: INTRODUCTION	22
2.1 ADVISORY GROUP.....	22
2.2 THE MAIL SURVEY.....	22
2.2.1 <i>The sample.....</i>	22
2.2.2 <i>Survey distribution</i>	23
2.2.3 <i>Response rate</i>	23
2.2.4 <i>The questionnaire</i>	24
2.3 SECONDARY DATA SOURCES.....	26
2.4 STATISTICAL ANALYSES	26
2.4.1 <i>Telephone Interviews.....</i>	27
2.5 PROFILE OF THE SAMPLE OF RESPONDENTS TO THE MAIL SURVEY.....	27
2.5.1 <i>Farm operators</i>	27
2.5.2 <i>Property size</i>	29
2.5.3 <i>Commercial agricultural production</i>	30
2.6 SUMMARY	31
3 ENVIRONMENTAL MANAGEMENT ON AUSTRALIAN FARMS.....	32
3.1 INTRODUCTION.....	32
3.2 BACKGROUND	33
3.2.1 <i>Factors influencing adoption</i>	33
3.3 THE PRESENT STUDY.....	37
3.3.1 <i>The survey.....</i>	37
3.4 RESULTS.....	38
3.4.1 <i>Environmental problems on farms.....</i>	38
3.4.2 <i>Best-practice land management on farms.....</i>	39
3.4.3 <i>Environmental conservation on farms.....</i>	39

3.4.4	<i>Barriers to sustainable agriculture</i>	40
3.4.5	<i>Local institutions for natural resource management</i>	42
3.4.6	<i>Place, social capital and environmental conservation</i>	44
3.4.7	<i>Factors predicting environmental conservation on farms</i>	46
3.5	DISCUSSION AND CONCLUSIONS	47
4	ENVIRONMENTAL CRIME ON FARMS	50
4.1	INTRODUCTION	50
4.2	BACKGROUND	50
4.2.1	<i>Farmers and the environment</i>	51
4.2.2	<i>Toward a theoretical explanation of environmental crime in the rural context</i>	54
4.3	THE SURVEY	55
4.4	RESULTS.....	56
4.4.1	<i>Environmental Crime on Farms</i>	56
4.4.2	<i>Reporting environmental crime</i>	57
4.4.3	<i>Blame</i>	60
4.4.4	<i>Determining vulnerability to victimisation</i>	61
4.5	DISCUSSION AND CONCLUSIONS	63
5	ORDER WITHOUT LAW: UNDERSTANDING CULTURAL DETERMINANTS OF NATURAL RESOURCE MANAGEMENT	66
5.1	INTRODUCTION.....	66
5.2	BACKGROUND	67
5.2.1	<i>Informal order</i>	67
5.2.2	<i>Social Norms and natural resource management</i>	69
5.3	THE PRESENT STUDY.....	70
5.3.1	<i>The survey</i>	70
5.4	RESULTS.....	71
5.4.1	<i>Managing neighbourhood disputes</i>	71
5.4.2	<i>Maintaining social order</i>	76
5.4.3	<i>Responsibility for natural resource management</i>	78
5.4.4	<i>Effective natural resource management</i>	79
5.5	DISCUSSION AND CONCLUSIONS	81
6	FARMERS' PERCEPTIONS OF CLIMATE CHANGE	83
6.1	INTRODUCTION	83
6.2	BACKGROUND	83
6.2.1	<i>Aim and hypotheses</i>	85
6.3	THE SURVEY	85
6.4	RESULTS.....	86
6.4.1	<i>Belief in climate change</i>	86
6.4.2	<i>A typology of perceptions of climate change risks</i>	88
6.4.3	<i>Relationship between perceptions of climate change risk and conservation practices</i>	92
6.4.4	<i>Other influences</i>	94
6.5	DISCUSSION	95
6.5.1	<i>Conclusion</i>	97
7	FARMERS' ATTITUDES TO ENVIRONMENTAL ISSUES: LAWS, REGULATIONS AND COMPLIANCE	98
7.1	INTRODUCTION	98
7.2	BACKGROUND	99
7.2.1	<i>Previous studies of landholders' attitudes to the environment</i>	100
7.2.2	<i>Attitudes and behaviour</i>	101
7.3	THE PRESENT STUDY	101
7.4	RESULTS.....	102
7.4.1	<i>Farmer attitudes to the environment</i>	102
7.5	NEW ATTITUDE STATEMENTS DEVELOPED FOR THE PRESENT STUDY.....	106
7.5.1	<i>Current issues</i>	106

7.5.2	<i>Attitudes to environmental crime</i>	107
7.6	ATTITUDES TO ENVIRONMENTAL LAWS AND REGULATIONS	108
7.7	ACCESS TO INFORMATION ON ENVIRONMENTAL REGULATIONS	109
7.8	THE IMPACT OF ENVIRONMENTAL REGULATIONS ON FARM OPERATIONS	111
7.9	ENCOURAGING COMPLIANCE WITH ENVIRONMENTAL LAW	113
7.9.1	<i>Improving regulation and regulatory processes to raise compliance</i>	114
7.9.2	<i>Education and incentives to raise compliance</i>	118
7.9.3	<i>Improving regulation to support beyond compliance activities</i>	119
7.9.4	<i>Improving regulation for the future of agriculture</i>	119
7.10	DISCUSSION	120
7.10.1	<i>Conclusion</i>	122
8	MOTIVATIONAL POSTURES AND COMPLIANCE WITH ENVIRONMENTAL LAW	123
8.1	INTRODUCTION	123
8.2	BACKGROUND	123
8.2.1	<i>Environmental regulation and regulatory theory</i>	123
8.2.2	<i>Compliance motivations</i>	125
8.2.3	<i>Motivational Posture Theory</i>	127
8.2.4	<i>Closing the distance: relationships, trust and agreement</i>	128
8.3	THE PRESENT STUDY.....	129
8.3.1	<i>The survey</i>	130
8.4	RESULTS.....	132
8.4.1	<i>Cluster profile: Four motivational postures</i>	132
8.4.2	<i>Motivational postures, location, place attachment and social cohesion</i>	134
8.4.3	<i>Motivational Postures and regard for the aims of regulation</i>	136
8.4.4	<i>Motivational postures as predictors of compliance behaviour</i>	140
8.4.5	<i>Motivational Postures and regard for environmental governance</i>	141
8.4.6	<i>Motivational postures and appreciation for regulatory solutions and moral regard for environmental transgressions</i>	144
8.4.7	<i>Motivational Postures and the rural-urban divide</i>	146
8.5	DISCUSSION	146
8.6	CONCLUSION.....	151
9	SUMMARY AND DISCUSSION	152
9.1	INTRODUCTION	152
9.2	SUMMARY OF THE MAIN FINDINGS.....	152
9.3	IMPLICATIONS OF THE FINDINGS	155
9.3.1	<i>Natural resource management in rural communities</i>	156
9.3.2	<i>Social Norms</i>	157
9.3.3	<i>Formal environmental laws and regulations and improving compliance</i>	157
9.3.4	<i>Encouraging compliance</i>	158
9.4	LIMITATIONS OF THE STUDY	158
9.5	FURTHER RESEARCH	158
9.6	CONCLUSION.....	159
	REFERENCES	160
	APPENDIX 1: CONSERVATION ACTIVITIES ON FARMS: CH. 3	172
	APPENDIX 2: WHO AND WHAT PARTICIPANTS BLAME FOR ENVIRONMENTAL CRIME: CH 4	179
	APPENDIX 3: CHAPTER 5:	185
	APPENDIX 4: NEIGHBOUR RESPONSES TO PARTICIPANTS LAND USE CHANGES: CH 5	193

Figures

FIGURE 1.1: DISTRIBUTION OF RESPONSES BY STATE (N=1926) (10 MISSING DATA).....	24
FIGURE 1.2: AGE PROFILE OF THE SAMPLE (N=1248)	28
FIGURE 1.3: FARM EXPERIENCE (N=1248) (WEIGHTED)	28
FIGURE 1.4: SUCCESSION PLANS (N=1248) (WEIGHTED).....	29
FIGURE 1.5: FARM SIZE (N=1926).....	29
FIGURE 1.6: AGRICULTURAL ENTERPRISES ACROSS THE WHOLE SAMPLE (N=1926).....	31
FIGURE 2.1: PLACE AS IN THE INTERSECTION OF PROCESSES AFFECTING HUMAN ACTION	35
FIGURE 2.2: ENVIRONMENTAL PROBLEMS ON FARMS WITHIN THE SAMPLE (N=1926).....	38
FIGURE 2.3: ENVIRONMENTAL PRACTICES ON FARMS (N=1248) (WEIGHTED).....	39
FIGURE 2.4: MOTIVATION TO PRESERVE AN ENVIRONMENTAL AREA ON FARM (N=1248) (WEIGHTED)	40
FIGURE 2.5: FACTORS PREVENTING ENVIRONMENTAL IMPROVEMENTS ON FARM (N=1248) (WEIGHTED).....	42
FIGURE 2.6: PARTICIPATION IN LOCAL NRM GROUPS (N=1248) (WEIGHTED)	42
FIGURE 2.7: PLACE ATTACHMENT (N=1248)	44
FIGURE 2.8: PLACE ATTACHMENT AND SUSTAINABLE PRACTICES (N=1248).....	45
FIGURE 2.9: SOCIAL CAPITAL (N=1248).....	45
FIGURE 2.10: SOCIAL CHANGE IN FARMING COMMUNITIES IN THE PAST FIVE YEARS (N=1248).....	46
FIGURE 3.1: PROPORTION OF INCIDENTS OF ENVIRONMENTAL CRIME (N=1926).....	57
FIGURE 3.2: FARMER REACTIONS TO INCIDENTS OF ENVIRONMENTAL CRIME (N=1248).....	58
FIGURE 3.3: REASONS FOR NOT REPORTING ENVIRONMENTAL CRIME (N=1248).....	59
FIGURE 3.4: PERCEIVED SERIOUSNESS OF CRIME RELATIVE TO REPORTED VICTIMISATION (N=1248).....	60
FIGURE 4.1: PERCEPTIONS OF RESPONSIBILITY FOR ENVIRONMENTAL MANAGEMENT ON FARMS (N=1248)	79
FIGURE 4.2: RANKING OF EFFECTIVENESS FOR NATURAL RESOURCE MANAGEMENT (N=1248)	80
FIGURE 5.1: ATTITUDES TO CLIMATE CHANGE (N=1926).....	86
FIGURE 5.2: BELIEF IN CLIMATE CHANGE BY AGE (N=1248)	87
FIGURE 5.3A AND 5.3B: BELIEF IN CLIMATE CHANGE BY INDUSTRY (N=1926).....	88
FIGURES 5.5A TO 5.5E ATTITUDES TO CLIMATE CHANGE RISK (N=1248).....	89
FIGURE 5.6: CLUSTER PROFILE FOR CLIMATE CHANGE BELIEFS AND RISK PERCEPTIONS (N=1248).....	90
FIGURE 5.7: TYPOLOGY OF CLIMATE CHANGE BELIEF AND RISK PERCEPTION PROFILES	91
FIGURE 5.8: AGE BY CLIMATE CHANGE GROUPS	92
FIGURE 5.9: CLIMATE CHANGE BELIEFS AND ENVIRONMENTAL ACTIVITY	92
FIGURE 5.10: ATTITUDES TO GOVERNMENT'S ROLE IN ENVIRONMENTAL MANAGEMENT.....	95
FIGURE 6.1A: HOBBY FARMERS HAVE NO IDEA ABOUT HOW TO PROPERLY MAINTAIN THE ENVIRONMENT ON THEIR LAND. (N=1248)	106
FIGURE 6.1B: CONSUMERS AND BUYERS OF PRODUCTS HAVE A RIGHT TO DEMAND A CERTAIN STANDARD OF AGRICULTURAL PRODUCTION. (N=1248).....	107
FIGURE 6.2A THE HIGH COST OF IRRIGATION WATER AND TOUGH TIMES ON THE LAND MAKES THE UNAUTHORISED TAKING OF WATER JUSTIFIABLE (N=1248).....	107
FIGURE 6.2B: UNAUTHORISED LAND CLEARING ON FARMS IS WRONG. (N=1956).....	108
FIGURE 6.3A: ENVIRONMENTAL LAWS AND REGULATIONS ARE WRITTEN TO KEEP CITY PEOPLE HAPPY. (N=1248)	108
FIGURE 6.3B: ENVIRONMENTAL LAWS AND REGULATIONS ARE INCREASINGLY IMPORTANT AS ENVIRONMENTAL DEGRADATION GETS WORSE. (N=1248).....	109
FIGURE 6.3C: ENVIRONMENTAL PROBLEMS ARE BEST MANAGED BY FARMERS WITHOUT GOVERNMENT INTERFERENCE. (N=1248).....	109
FIGURE 7.1. MOTIVATIONAL POSTURE CLUSTER PROFILES.	133
FIGURE 7.2. CLUSTERS BY AGE	134
FIGURE 7.3. CLUSTERS BY EDUCATION	134
FIGURE 7.4: POSTURES BY STATE.	134
FIGURE 7.5: POSTURES BY INDUSTRY TYPE.....	135
FIGURE 7.6A. POSTURES BY LENGTH OF TIME LIVING ON THEIR PROPERTY	136
FIGURE 7.6B. POSTURES BY LENGTH OF TIME LIVING IN DISTRICT	136
FIGURE 7.7: ENVIRONMENTAL PROBLEMS BY POSTURE *(P>.05).....	137
APPRECIATION OF HARM:	137
FIGURE 7.8. APPRECIATION OF HARM BY POSTURE.....	137

FIGURE 7.9. BEST MANAGEMENT PRACTICES ACROSS THE POSTURES *($p > .05$) (NOTE: MORE THAN ONE CATEGORY COULD BE SELECTED)	138
FIGURE 7.10: COMPARISON BETWEEN POSTURES IN REASONS FOR ENVIRONMENTAL CONSERVATION	138
FIGURE 7.11: INVOLVEMENT IN ENVIRONMENTAL GROUPS BY POSTURE	139
FIGURE 7.12. FACTORS PREVENTING IMPLEMENTATION OF ENVIRONMENTAL IMPROVEMENTS BY POSTURE	140
FIGURE 7.13. ATTITUDES TO GOVERNANCE BY POSTURE.....	144
FIGURE 7.14. ACCEPTANCE OF REGULATION BY POSTURE.	145
FIGURE 7.15. REGARD FOR ENVIRONMENTAL REGULATION AND CRIMINALIZATION BY POSTURE	145
FIGURE 7.16. ATTITUDES TO RURAL-URBAN ISSUES BY POSTURE	146

Tables

TABLE 1.1: SAMPLE PROFILE (N=5267)	23
TABLE 1.2: POST-STRATIFICATION CASE WEIGHTS AND CELL SIZES USED TO ADJUST FOR NON-RESPONSE.	27
TABLE 1.3: LAND TENURE TYPES ACROSS THE MAIN SAMPLE.....	30
TABLE 2.1: DIFFICULTIES MAINTAINING PRESERVED ENVIRONMENTAL AREA.	41
TABLE 2.2: PROPORTION OF RESPONDENTS WHO ARE MEMBERS OF LANDCARE.	43
TABLE 2.3: LOGISTIC REGRESSION COEFFICIENTS PREDICTING PLACE-BASED ENVIRONMENTAL CONSERVATION	47
TABLE 3.1: FARMER ATTITUDES TOWARDS WHO OR WHAT TO BLAME FOR ENVIRONMENTAL CRIME (N=1248).	61
TABLE 3.2: LOGISTIC REGRESSION COEFFICIENTS PREDICTING VICTIMISATION (N=1248).	62
TABLE 5.1: LOGISTIC REGRESSION COEFFICIENTS PREDICTING ENVIRONMENTAL CONSERVATION	93
TABLES 6.1A TO 6.1G: ATTITUDES TO THE ENVIRONMENT (SOURCE: REEVE 2001)	102
TABLE 7.1: THE FIVE MOTIVATIONAL POSTURES.....	128
TABLE 7.2. THE FIVE MOTIVATIONAL POSTURES AND STATEMENTS FOR COMPLIANCE WITH ENVIRONMENTAL LAWS.	131
TABLE 7.3: LOGISTIC REGRESSION COEFFICIENTS PREDICTING ENVIRONMENTAL CONSERVATION	141
TABLE 7.4. ATTITUDES TO RESPONSIBILITY FOR ENVIRONMENTAL MANAGEMENT ACROSS THE POSTURES	142

Executive Summary

This interdisciplinary collaborative research examined the complex social constructs that impact upon natural resource management within rural communities in Australia. The primary research questions were:

- ▢ What is the nature and extent of farmers' involvement in natural resource management on their land and in their community?
- ▢ What are the physical, ecological and social barriers to farmers' adoption of sustainable practices?
- ▢ What is the nature and extent of environmental crime victimisation at the individual farm level?
- ▢ How do informal social norms operating in farming communities influence natural resource management and maintain social order?
- ▢ How do farmers view and respond to formal environmental laws and regulations?
- ▢ What is the optimal management structure for natural resource management in rural Australia?

Method

The research consisted of two studies. The first study was comprised of a mail survey of 5,269 farmers across Australia and follow-up interviews with farmers, representatives of industry bodies and other key informants. Second, three individual case studies were conducted in the Moira Shire in Victoria, Walgett in New South Wales and in the Whitsunday Regional Shire in Queensland.

Results

The study found that farmers are very concerned about environmental degradation. Almost all had implemented some type of best practice land management practice on their land. More than half had preserved an area on their land just for its environmental benefits. The greater proportion were involved in Landcare or other groups concerned with natural resource management at the local community level. Barriers to these objectives were a lack of time and money, and drought. Weeds, particularly woody weeds, pest animals and water availability were primary environmental concerns on farms. Other problems were human caused. Just under half of the respondents had been victims of environmental crimes, such as chemical spray drift or rubbish dumping but rarely were these events reported to police or other authorities. Farmers are reticent to approach a neighbour about environmental mismanagement preferring to lead by example. Optimal natural resource management was a combination of all stakeholders but with farmers taking more a primary role.

Not all farmers are convinced of climate change because climate variability is part of farming in Australia. Environmental regulations were seen as a necessary. However, any laws were considered too restrictive, inflexible, costly in time and lost productivity and insensitive to landholders' requirements across diverse environmental areas and industries. A fourfold typology of landholders' motivational postures towards compliance with environmental law was empirically derived: one associated with compliance, labelled "Aligned", and three associated with non- or creative compliance: one Disengaged, one Game playing and one Resistant. The typology demonstrated that motivational postures are related to place, jurisdiction and degree of regulatory alignment with the content, process and aims of regulatory interventions.

In the second study, individual case studies were undertaken in three states to examine the informal and formal order surrounding natural resource management. Farmers in all case studies appreciated that environmental aims were important and were doing much to protect the environment. In every case study area farmers were willing to acknowledge that there were landholders who were poor environmental managers. However there was a great deal of reluctance toward confronting these problems within the community. Instead, social norms work to maintain cohesion. Weed and pest management were everywhere targeted as important environmental issues. Time and cost were identified as barriers to doing more. The study found that many landholders were also concerned by formal regulatory approaches, particularly regarding land clearance regulation, especially in the New South Wales case study. Concerns were also focussed on issues and laws of more regional importance such as reef protection (in the Queensland case study) and water regulation (in the Victorian case study). There was not a great deal of trust placed in government. Farmers identified that government agencies had poor track records and had underperformed in environmental management generally. Farmers felt that regulations did not accurately reflect nor could be made sufficiently targeted to the particular environmental needs of individual holdings. There was also widespread disapproval of the increasing disconnect between regulators and farmers which farmers attributed to increasing urbanisation of the population, politicisation of environmental issues and professionalization of agency staff. Farmers felt that farming was a practice which was being unfairly stigmatised as environmental vandalism instead of being valued as a contributor to the national economy and future food security. Land clearance regulation caused the greatest concern for landholders.

Implications

- Many farmers are motivated by altruism to lead by example by implementing new practices that other farmers may emulate and were pleased when their local community recognised their efforts. Greater recognition is needed of farmers' contribution to environmental conservation rather than being unfairly blamed as the cause of all of Australia's environmental problems. Such recognition, particularly by government, would be in line with informal norms for farmers to lead by example which may encourage more sustainable practices.
- Greater acceptance of government environmental policy could be achieved if governments also lead by example and addressed weed and pest animal problems within national parks and state forests. This would be in line with social norms that land management is the owner's responsibility. With acknowledgement of the extent of the problem, the size of the area to be managed and scarce resources, it is suggested that establishing memorandums of understanding with sporting shooting clubs to deal with feral animal problems that arise within national parks and state forests will allow volunteers to provide a professional service while enjoying their chosen recreational pursuit.
- Social change has seen increasing numbers of hobby/lifestyle farmers, and urban encroachment into agricultural areas which creates a diversity in land uses and approaches to natural resource management which can lead to conflict within communities. Farmers' are willing to be inclusive and share their knowledge and advice with newcomers but often their efforts are in vain. There is a need for educational programs for farmers new to the industry and hobby or lifestyle

farmers to ensure they are aware of local environmental problems and the necessary practices for sustainable farming as well as the pertinent environmental laws and regulations.

- The infestation of weeds and pest animals due to mismanagement on neighbouring properties was defined by several respondents as a 'crime' as the time and financial cost of pest management is significant. With increasing public concern about environmental degradation, certain actions that negatively impact the environment are increasingly likely to be labelled deviant. It would be useful if the Australian Bureau of Statistics (ABS) gathered specific data on 'environmental crime'.
- Intent or wilful negligence were essential ingredients of what should be defined as criminal. Specifically, spray drift was more often seen to be accidental and therefore was not a criminal act. Rubbish dumping is a concern for farmers as it can injure or kill livestock and wildlife, cause pollution and impede biodiversity and revegetation, alter drainage courses and increase susceptibility to flooding and erosion, increase fire risk, and encourage pests. Tyres dumped on road sides were a particular threat for fire. Council charges for rubbish tips were the common reason cited for illegal dumping.
- Participants acknowledged the necessity for laws and regulations to cover the handling and use of chemicals and in many areas there was appreciation of programs such as Drum Muster. However, not all chemical containers are included in this program. There were calls for chemical companies to take more responsibility for the disposal of the chemicals they produce and sell.
- Water loss to properties downstream as a result of dams or structures erected to harvest water from waterways or from overland flows, was clearly defined as crime and participants urged governments to effect greater control in this regard. While water policy was criticised, water theft was little mentioned in the mail survey and in the field work. Yet there have been a number of reports of theft in Victoria and in the Bowen area. It may reflect a lack of awareness of thefts, a general or particular disinclination to comment, a refusal to acknowledge theft occurs when water is such a scarce resource, a recognition that some financially stressed farmers have no other choice, or a relative prioritisation of this issue as lower in the order of issues of concern. This is an interesting issue that requires further research.
- A number of social norms operating in rural communities which are relevant to natural resource management have been identified in this research. They include:
 - A strong belief in landholder's absolute property rights requiring others to respect those rights.
 - A commitment to good farm management and land stewardship.
 - A belief that landholders are responsible for management of their land and farm operation and therefore, how landholders manage is their own business.
 - A focus on leading by example, quietly, unobtrusively, to introduce new farming innovations or conservation practices.
 - An expectation that farmers work together to support each other and their community and be involved in community activities – and that includes newcomers.
 - Any disputes between neighbours to be resolved without involving formal law to maintain peace and harmony within the community. This may mean turning a blind eye to some types of deviance within the community.
 - A belief that compliance with environmental law is the right and proper thing to do.
- Understanding how these norms strongly influence landholders' behaviours is essential for developing future policy and programs. Voluntary compliance may be achieved where laws mirror pre-existing norms, and the law then obtains the benefits of informal sanctions and/or internalised motivators which work to enforce the desired behaviour.
- There was also recognition that there were farmers who were managing their land inexpertly, at great detriment to their neighbours, the environment, as well as themselves. The forces of social suasion here were muted, with the maintenance of community harmony seen as a higher

priority. Poor land management, particularly weed and pest animal management, was a major concern for landholders in each region as it often impacts upon neighbouring properties. Keeping the peace within the community was a strong norm requiring discrete management of these situations. Much of the time this meant 'put up and shut up' but with weed and pest management being a costly and time consuming task, mismanagement often reached a point where confrontation was deemed necessary. A 'quiet word' to the neighbour was the preferred option. Sometimes subtle social pressure is applied through gossip or innuendo to encourage change. In other situations, there are appeals to relevant authorities or industry organisations who can act as 'middle men' to address the issue. Confrontation was viewed as inappropriate in situations where all were in the same boat, or people were alternatively culpable for an equivalent action, or where there were mitigating factors. In all communities it was thought that farmers could not be held responsible where choices were limited by financial capacity rather than lack of will.

- Less tolerance was afforded newcomers to the area who lacked knowledge and understanding of good farm management. The norm requiring landholders to be responsible for land management means that newcomers are expected to know their responsibilities. Confronting newcomers such as hobby farmers was seen as justifiable as it had an educative function, and with fewer of the social costs attached to approaching long-term neighbours. While local farmers are willing to assist in this regard, they are frustrated when their efforts are ignored and newcomers become further alienated from the community. Social change is increasing in rural areas and social change reduces social capital which has implications for natural resource management.
- Landcare membership is falling and the organisation itself acknowledges they need to re-engage with traditional farmers. A number of informal institutions are taking the place of Landcare.
- Participants maintained farmers should take the lead in natural resource management but with support from government, science and industry. There is a need for more consultation with landholders in the development of environmental policy. In most areas, the growing social distance between government and landholders has led to a rise in informal community groups to address local environmental needs. There is a need for exploration of a framework of 'nested institutions' for natural resource management to maximise environmental gains as well as raise social capacity within rural communities.
- One clear message that resonated throughout the findings from the mail survey and in every case study area was farmers' lamenting of the loss of extension officers who remained in a district, knew the area and the environmental problems, and knew the people and were trusted and reliable sources of locally relevant advice. Farmers maintained that reduced resources for Departments of Primary Industry had led to the demise of this model of extension and they were disparaging about the current lack of services and information provided by government agencies. There was a strong call for a return to the earlier model. Extension officers can be an important conduit of government information and can be a link between the sometimes polarised views of farmers and policymakers on environmental issues.
- Social norms have their limits and participants agreed that formal laws have their place. The study found landholders accept that environmental laws and regulations are necessary but noted that the design and implementation of many of these laws are impractical, inflexible and restrictive and often irrelevant for local environmental conditions which alienates landholders and impedes productivity. 'One size does not fit all' was a frequent comment. Participants offered several recommendations to improve the regulatory approach:
 - Reassessment of aims and what type of outcomes are trying to be achieved, for example recognition of importance of agriculture in terms of food security; alignment of land use with land suitability; active management of both production and conservation areas; conservation and production as combined rather than competing aims.

- Increasing consistency in application of laws across sectors (mining etc.) and jurisdictions.
- Increasing flexibility to match local conditions and needs.
- Implementation to use collaboration and incentives as well as enforcement, such as supporting model farmers and best practice; educating and disseminating best practice; utilising local and applied knowledge as well as increasing use of expert knowledge; and prioritisation of enforcement and transparency of enforcement activity
- Rationalisation of regulatory processes to be less time consuming, costly, labour intensive.

Conclusions

Australian farmers are not the environmental vandals they are often reported to be. The majority are deeply concerned about environmental degradation and most have adopted sustainable farming practices and are actively involved in conservation projects on their land and in their local communities. Greater recognition of their efforts is needed by government and the public generally. Governments also need to recognise the effectiveness of informal social norms for encouraging best practice land management to work within this framework to encourage compliance with regulations governing natural resource management. With less blame and a more 'shared fates' approach, desired outcomes may be achieved. Lawmakers who do not appreciate the social conditions that foster informal cooperation will create a world where there is more law and less order.

Recommendations

Accordingly, the following recommendations are offered based upon the findings of this research:

- **Recommendation 1:**

That weeds and pests be actively managed on national parks and forests to demonstrate government capacity for land management.

- **Recommendation 2:**

That local government consider waving rubbish tip fees to address increasing problems with illegal dumping.

- **Recommendation 3:**

The government review fees concerning the recycling of tyres to address increasing fire risk with illegal dumping in rural areas.

- **Recommendation 4:**

That chemical companies take responsibility for the disposal of used containers.

- **Recommendation 5:**

That Drum Muster be extended to account for all used chemical containers.

- **Recommendation 6:**

That there be more consultation and working together between landholders and governments towards environmental conservation.

- **Recommendation 7:**

That more funding be provided for state departments of primary industry, particularly for the employment of agronomists at the local level. These should be people with a sound knowledge and practical experience of the area in which they work.

- **Recommendation 8:**

That there be greater co-operation between departments of primary industry and environmental agencies to reflect the view that environmental conservation and production are mutually beneficial rather than competing aims.

- **Recommendation 9:**

That the concept of 'nested institutions' be explored as a future model for more effective natural resource management

- **Recommendation 10:**

That there be support for farmers to undertake best practice and to 'value-add' to those farmers already undertaking best practice and beyond compliance activities by using these as educational 'hands-on' models for other farmers locally.

- **Recommendation 11:**

That there be support (education and incentives) for farmers who are prevented by short-term economic circumstance rather than lack of willingness to do more for the environment.

- **Recommendation 12:**

That there be targeted enforcement for landholders who despite financial capacity and provision of education maintain poor land husbandry.

- **Recommendation 13:**

That there be greater trust placed in community-generated initiatives and individual landholder innovations to foster social capital.

- **Recommendation 14:**

That less blame and a more shared fates appreciation that not just landholders are responsible and the whole nation has a common purpose in building an economically and environmentally sustainable future.

- **Recommendation 15:**

That governments work towards the confluence of informal and formal orders by identifying common ground with landholders and integrate the vernacular/local/practitioner knowledge as well as expert knowledge to adopt agreed aims and approaches for natural resource management.

- **Recommendation 16:**

That there be law reform in order to achieve simplification of process and uniformity of principle but flexibility of application to account for local biophysical and socio-economic differences.

- **Recommendation 17:**

That the continual improvement cycle for environmental law include greater practitioner based knowledge as well as greater expert knowledge with both streams also being used in educational programmes.

- **Recommendation 18:**

That there be greater commitment to demonstrating fairness and accountability in environmental law and regulation.

- **Recommendation 19:**

That there be consideration of a principle-based approach to environmental regulation drawing on multi-functional landscape and land capability approaches as well as a sharing of the responsibility of environmental health among all sectors of the Australian community.

- **Recommendation 20:**

That there be consideration in environmental law reform of the future of agricultural landscapes, rural communities and new industries in terms of agricultural restructuring, food security and environmental health.

- **Recommendation 21:**

That the ABS collect data on environmental crime victimisation.

1 Introduction

Environmental problems are not problems of our surroundings, but - in their origins and through their consequences - are thoroughly social problems, problems of people, their history, their living conditions, their relation to the world and reality, their social, cultural and political situation.

Ulrich Beck (1992: 81).

The purpose of this interdisciplinary collaborative research was to examine the complex social constructs that impact upon natural resource management within rural communities in Australia. The primary research questions were:

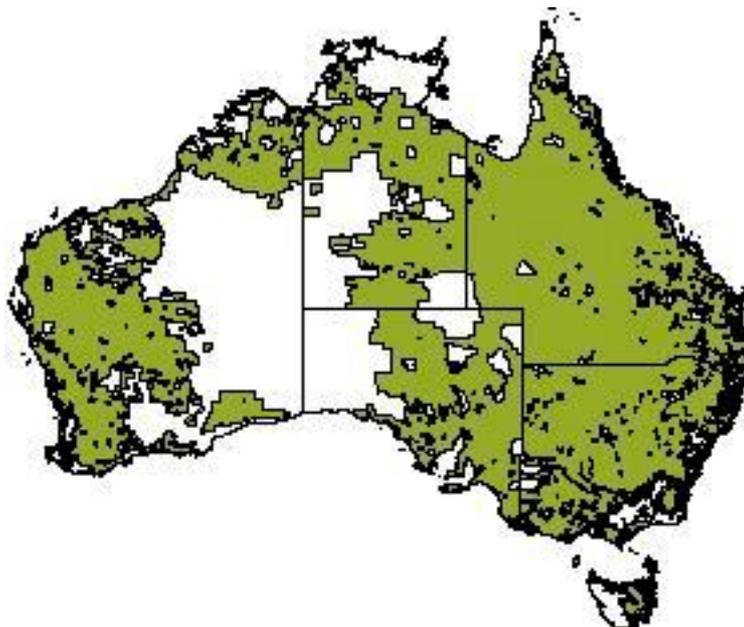
- What is the nature and extent of farmers' involvement in natural resource management on their land and in their community?
- What are the physical, ecological and social barriers to farmers' adoption of sustainable practices?
- What is the nature and extent of environmental crime victimisation at the individual farm level?
- How do informal social norms operating in farming communities influence natural resource management and maintain social order?
- How do farmers view and respond to formal environmental laws and regulations?
- What is the optimal management structure for natural resource management in rural Australia?

1.1.1 Agriculture in Australia

Agricultural production in Australia is primarily extensive pastoral and cropping activities although intensive livestock production and horticulture are growing in importance (ABS 2009). The main industries are beef cattle, dairy cattle, sheep, grain growing, or a combination of two or more of these. High variability in river flows and annual rainfall, which is characteristic of the Australian environment, means many crops and pastures are dependent on irrigation. Rice, grapes, vegetables, cotton, fruit (including nuts) and sugar cane are the main irrigated crops. In 2005-06, almost 30% (45,100) of all agricultural establishments reported irrigation activity although, the total area of land irrigated is less than 1% of the total land used for agriculture (ABS 2009).

Although agriculture now only contributes 3% of gross domestic product, the industry remains economically important to Australia. It exports two-thirds of production: export earnings for 2009-10 are forecast to be \$32 billion, a rise from \$31 billion in 2008-09. Important export commodities are wheat, barley, canola, lupins, peas, rice, raw cotton, sugar and lamb. The value of Australian farm exports is expected to be worth AUD\$34 billion in 2013-14 (ABARE 2009). It is also the sector

which manages the majority of Australia's landscape, occupying 60% of its 7.7 million square kilometres and accounts for 65% of Australia's water consumption (ABS 2009).



Land use in Australia (ABS 2009)

There were 141,000 agricultural operations Australia-wide as at 30 June 2008 (ABS, 2009). Drought and low commodity prices had realised a 6% fall in the number of agricultural operations over the previous year. The average sized property ranges between 100 and 499 hectares. These 48,500 holdings comprise 33% of all farms in Australia and consist of mostly beef cattle, sheep, grain and dairy operations (ABS, 2001). Holdings of less than 49 hectares account for 21% (31,200) of all farms and produce cattle, grapes, fruit, vegetables and plant nurseries. Farm holdings of over 2,500 hectares account for 14,100 (10%) of all farms and are mostly confined to large scale grazing and cropping operations (ABS, 2001).

1.1.2 Agriculture and the environment

Australia has a fragile environment. Soils are geologically old and apart from a few basaltic and alluvial soils, the soil structure is insubstantial and relatively infertile by world standards with deficiencies in phosphorus and nitrogen (FIFA 2002; ABS 2009). Australia is the driest inhabited continent even though some regions have annual rainfall of over 1200 millimetres. One third of the continent is desert and the other two-thirds are arid or semi-arid. Hot summers and an abundance of sunlight create high rates of evaporation (ABS 2009). Rainfall is one of the most variable in the world. On average there are about three good years and three bad years out of ten. This is largely due to the Southern Oscillation effect (BOM 2009). However, severe drought has prevailed over the past decade particularly in the eastern states, which has significantly reduced agricultural production. Farming within this environment is therefore a challenge.

The sustainability of agricultural productivity and the rural (and urban and overseas) communities which depend on them are threatened by land degradation and desertification, water scarcity and quality, salinity, climate change, habitat and biodiversity losses occasioned through land clearance, and natural disasters such as bushfire and floods. The future productivity of Australian farms in the face of continued decline in land degradation and climate change, the need for food security and terms of trade, will depend on the ability of landholders to adopt sustainable farming practices. Governments contribute to this end by regulating or taxing damaging activities, providing information, by persuasion, market-based instruments for natural resource management and government sponsored programs such as the National Landcare program (ABARE 2006).

However, concerns remain that landholders are not adopting sustainable land management practices in response to the well documented evidence of environmental decline. For example, Australia is listed in the top land clearing nations and land clearing is the chief driver of biodiversity loss and continues for urban expansion and agricultural conversion. Land clearance is also an important producer of greenhouse gases and a major cause of the chronic decline in the quality of land and water resources, and the sustainability of both natural environments and production landscapes (FAO 2001).

There have been evidence-led policy changes but these have been difficult to implement in practice and have met with resistance from lobby groups and the community. Agricultural lobby groups have been particularly vociferous in their criticisms of the impacts of environmental legislation on farmers. This study was undertaken in order to find out what farmers think about environmental sustainability and governance and what practices they are implementing on their farms for environmental health.

1.2 Research objectives

The primary objective of this research was to examine the impact of formal and informal laws on natural resource management in rural communities. The study also gathered information on farmers' activities that contribute to environmental sustainability on their properties and in their communities as all too often farmers are blamed for environmental degradation, and the positive contribution that farmers make to environmental sustainability is overlooked. A further objective was to conduct the first empirical victimisation study of environmental crime at the individual farm level.

Current research, policy and programs tend to overlook the importance of understanding the nuances of the social environment of rural communities and as a consequence, many regulations and programs for environmental protection remain ineffective. The study sought to identify the social norms pertaining to environmental management in rural communities and the way residents maintain social order. Farmer attitudes to climate change, environmental laws and regulation, and compliance with informal and formal laws were explored.

The specific objectives of the study were to:

- document the nature and extent of farmers involvement in environmental conservation on their land and in their community
- identify the barriers to adoption of natural resource management
- gather information on the extent and nature of environmental crime on farms and the relationship between victimisation and physical deterrence factors on farms
- assess the extent of reporting of these incidents to authorities and the reasons for not reporting
- identify innovative institutional arrangements for natural resource management at the local community level
- identify farmer attitudes towards environmental conservation issues, and
- identify farmer attitudes towards environmental laws and regulations.

Two theories, Opportunity Theory (Cohen, Kluegal and Land, 1981) and Braithwaite et al's (1994) theory of Motivational Postures were employed to guide the research process. The study also drew upon a range of theories from several disciplines to clarify the findings and explain the complexities of natural resource management within the dynamics of farming communities.

This report provides policy makers with insights into farmers' attitudes to the formal and informal laws pertaining to natural resource management and the way the social structure of farming

communities' impacts upon the adoption of sustainable farming practices. The findings will assist future development of policy and programs to prevent future land degradation.

1.3 Structure of the report

Due to the complexity of this study, there is no chapter devoted to a review of the literature. Instead a literature review is provided as background to the specific topic addressed within each chapter. The literature crosses several disciplines including Law, Criminology, Rural Sociology, Social Psychology, Economics and Natural Resources. Each discipline adopts a different approach to discussions of natural resource management, social order, farmer attitudes to the environment and compliance with environmental regulations. The literature searches utilised the World Wide Web, the University of New England's Library and various electronic databases as well as published information gathered during the fieldwork.

The report is presented in two parts. The following chapters report on the first part of the study: the national mail survey of farmers. In Chapter Two, the methodology employed for the mail survey and follow-up interviews is described and a profile of the respondents to the survey provided. In chapter three, respondents' descriptions of environmental management on their land are presented. In Chapter four, environmental crime victimisation on farms is examined. In Chapter five there is a discussion on the way communities manage environmental mismanagement within their district. Chapters six to eight examine farmers' attitudes to a range of environmental issues including climate change, natural resource management and environmental laws and regulations. The final discussion of the main findings and conclusions to the first study are presented in Chapter nine. In Part Two, the findings of the case studies conducted in Victoria, New South Wales and Queensland are presented.

Part One: National Mail Survey of Farmers

2 Part 1: Introduction

In this chapter, the research approach for the first part of the study is outlined. Data were collected using a mailed self-administered survey and through follow-up telephone interviews with survey respondents. The research employed a triangulated approach incorporating primary and secondary data collection and analysis complimented by telephone interviews conducted to gather further information and enhance understanding of the research questions.

2.1 Advisory group

The research project was guided and informed by an advisory committee, which included representatives from the NSW Police Service, the NSW Department of Environment and Climate Change, NSW Farmers' Association, Agribusiness Association, and Greening Australia. Advice was also received from Professor Joseph Donnermeyer, a rural sociologist from Ohio State University. This group offered advice, access to key informants, critiqued the questionnaire and reviewed drafts of the final report.

The research approach and questionnaires were approved by the University of New England's Human Research Ethics Committee (Approval No. HE08/053, valid to 6 May 2009).

2.2 The mail survey

2.2.1 The sample

The nationwide mail survey of farmers was conducted in the winter of 2008. A sample size of 5,267 producers was identified from the 137,968 primary producers located across Australia as at the 2006 Census (ABS 2009). The sample was stratified by state and by industry type by taking 2% of the number of producers by industry and by state listed in the Australian Bureau of Statistics data on Agricultural Commodities (ABS 2009). Table 2.1 presents the sample profile and response rate.

The names of participants were randomly selected from listings of farmers in Telstra's Yellow Pages and on various internet sites. While this purposeful sample is biased to the extent that it represents only those producers who are listed in the Yellow Pages or on the internet, it does provide access to the target population for the survey, that is, producers across a range commodity types. Researching farmers in the UK, Errington (1985) concluded that this method provides an acceptable sampling frame.

Table 1.1: Sample profile (N=5267)

Livestock	Survey Sent	Response rate	Crops	Survey Sent	Response rate
Graziers	2561	37%	Grapes	266	34%
Dairy cattle	368	36%	Cotton	26	35%
Chicken	53	34%	Sugar cane	173	33%
Pigs	38	34%	Fruit	505	34%
Horses	100	23%	Farmers	1126	39%
Alpacas	33	61%	Olives	14	43%
Deer	6	33%			

2.2.2 Survey distribution

The mail survey was designed and reviewed by the Advisory Board and the piloted twice with two separate groups of 100 farmers. The final survey was mailed in the winter of 2008. A covering letter explained the purpose of the study, participants' rights and assurance of confidentiality. A reminder notice and questionnaire were sent to non-respondents after four weeks. Four weeks later, a one-page 'Close of Survey' form containing some key questions was mailed to persistent non-respondents.

The purpose of the 'Close of Survey' form for persistent non-respondents was to determine the extent to which the original set of respondents were truly representative of farmers' experiences and to provide a means for adjusting or weighting cases for estimates to the population. The aim was to address any response bias within the sample, since it was possible that respondents were largely those who had a high level of concern for the environment. The one-page form contained key questions such as environmental crime experiences, environmental problems on farm and conservation practices. Question wording was exactly the same as that used in the main survey. A covering letter explained the need to have a few questions answered by those who were unable to respond to the main survey so as to ensure that the data were a true representation of natural resource management on farms.

2.2.3 Response rate

The overall response rate to the mail survey was 41% allowing for 715 'return to senders' where respondents had left the district (reflecting the high number of farmers who have recently left farming due to drought and economic decline). The sample provided 1248 respondents and their properties for analysis on the main survey and a further 678 respondents to the close-of-survey questionnaire. Figure 1.1 displays the responses by state.

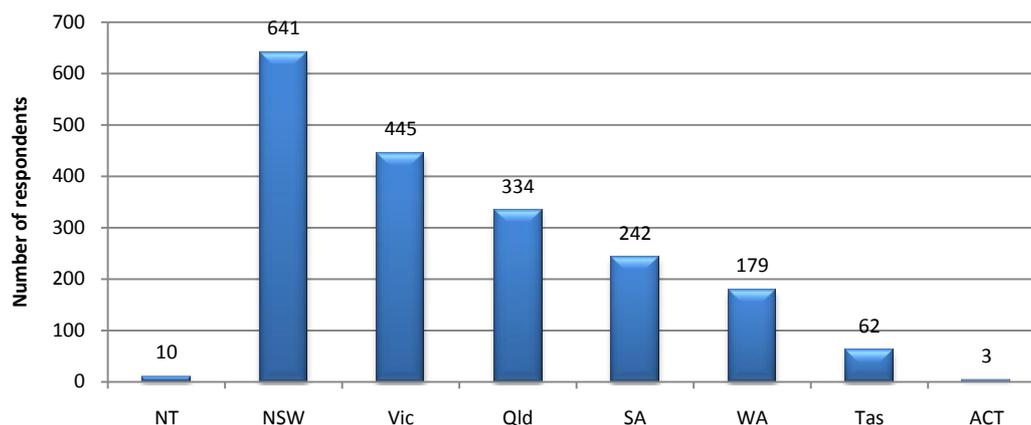


Figure 1.1 Distribution of responses by state (N=1926) (10 missing data)

2.2.4 The questionnaire

Data was gathered on the following concepts within the survey.

- **Demographic information**

Farmers provided details on the type of commercial agricultural production they were engaged in along with some geographical and topographical information about their properties. They also provided demographic information about themselves and their farm business.

- **Environmental Conservation on farms**

Participants were asked about the main environmental problems they faced on their property. They were asked to indicate the types of best-practice land management they employed and if they had received financial support for these activities. They were asked whether they had preserved a conservation area on farm and their reasons for doing so. They were also asked about any barriers to implementing environmental improvements and whether their land had been impacted by land use changes made on neighbouring farms. Similarly they were asked if any land use changes they had made had impacted on neighbours.

- **Environment crime victimisation**

The extent and nature of victimisation of environmental crime on farms was sought. Participants were asked to indicate whether they had experienced crime in the previous two years and whether or not they had reported the crime to the police or to the authorities, if they had discussed it with others in their community and if they would describe the crime as serious. Farmers were given the opportunity to describe the incident and indicate who or what they blamed for these types of offences. The reasons for not reporting a crime were sought

- **Social Capital**

Participants described *Social Change* in their community and whether they considered these changes to be positive or negative.

Membership of environmental conservation groups both formal and informal was ascertained. The range of types of groups was also identified.

Collective efficacy: A measure of the level of guardianship at the community level drew upon a scale developed by Sampson, Raudenbush and Earls (1997) to measure collective efficacy. Respondents were asked how strongly they agreed (on a four-point agree-disagree scale) that: *People around here are willing to help their neighbours*; that: *This is a close-knit community*; that: *People in our*

community can be trusted; that People in this community generally don't get along with each other and that: People in our community do not share the same values. The last two statements were reverse coded.

- **Place Attachment**

Place Attachment or the human bond with the physical environment (Low and Altman 1992) was assessed by an eight item instrument that participants rated on a four-point agree-disagree scale) which identified what they most valued about living in their community. The scale drew on previous research on place attachment (Williams, 2000) which recommended asking respondents to rate the value of the major components of places (i.e., social, community, natural landscape).

- **Natural resource management**

Participants were asked to rate property owners, and various private and public agencies according to the degree to which they believed they were responsible for environmental management. Responses ranged from *Mainly Responsible, Partially Responsible* to *Least Responsible*.

Participants were also asked to rate various institutions on a five point Likert Scale according to their effectiveness for environmental management.

- **Attitudes to environmental issues**

Participants rated a series of attitude statements concerning various environmental issues on a five point *Strongly agree / Strongly disagree* scale. Seven statements were drawn from a longitudinal study of farmers' attitudes to the environmental and land management issues conducted in 1991 and 2000 (Reeve and Black 1993; Reeve 2001). These items allowed comparison of attitudinal change on these issues over the past 18 years and to identify any new areas of concern for farmers.

Respondents also rated six statements pertaining to environment risks from the impacts of climate change also on a five point *Strongly agree / Strongly disagree* scale. These questions were designed to elicit an understanding of how farmers' perceive and cope with the prospect of environmental degradation as a result of climate change when there is little knowledge of how, when, or where this may occur. This instrument drew upon a scale devised by Lehman and Taylor (1987) which produces a fourfold typology of locus of control by perception of risk of a climatic event. This scale was then used to analyse the responses to questions on environmental management.

- **Attitudes to environmental laws and regulations**

To explore personality traits that influence compliance with environmental laws and regulations, ten statements were adapted from Braithwaite et al's (1994) 34 item Motivational Posture scale, to assess motivation postures towards environmental law among Australian farmers. The scale contained ten items to test the five postures defined by Braithwaite of commitment, capitulation, resistance, disengagement, and game playing. An additional question pertaining to the cost of compliance with environmental law was added. Participants rated their level of agreement or disagreement for each of the eleven statements across on a five point *Strongly agree / Strongly disagree* scale.

Two further questions sought data on farmers' access to information about environmental regulations and about the problems regulations cause for farm businesses.

- **Additional comments**

Space was provided for respondents to comment on any aspect of the survey. These comments are included within the report to highlight or to explain particular findings.

2.3 Secondary data sources

For the analysis, data were classified by state and by degree of remoteness as classified by the Accessibility/Remoteness Index of Australia (ARIA within the ASGC)(ABS 2006a). This index classifies communities into five categories of remoteness based on level of accessibility to a wide range of goods and services and opportunities for social interaction:

- Highly Accessible (ARIA score 0 to 1.84) – relatively unrestricted;
- Accessible (ARIA score >1.84 to 3.51) – some restrictions;
- Moderately Accessible (ARIA score >3.51 to 5.80) – significantly restricted
- Remote (ARIA score >5.80 to 9.08) – very restricted; and
- Very Remote (ARIA score >9.08 to 12) – very little accessibility

Data are also drawn from the Australian Bureau of Statistics as required to compare and contrast the primary data collected.

2.4 Statistical analyses

Data analysis was performed using the *Statistical Package for the Social Sciences* (SPSSx). Only non-parametric statistical analyses were used as characteristic of social data, most variables were highly skewed or were of a binary nature. The primary tools employed were chi square analyses to test relationships between variables and binary logistic regression to identify factors predictive of environmental conservation practices or victimisation.

The analyses were weighted to account for non-response bias in the data. As noted above, within the main survey sample of 1248 respondents, it is very likely that a greater level of environmental concern or victimisation experiences encouraged their response to the survey. The one-page follow-up close of survey questionnaire was used to provide a means of estimating the extent of non-response bias. As the close of survey questionnaire did not elicit a response from all non-responders it is impossible to completely correct for non-response bias. However, it can be assumed that those non-responders to the main questionnaire that responded to the one-page follow-up are likely to share some of the characteristics of the hard-core non-responders. Comparisons conducted between the responses to questions that were common to both questionnaires were then used to develop a weighting procedure to correct for the over- and under-representation of respondents in the main survey data.

Significant relationships between propensity to respond (to the full questionnaire or to the close of survey questionnaire) and the answers given to questions that were common to both questionnaires were identified with a chi-squared test of independence of factors. The requirement to maintain adequate cell counts meant that only the two variables with the strongest relationship to type of response (full or close of survey questionnaire) could be used in weighting. These were a question as to whether or not farmers preserve a place on their land for environmental benefits ($\chi^2=87.89$, d.f.=1, $p<0.0005$) and an attitude question regarding compliance with environmental laws and regulations ($\chi^2=30.71$, d.f.=4, $p<0.0005$).

The post-stratification case weights and cell sizes are shown in Table 1.2. It can be seen that the weights do not exceed 2.5, the value beyond which high weights are normally truncated. Also the two cells with counts less than 30 have weights close to 1, which means there is no possibility of a small number of respondents being given undue emphasis in the weighted results.

The weighting procedure was primarily employed within the analyses where the findings were generalised to the farming population across Australia. However, where the focus was on relationships between variables, unweighted data were used to avoid compromising the validity of tests of the statistical significance of these relationships.

Table 1.2: Post-stratification case weights and cell sizes used to adjust for non-response.

(The upper figure in each cell is the case weight and the lower figure is the number of respondents to whom this weight is applied.)

Have preserved a place for environment	Compliance with environmental laws				
	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Yes	1.3105990	1.1100090	1.2783948	0.9383381	1.0286966
N	104	340	86	37	10
No	1.0577324	0.8323897	0.8089915	0.7642439	0.9644031
N	62	319	151	53	12

2.4.1 Telephone Interviews

The initial mail-out of the survey included a letter inviting farmers to participate in a telephone interview to discuss the issues in greater depth. Twenty-eight telephone interviews were conducted with 22 males and 6 female participants. A structured interview schedule comprising mostly open-ended questions guided the interview process. The interviews took an average of 45 minutes to complete. Information was gathered on farmers' experiences of environmental crime. The interviews also sought participants' ideas about possible solutions to non-compliance and management of natural resources in farming communities. Attitudes to environmental laws and regulations were explored in depth.

Telephone interviews were also conducted with various professionals who also had knowledge on environmental conservation on farms and compliance with environmental regulations. These included representatives of farmer organisations and agricultural industries. Information was sought to clarify specific issues that had emerged in the course of the research.

2.5 Profile of the sample of respondents to the mail survey

2.5.1 Farm operators

The main survey sample of 1248 respondents included 993 males (80.4%) and 242 (19.6%) females. This means that males are over-represented as approximately one third of Australian farmers are women (ABS 2006a). The ages within the sample ranged between 21 and 91 years (Median 58yrs; Mean 57.51 yrs, SD 12.28 yrs). This is older than the national average for farmers of 52 years as at the 2006 Census. However the national average of farmers older than 65 years of age is 18% and the proportion under 35 years of age is 10% (ABS 2008) and current sample has a proportion of 25% over 65 and 17% under the age of 35. A longitudinal study of Australian farmers conducted in 1999 and 2000 (Reeve 2001) observed that the proportion of farmers over the age of 60 years had increased from 24.1 to 30.4 per cent. In the present study, those aged 60 and above comprised 42.5% of the sample. Figure 1.2 presents the range of ages within the sample.

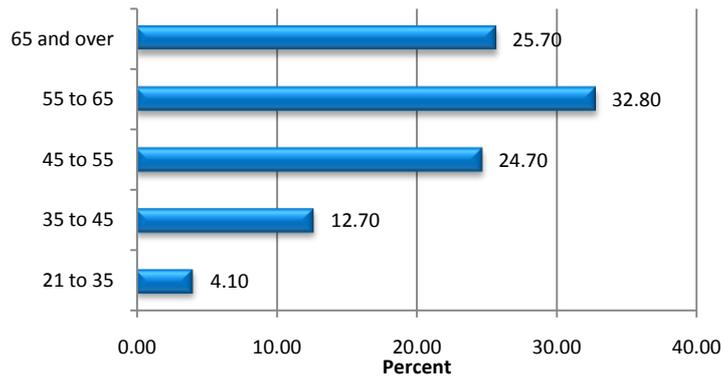


Figure 1.2: Age profile of the sample (N=1248)

Almost all were farm owners 1143(91.6%) while 55(4.4%) were farm managers and the remaining 25 (2%) had other arrangements such as share farming. Respondents had been farming their current property between one and 90 years (Mean 37.18 yrs, SD 18.85yrs). Forty three per cent had lived in their district between 20 and 50 years, while 39% had been there most of their lives or 50 years or more. Only 19 farmers (1.5%) were relative newcomers to the district (less than three years). The greater proportion (60.6%) had other family living within the district. Just over half (56.6%) were on land previously owned by relatives.

The greater proportion of farm businesses 739(61%) were family partnerships, 228(18.8%) were private or family companies while 197(16%) were sole operations. The remaining 47 (4%) included public companies, family trusts or other types of partnerships. Just over half 734 (61%) received the majority of their total net income from farming, while 170(14%) received between half and 85% of their income from farming, 168 (14%) received between 15 and 50% and 141 (11%) received less than 15% of their total net income from farming. Equity in farm properties varied between less than 50% for 49 respondents (4%); between 50 and 69% for 161 respondents (13.5%); between 70 and 89% for 373 (31%) and more than 90% (the property is virtually debt free) for 608 (51%) of the respondents. This suggests that those farmers who were inclined to respond to the survey were more likely to be in a sound financial position.

Practical experience working on the land and attendance at agricultural field days and workshops were cited as the main sources of skills training in agriculture. Respondents' years of practical experience on the land ranged between two and 86 years (Mean 36.75; SD15.01) (See Figure 1.3). The proportion of farmers with higher degrees is increasing. Just over 21% had completed part or all of a university or agricultural college degree. Previous national studies of Australian farmers (Reeve, 2001) found, the proportion of respondents with a tertiary or postgraduate qualification had increased from 5.6% in 1991 to 13.1% in 2000.

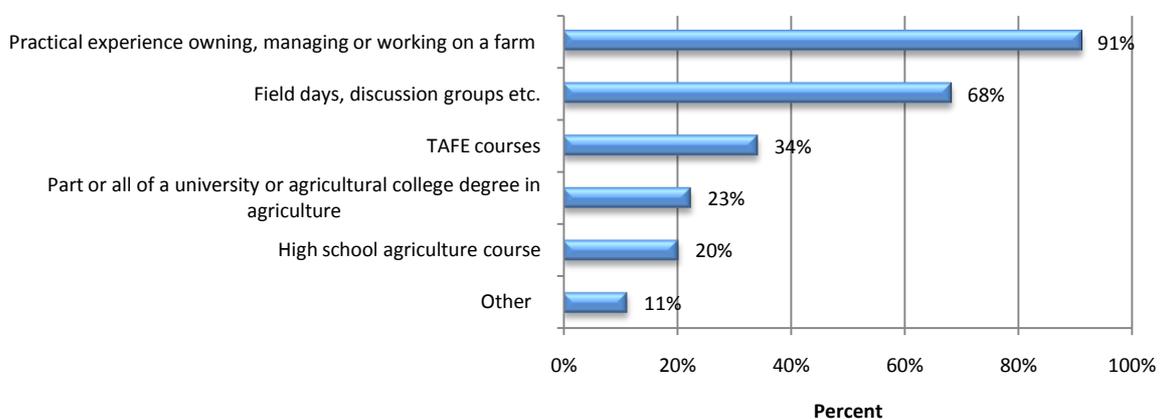


Figure 1.3: Farm experience (N=1248) (Weighted)

Future plans for the property mostly involved building the farm business (64%) (Fig. 1.4). Just over half had plans for the intergenerational transfer of the farm on retirement (56.6%). This may be a reflection of the fact that (56.6%) of the respondents reported that their property had been previously owned by relatives.

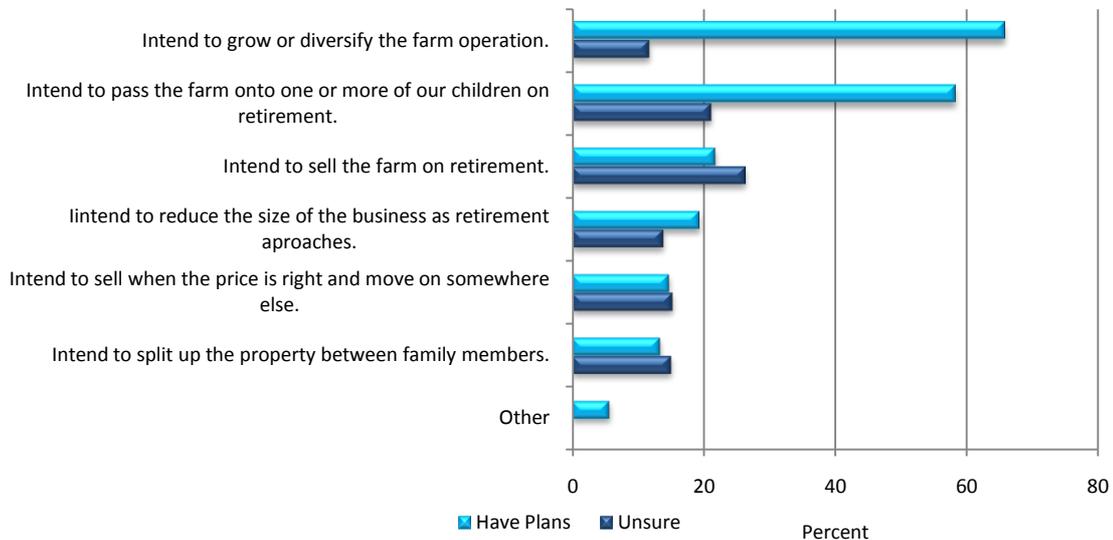


Figure 1.4: Succession plans (N=1248) (Weighted)

2.5.2 Property size

The size of the properties ranged from .40 hectares to 833,000 hectares (Median 625ha; Mean 10,585; SD 57,935ha). Figure 1.5 shows that most were smaller holdings with the greater proportion between 100 and 500 ha. This is in line with national data on average sized property ranges between 100 and 499 hectares (ABS 2001).

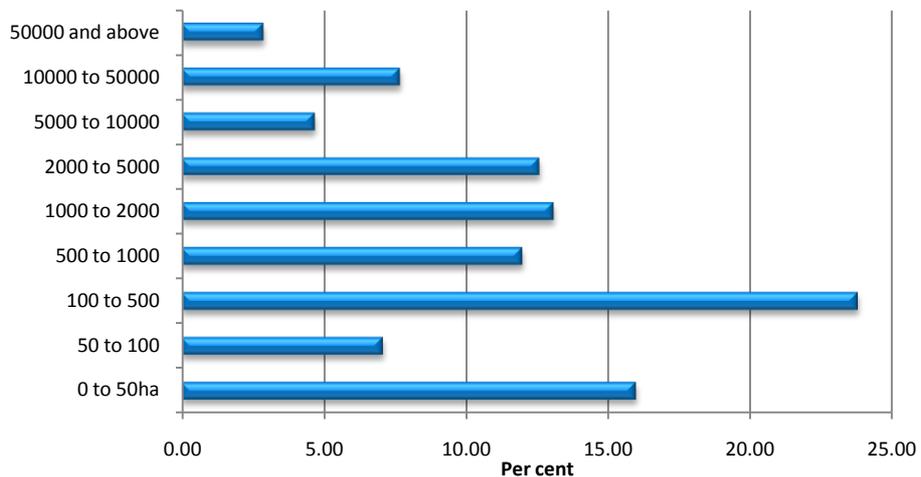


Figure 1.5: Farm size (N=1926)

Table 1.3 displays the types of tenure across the main sample. Freehold tenure was common to the majority of properties.

Table 1.3: Land tenure types across the main sample

	Total Hectares	Freehold (N=1335)	Crown Lease (N=201)	Lease (N=175)	Agistment (N=25)	Share Farm (N=31)	Other (N=13)
Range (Ha)	.40 to 833,000	1 to 800,000	.40 to 700,000	0 to 28,328	1 to 14,164	5 to 4,047	1 to 40,469
Mean (SD)	10,585.17 (57,935.57)	3,117.93 (25,588.76)	36,832.12 (105,539.46)	884.07 (2789.54)	1293.95 (3,340.63)	516.56 (857.7)	9,192.5 (13,459.3)

2.5.3 Commercial agricultural production

There were equal proportions of livestock only 763 (39.6%) and mixed farming operations 767(39.8%). Only 314 (16.3%) of properties were cropping only enterprises. Figure 1.6 displays the different types of agricultural enterprises across the sample. Beef was the most common type of production. The 'other' stock categories included bees, donkeys, aquaculture and rabbits. 'Other' crops comprised turf, seed, flowers and herbs.

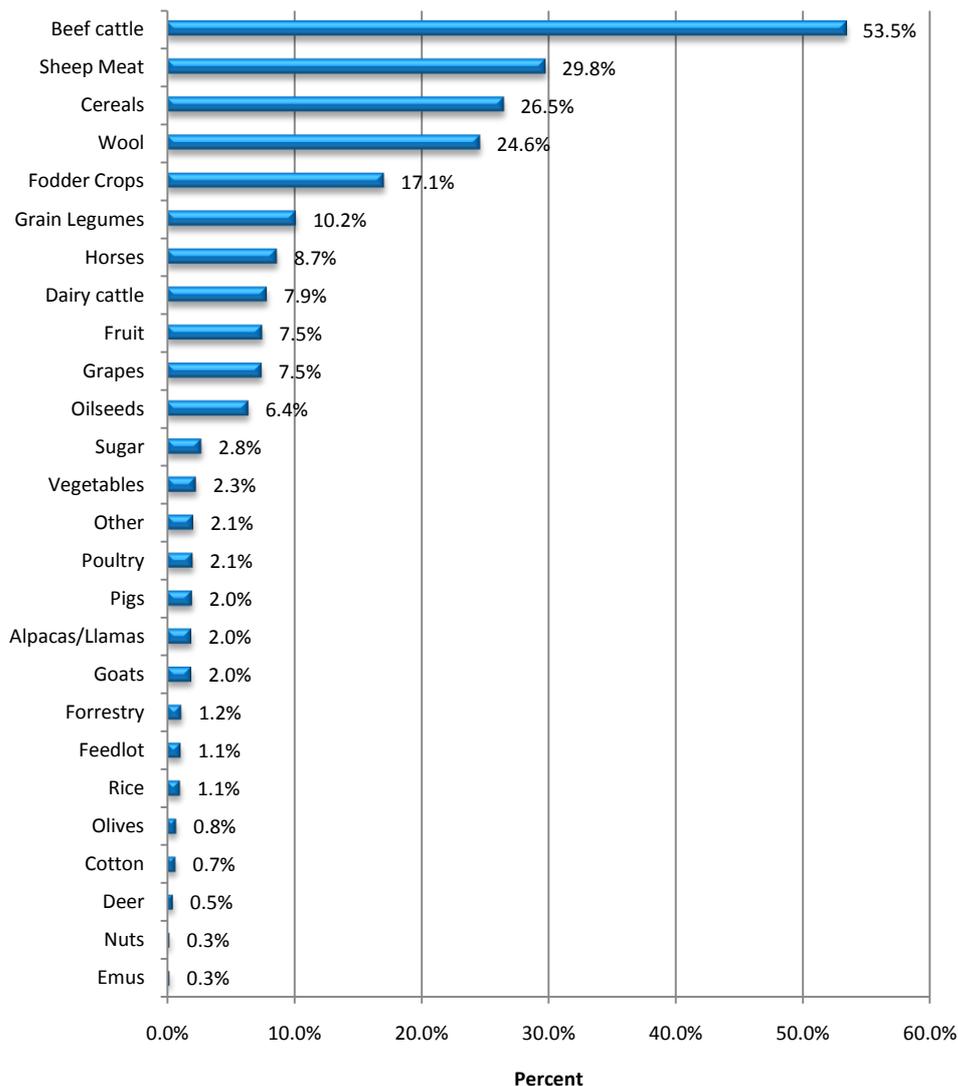


Figure 1.6: Agricultural enterprises across the whole sample (n=1926).

2.6 Summary

This chapter provided an overview of the methods by which the self-report mail survey of farmers and the telephone interviews held with farmers and various key professionals were conducted. A profile of the sample of respondents to the survey and of their properties was provided. The following chapters present an overview of the findings of the analysis of the data collected by these methods.

3 Environmental Management on Australian Farms

3.1 Introduction

Land degradation is one of the most critical environmental issues facing Australia. Gretta and Salma (1997) define land degradation as “the decline in the biological productivity or usefulness of land resources in their predominant intended use... stemming from human activity”. Forms of land degradation include salinity, erosion, chemical contamination and changes in soil structure. Farming in this environment requires the use of superphosphate and nitrogenous fertilisers particularly for pasture and cereal crops. While the processes resulting in degraded land are often natural phenomena, the term ‘land degradation’ used here refers to the anthropogenic acceleration of these processes and the consequent impacts on agricultural productivity (Haw et al 2000). Nutrients are continually lost from soil in plant and animal products. In addition, nutrients that are naturally occurring or applied as fertiliser are unavoidably lost to air and water (FIFA 2002). Other farming activities that can damage the environment include the over extraction of water and depletion of groundwater; run off from intensive livestock operations or misuse of chemicals which can pollute soil or waterways; soil erosion or degradation; and land clearance for cultivation or intensive grazing which can destroy wildlife habitat and threaten biodiversity (Reichelderfer, 1991).

Future productivity in Australian agriculture is dependent upon widespread adoption of sustainable farming and grazing practices that reduce the incidence of land degradation (Reeve et al., 2000). *Sustainable agriculture* involves farming systems that are environmentally sound but remain profitable, productive, and compatible with socioeconomic conditions (Pesek, 1994). While there has been substantial improvement in natural resource management by mining, forestry and manufacturing industries, progress in agriculture has been less than ideal (Reeve et al., 2000). Furthermore, with the increasing scale of potential impacts from climate change, there is greater urgency for farmers to minimise the impact of farming systems on the environment (Howden et al 2007).

The first part of the analysis presented in this chapter, sought to identify the nature and extent of sustainable farming practices conducted on farms and whether farmers had implemented any additional conservation measures to satisfy their own desire to improve the environment. This information was important to gather as all too often farmers are blamed for environmental degradation, and the positive contribution that farmers make to environmental sustainability is overlooked. In this chapter, a review of the literature on the factors that influence farmers’ adoption of sustainable practices is presented and the findings from the analysis of the survey data concerning environmental conservation on farms is outlined and discussed.

3.2 Background

Australia wide, concerns about environment degradation have pressured industry groups to develop voluntary environmental codes of practice to demonstrate that the environmental risks from farming activities are being addressed (Geno 2000, Heisswolf et al 2003). National environmental programs, such as the National Landcare Program and the National Action Plan for Salinity and Water Quality have encouraged landholders to adopt sustainable practices through information provision, social processes and financial incentives (Pannell et al 2006). While some practices have been readily taken up by landholders, particularly those that address on-farm issues such as lime application for acid soils or no-till farming for reducing erosion and improving soil structure, in general, adoption has been limited (Pannell et al 2006; Heisswolf et al, 2003; Reeve et al 2000). Adoption is constrained by the fact the recommended practices are voluntary and there is a lack of incentives and resources for landholders to implement changes (CRC Reef research 2003).

3.2.1 Factors influencing adoption

There has been a plethora of research into the factors that influence farmers' adoption of new innovations across a wide range of disciplines (e.g. Rogers, 2003; Feder and Umali, 1993; Feder et al., 1985; Lindner, 1982; Pannell et al., 2006; Webb, 2004; Cary et al., 2002; Guerin and Guerin, 1994; Marsh and Pannell, 2000). In one of the best reviews of the cross-disciplinary literature on this issue, Pannell et al. (2006) identified some broad consistent themes. In particular, landholders are unlikely to change their practices unless the proposed changes are consistent with their goals, which include material wealth and financial security; environmental protection and enhancement (beyond that related to personal financial gain); social approval and acceptance; personal integrity and ethical standards; and the need for balance in work and lifestyle (Pannell et al., 2006; Cary, et al., 2002). Pannell et al (2006) conclude that adoption is based on landholders' subjective perceptions or expectations rather than on objective factors. These perceptions depend upon the characteristics of the practice to be adopted and the process of learning and experience as well as the characteristics and circumstances of the landholder within their social environment.

- **Characteristics of the practice**

Drawing on Rogers (2003), Pannell et al (2006) delineated two factors that facilitate adoption of a recommended practice; the *relative advantage* of the practice or the net benefits of adoption, and its *trialability*, or the ease of the adoption process. Rogers (2003) maintained that adoption depends upon the relative advantage of a particular innovation compared with competing innovations, its compatibility with a landholder's existing production system, its level of complexity, how easy it is to trial and how easy the results from the trial can be discerned. Pannell et al (2006) add that relative advantage depends on the landholder's particular goals and the biophysical, economic and social context where the innovation will be used. Relative Advantage is affected by geographical location, government policy, and the costs, benefits and risk associated with adoption in the short and long term. When the advantages of sustainable practices are observable or can be trialled on a small scale prior to full implementation, it minimises risk which facilitates adoption (Webb 2004; Cary et al 2002; Pannell et al 2006). If an innovation changes the social standing of people within the local culture it can accelerate or retard the rate of adoption (Pannell et al 2006).

Practices that are not profitable for a farm business may only be adopted on a small scale, or adopted only by farmers with strong conservation goals. Consequently environmental benefits are more likely to be achieved if the practices provide a commercial advantage to producers.

- **Individual characteristics**

Personality and individual characteristics influence a landholder's goals and therefore can influence the capacity to adopt an innovation. Some of these characteristics include:

- **Age:**

The relationship between adoption and age, stage of life or experience is complex (Rogers 2003; Cary et al 2002; Webb, 2004; Pannell et al 2006). Younger farmers are more likely to be aware of land degradation on their property and recognise the need to adopt conservation practices (Fenton et al. 2000). However, older farmers may have greater levels of experience and skills to adopt sustainable practices (Anosike and Coughenour 1990 in Pannell et al 2006). If there is no planned intergenerational transfer of the property and if the sale of the property is unlikely to realise the benefits of conservation practices, older farmers may have less incentive to implement changes to management practice (Gasson and Errington 1993 in Pannell et al 2006; Stanley et al 2005). Age can be related to physical health which may also influence adoption (Pannell et al 2006).

- **Education:**

There is also no clear relationship between formal education and adoption although education enables ability to earn off-farm income which is linked to increased farm incomes (Kilpatrick et al. 1999). Kilpatrick (2000) posits education has a catalysing impact on farmers' abilities and levels of interest in improving farm practices. Education may ensure the limitations of the practice are recognised which can reduce or delay adoption (Marsh et al. 2006). Pannell et al (2006) suggest that a farmer's level of education is less likely to be a predictor of adoption than their participation in specific relevant training courses, which are more likely to be the preferred style of learning for farmers (Kilpatrick et al. 1999; Cary et al 2002; Webb, 2004; Pannell et al 2006).

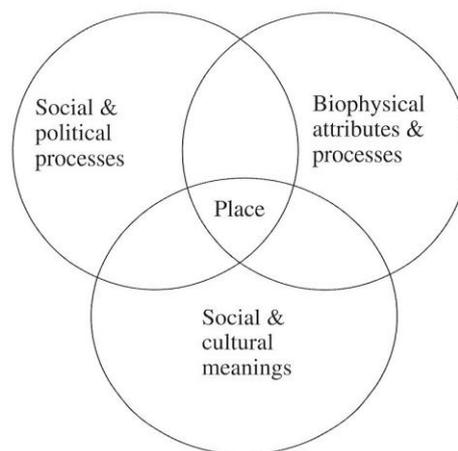
- **Personality:**

An individual's personality characteristics, such as conscientiousness or agreeableness, also determine the adoption of sustainable management practices, and are not amenable to change through the provision of information and extension services (Cary et al 2002; Webb, 2004; Pannell et al 2006). For example, farmers vary greatly in their level of risk aversion in regards to decisions. Individuals with an 'internal locus of control'; a strong belief in their own ability to influence the circumstances of their lives, are more confident in making decisions (Pannell et al 2006).

- **Values and attitudes:**

The reason for holding land (e.g. agricultural production versus lifestyle) can influence adoption decisions (Cary et al 2002; Webb, 2004; Pannell et al 2006, Vanclay, 2004). For example, Salamon (1984) distinguished between *yeoman* farmers who aim to pass the family property and farming as a trade to at least one member of the next generation to ensure that the land remains in the family, and *entrepreneurs*; farmers whose primary goal is to run an efficient, productive, profitable business where land is an asset that can be bought and sold. These diverse goals manifest in different operating styles which influence decision making.

Attachment to place or the human bond with the physical environment has been empirically shown to be related to conservation activities. The emergence of place-based conservation groups, such as Landcare, are evidence of this. These community groups can be comprised of people from diverse backgrounds and differing views on natural resource management who work together to address environmental issues within their local district (Cheng, Kruger and Daniels, 2002). Low and Altman (1992, p5) defined *Place* as a physical space imbued with meaning assigned to it by its occupants through personal, social and cultural processes. Place meaning includes instrumental or utilitarian values as well as subjective feelings of belonging, beauty or spirituality. Importantly, places are imbued with socially constructed and frequently politically defined expectations of appropriate behaviour (Cheng and Daniels, 2003; Cheng, et al, 2002). From a theoretical aspect, place attachment implies care and concern for the place which in turn suggests that people with a strong attachment to place will oppose environmental degradation (Vorkinn and Riese, 2001).



**Fig 2.1: Place as in the intersection of processes affecting human action
(Cheng and Daniels 2003).**

Land stewardship: Australian landholders in general hold a strong stewardship ethos (Vanclay and Lawrence 1995). However these values do not necessarily translate into improving sustainable practices on farms. Lawrence et al. (2004) found that despite strong stewardship values, poor natural resource management persists when: landholders lack knowledge of the problem; the problem is contested or denied due to a lack of appreciation of unseen processes (such as underground salinity or habitat loss below the water in rivers); the problem is accepted but it may be more rational for farmers to continue with current management practices, they are unsure about how to alter current practice or move to alternatives, their financial circumstances precludes change, they blame governments for causing the problem, or the problem is viewed as ‘too far gone’ (Lawrence et al, 2004).

Farm business characteristics

- **Family structure:**

The majority of Australian farms are family operations (ABS 2006b). Therefore, decision making is complicated by the interplay of family members often involving two or three generations. Rarely will one decision-maker determine whether a new innovation is put into practice. Time constraints will limit a farm family’s ability to focus on new ideas and gather information. Other priorities in family life may take precedence (Pannell, et al 2006).

- **Financial viability:**

Higher levels of adoption of best practice environmental management are linked to higher levels of income. As Vanclay (2004) notes, although profit is the defining force, it is true that ‘it is hard to be green when you are in the red’. Australian farmers have been under continual pressure from persistent drought, falling terms of trade which has reduced farm incomes and limited capacity to adopt new practices (Cary et al 2002; Webb, 2004; Pannell et al 2006). Off farm income can contribute to financial security which will facilitate adoption but it can also limit the types of practices employed to those with fewer time demands (Cary et al 2002; Webb, 2004; Pannell et al 2006). Farming businesses with low equity have less discretionary income to invest in sustainable farming practices, particularly where those practices do not deliver any efficiency or productive gains. However, Cary et al. (2002) found that the perception of future farm viability, the idea that the future looks rosy, has a larger impact on adoption than objective measures of farm business viability.

- **Property size:**

Larger properties may have the advantage of greater economies of scale and may be more able to implement new sustainable practices (Cary et al 2002; Webb, 2004; Pannell et al 2006).

- **Isolation:**

The physical distance of a property from sources of information about new practices can be a deterrent either because the information is perceived to be irrelevant to a farmer's situation or because they receive less exposure to the information. Proximity to other adopters encourages adoption (Pannell et al 2006).

Social Structural characteristics

- **Changes in extension practices:**

The way extension is delivered in Australia has undergone major changes in recent times due to reduced government spending, a move to privatisation of extension services, and changes in approaches from individual to group programs, which can greatly impact on adoption (Pannell et al 2006).

- **Social networks:**

Landholders are more likely to adopt practices that others in their neighbourhood are practicing. The existence and strength of landholders' social networks and membership of organisations such as catchment groups also facilitates adoption (Cary et al 2002; Webb, 2004; Pannell et al 2006; Munasib and Jordan 2005). Participation in groups such as Landcare, particularly over long periods of time exposes members to new innovations which may extend to others within their broader social network.

Landcare was introduced in the late 1980s as a key national initiative to bring land degradation problems under control (Reeve 2001). The concept was built upon the premise that participants in land care projects would develop a land stewardship ethic which would promote adoption of best-practice land management practices which would reduce and prevent land degradation problems (Reeve 2001). Landcare has been credited with improving social capital, increasing the capacity of communities to attract government funding, adding to landholder's awareness skills and adoption of best management practices, and improved environmental outcomes (Reynolds and Ash, 2003). Activities include meetings, field days, tours and conferences, information distribution via local media, farm and catchment planning, funding submissions and projects such as tree planting, pest management and fencing conservation areas (Reynolds and Ash, 2003).

While Landcare has played a significant role in raising environmental awareness (Cary and Webb 2001; Fenton et al. 2000), this does not necessarily lead to adoption of more sustainable practices, which requires motivation, financial incentives and appropriate skills and resources (Lawrence et. al 2004). Reeve (2001) in a national survey of 5000 farmers found that the amount of change in environmental attitudes between 1991 and 2000 is about the same among Landcare group members and those who are not members. A national survey of 504 farmers (Geno 2000) found 71.8% of farmers talk over important farm decisions with peers, 61.3% base some of their decisions on industry information, 31.8% ask family for advice, 28.7% use Landcare groups' activities as a guide, while 14.4% indicated they would consider changing a farm practice if a neighbour changed theirs. No relationships were found between farmers' level of environmental concern, attitudes to sustainability, perceived importance of the use of practices endorsed by the codes of practice or actual reported actions. Attitudes to government regulation, pressure from industry groups and the perceived risks of their farming practices and the necessity to engage in environmentally sound practices were the strongest predictors of adoption of sustainable practices (Geno 2000).

- **Social norms:**

Adoption is a learning process which involves the collection, integration and evaluation of new information before a decision is made. The knowledge that is developed through this process is unique to each landholder but will generally comprise a mixture of scientific information, personal experience, and cultural influences including formal laws, and informal social norms, ideologies and values. Yet even when full information is available, farmers often will still use heuristics, or 'rules of thumb', to simplify their decisions (Pannell et al 2006, Geno 2000).

- **Social change:**

Attitudes toward environmental sustainability are influenced by the increasing number of "tree changers" and rural weekenders in rural Australia who have brought new skills and new ideas about social values and norms. At the same time, increasing environmental awareness across the country is influencing Australians' consumption and political behaviours which in turn impacts upon farm production and farm management practice. Ethnic heterogeneity within a community can inhibit the flow of information and consequently, adoption rates (Cary et al 2002; Webb, 2004; Pannell et al 2006).

These factors were examined within the present study to identify the strength of association with each factor with the implementation of conservation practices on farms.

3.3 The present study

The aim of this first part of the analysis of the findings was to identify the nature and extent of those factors that are predictive of the adoption of sustainable practices on farm.

3.3.1 The survey

Questions within the survey gathered data on subjective and objective factors that influence adoption of sustainable practices. These data were analysed with a number of demographic variables to examine the relationship between environmental conservation on farms and social structures, norms and values. Measures included:

- **Environmental problems:**

Participants reported on the main types of environmental problems they experienced on farms.

- **Sustainable practices:**

Participants indicated the types of best-practice land management they employed and whether they had preserved an area for its environmental benefits and the reasons for doing so. They were also asked about any barriers to implementing environmental improvements

- **Attachment to place:**

Place Attachment or the human bond with the physical environment (Low and Altman 1992) was assessed by an eight item instrument that participants rated also on a four-point agree-disagree scale) which identified what they most valued about living in their community. The scale drew on previous research on place attachment (Williams, 2000) which recommended asking respondents to rate the value of the major components of places (i.e., social, community, natural landscape). The alpha rating for tests of reliability for this scale was 0.79 which is more than adequate given that Nunnally (1978) has indicated 0.7 to be an acceptable reliability coefficient.

- **Social Capital:**

This was assessed by three measures. First, following Munasib and Jordan (2005) social capital was measured by participant’s involvement in formal and informal local groups concerned with natural resource management. The range of groups was also identified. Second, the extent of social change in the community was measured as residential instability can impact on social capital. The third measure of social capital was the Collective Efficacy scale (Sampson, et al., 1997). Respondents were asked how strongly they agreed (also on a four-point Likert agree-disagree scale) that: *People around here are willing to help their neighbours; This is a close-knit community; People in our community can be trusted; People in our community do not share the same values; and People in this community generally don't get along with each other.* The last two statements were reverse coded. The alpha rating for tests of reliability for this scale was 0.81.

3.4 Results

3.4.1 Environmental problems on farms

Figure 2.2 presents the nature and extent of environmental problems experienced on farms within the total sample (N=1926). The main problems experienced were the management of weeds and pest animals, and drought and reduced water availability.

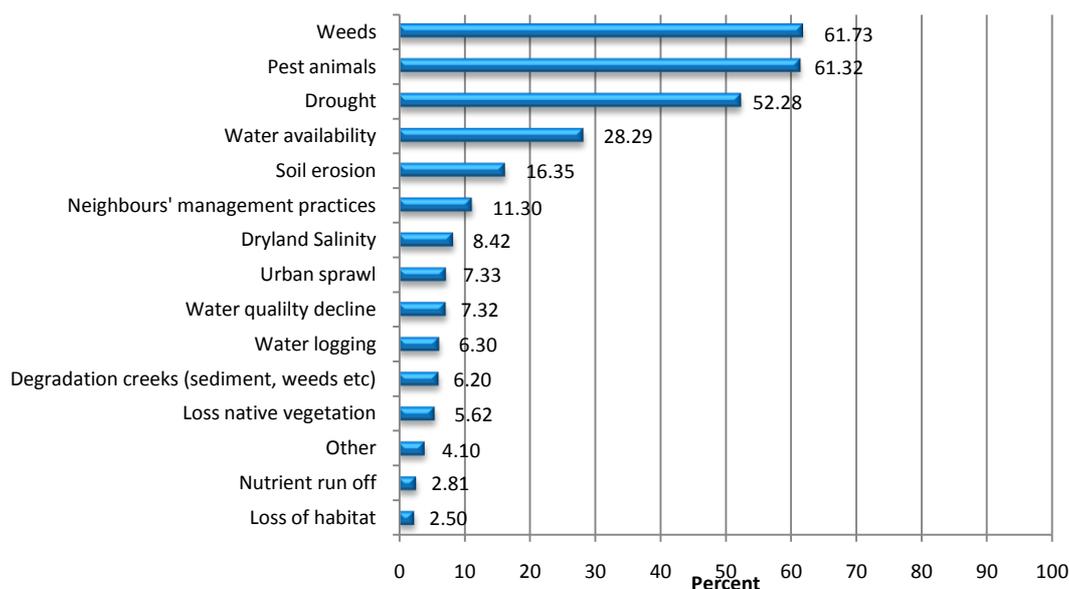


Figure 2.2: Environmental problems on farms within the sample (N=1926)

One farmer wrote:

Roadside weeds and rubbish dumping including garden waste are a serious problem. Falling and overhanging roadside trees are also a serious problem. Rabbits, kangaroos and fox numbers have increased significantly.

Eight people claimed that their greatest problem was government policy and laws regarding clearing vegetation. The ‘other problems’ reported included flooding particularly in the far north of Australia, acid soils, bird problems, and the thickening of native vegetation which is legally uncontrollable. As one wrote:

Tree "thickening". Most of our place is native vegetation. In many parts there are over 100 times more trees (saplings or seedlings). They eventually kill the big parent tree and we lose grass and groundcover.

3.4.2 Best-practice land management on farms

Farmers' level of participation in best-practice land management was assessed. Almost all (98%) had introduced at least one type of activity. Figure 2.3 displays the types of management practices implemented by respondents. Management of weeds and pest animals were the most common type of practices. Industry recommended codes of practice were also common demonstrating the influence of various industry groups in leading the way in sustainable agriculture. The 'Other' types of activities included irrigating with recycled water, organic farming, planting shelter belts and drilling sub-artesian bores equipped with solar pumps.

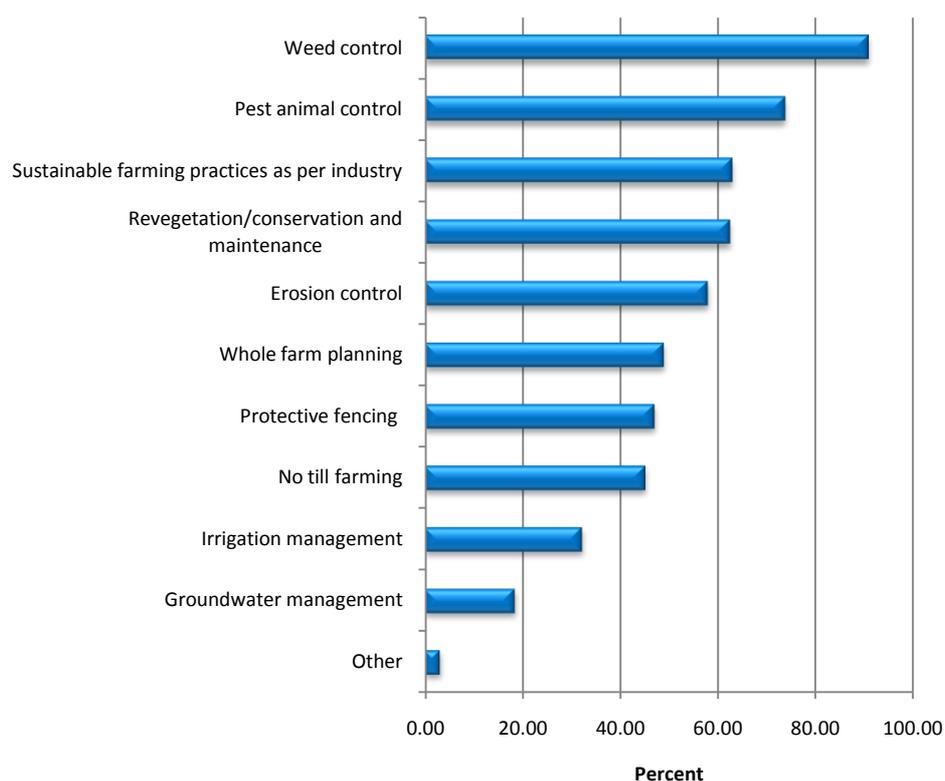


Figure 2.3: Environmental practices on farms (N=1248) (Weighted)

A total of 515 respondents (42%) had received support for these activities. For 306 (24.5%) support was received through a Landcare grant, for 236 (18.9%), this was in the form of a government grant; for 13 (1.0%) it was a community grant, while 85 (7%) received other types of funding through CMAs, Greening Australia, Envirofund, NRM grants, and Soil Conservation. Seven people reported that their activities were self-funded. One wrote that he was keen to do more if more funding was available.

3.4.3 Environmental conservation on farms

One focus of the present study was to explore the nature and extent of environmental conservation activities on farms that were beyond compliance with regulatory requirements. Of the total sample of 1926 participants, 1067 (56.5%) reported that they had an area on their property preserved for its environmental benefits. One respondent stated:

In a major sense, the entire property is preserved - it is best described as conservatory managed natural outback pastoralism

The types of areas preserved included fenced areas of remnant vegetation 503 (26%), revegetation/planted trees 221(12%), fenced/managed riparian, lake or lagoon areas or wetlands, 459(24%), dams to encourage birds and other wildlife 31(1.6%); and habitats 111(5.8%). 'Other'

conservation areas were areas that included waterfalls, mountains, escarpments, gorges or gullies, rocky outcrops, forests, caves, or saltpans. Appendix 1 presents a full list of the types of environmental preservation activities.

There were 1003 respondents (80.4%) who reported they had native vegetation on their property. Of these, 515 (27%) described this as remnant vegetation, 133 (7%) reported they had regrowth while 250 (13%) had a combination of both. The remaining 145 (7%) described other types of vegetation such as introduced species, agroforestry, or trees planted for windbreaks or in riparian areas for conservation.

Figure 2.4 highlights the farmers’ primary motivations for preserving environmental areas. These were primarily altruistic: to sustain the local environment.

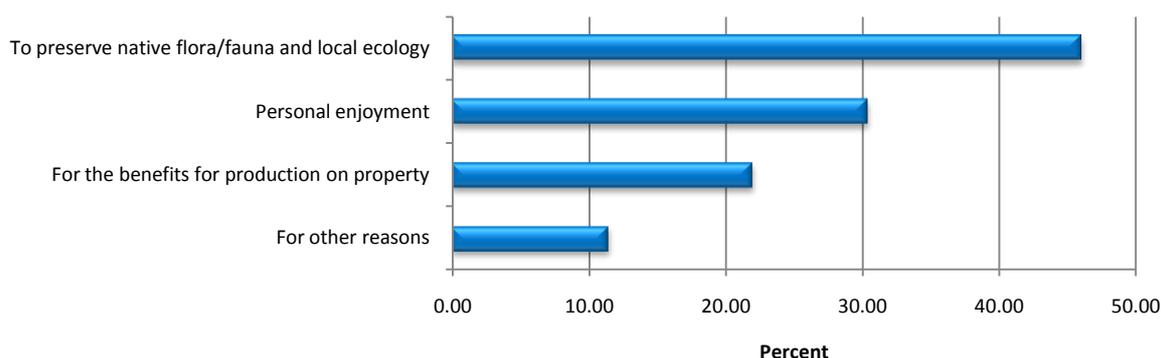


Figure 2.4: Motivation to preserve an environmental area on farm (N=1248) (Weighted)

The “other reasons” included: government directives or government funding incentives, to set an example to others, erosion control, a windbreak, a buffer between properties or roads for privacy and security, heritage values, Aboriginal sites, aesthetic or improved marketing appeal, and the possibility of future carbon credits. A few respondents admitted that the areas were preserved just because they were there or because the area had little productivity value; for example escarpments.

One of the respondents demonstrated the degree of environmental commitment within the sample.

I'd like to make my land adjoining a National Park a bird sanctuary. I already have some of the fencing but need another \$30,000 or so to see it come to fruition. Birds have been regularly netted and banded for the last 20 years so there has been a lot of information collected about lots of birds. The 240acres has lots of trees (mainly Ironbarks) and some good native grassland. If I can properly create a fox/cat/kangaroo-proof environment, it might be highly valuable for species preservation.

Problems in managing conservation areas

Of the main sample (N=1248), 66 (5.3%) reported that the general public had access to their conservation area. There were 170 respondents (13.6%) who reported difficulties managing the area. Table 2.3 displays the type of difficulties experienced. Controlling weeds was the most common problem.

3.4.4 Barriers to sustainable agriculture

The main obstacles preventing farmers from implementing environmental improvements on their land were the lack of time and money (See Figure 2.5).

As one farmer explained:

We would like to do more conservation on our property, but with the climate and financial situation being so terrible it is hard to justify spending the money.

For 15% of the respondents, the small size of their holding did not allow for environmental improvements. *Other* types of barriers included government restrictions (1.3%), being too old (0.5%), inability to secure funding grants (0.7%), a lack of water, insufficient labour, difficulties or a lack of success in establishing trees or other vegetation. There were 45 (4%) respondents who stated there was no need to do anything more because they believed the environmental condition of their property was fine as it was.

Table 2.1: Difficulties maintaining preserved environmental area.

	Number reported
Weed Control/Eradication/Weeds washed down by river	85
Pest Animal Control	50
Financial (cost of cost of ongoing management: weed and pest animal control, Shire rates, loss of production on preserved area).	18
Fence maintenance/Fencing Difficulties	15
Drought/Lack of Water	11
Trespassers/Litter/ need to control Public Access	14
Stock Exclusion/Stock Intrusion	8
Fire Hazard/Prevention/Control	7
Terrain (steep/inaccessible)	7
Erosion	6
Problems Created By Neighbouring Properties	6
Vegetation Overgrowth/Becoming Too Thick/Needs Trimming	6
Falling Branches/Trees	5
Damage Caused by Flooding/Storms	4
Replanting Native Species/Revegetation	4
Lack of time	4
No Practical Support/Advice	3
Water Pollution/Creek Degradation	3
Insect Damage	2
Legislation Constraints/Government Restrictions	2

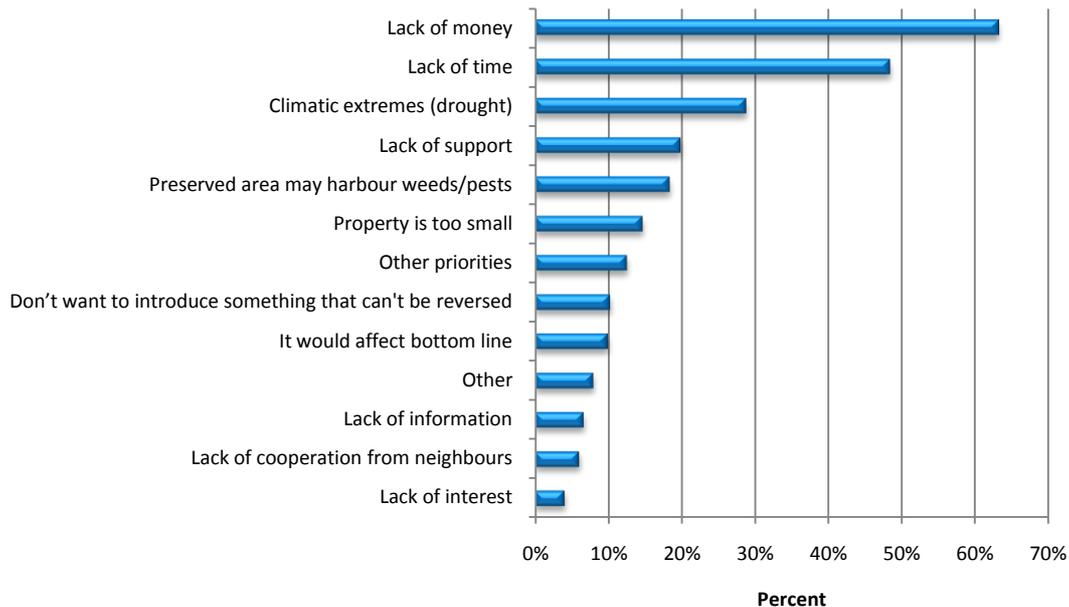


Figure 2.5: Factors preventing environmental improvements on farm (N=1248) (Weighted)

3.4.5 Local institutions for natural resource management

A total of 763 respondents (62.4%) reported they were involved in local groups concerned with sustainable farming or natural resource management. The following figure shows group participation by type of group. Landcare was the most common type of group organisation. However informal groups are growing in popularity. Other types of groups (N=249) included the South Australian Agricultural Bureau which is a non-profit voluntary organisation run by farmers for farmers (9 respondents); Farmer Associations (33), Industry groups (37), CMA's (8), and NRM groups (5).

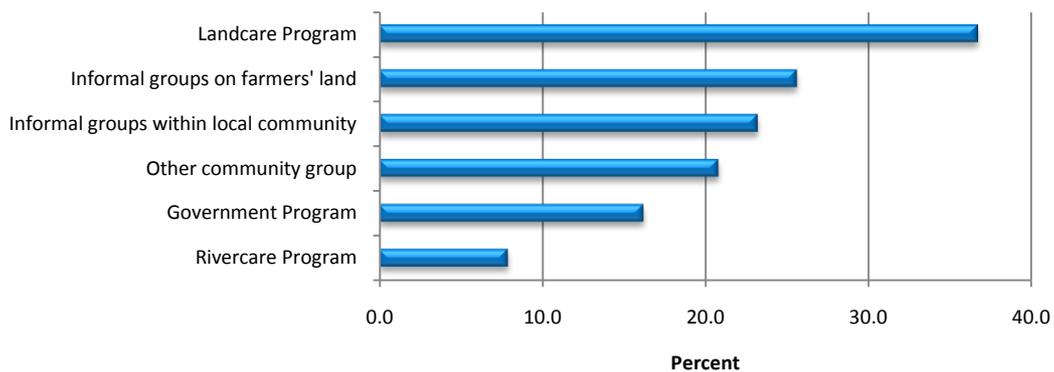


Figure 2.6: Participation in local NRM groups (N=1248) (Weighted)

Landcare is still very popular despite indications that interest is waning (Reeve 2001; Pannell et al 2006). Reeve (2001) found landholders' participation in environmental conservation activities was not defined by Landcare membership. The following table compares membership levels with those identified by Reeve and Black (1993) and Reeve (2001) which revealed that there was a 15% decline in membership between 2000 and 2008. South Australia was the only state that showed an increase in membership (43.5%).

Table 2.2: Proportion of respondents who are members of Landcare.

Survey Year	NSW	VIC	QLD	SA	WA	TAS	AUST
1991(N=2044)	12.1	21.19	28.9	17.2	48.2	15.5	22.6
2000 (N=1455)	38.9	52.7	36.1	20.0	68.9	52.5	43.2
2008 (N=1248)	36.0	41.7	35.3	28.7	41.9	32.6	36.7
Percentage change 2000 to 2008	-7.5	-20.9	-2.2	43.5	-39.2	-37.9	-15.0

Note: Northern Territory data are excluded due to the small numbers of respondents.

There was some criticism amongst respondents of the cliques within formal institutions which determined the direction of funding grants and the types of activities conducted.

We feel that CMA's have been a negative influence on community/individual action in environmental matters. They have alienated people and failed to be motivators; instead tried to be dictators and uncompromising. Big projects and money going to the few who play "their game" and more money again going to staff, offices and expenses.

There were 414 (33%) respondents who reported that they were involved in local community groups that were voluntarily and informally formed. Almost half of these, 192 respondents referred to their Landcare group, 24 mentioned their local CMA, 4 Greening Australia and 40 mentioned their local Bush Fire Brigade. However, we were primarily interested in the initiation of informal groups with no links to structured organisations. Of these, some were members of the Birchip Cropping Group, which formed in 1992 after a group of local farmers identified a need for crop variety and herbicide research in their district. This highly regarded group has rapidly grown to 500 members and is sponsored by agribusinesses to conduct research across the Wimmera Mallee region. Other local innovations reported included:

- A planning group that did a 100-year economic, environmental and social plan.
- A best-practice group of neighbours doing various training and courses.
- Blessington Community group: Consists of six farms formed to develop property management plans and deal with the environmental issues of the region.
- Biodiversity and Endangered Species Team (Woodland Birds Routine Monitoring Program).
- A weed action group to encourage farmers to cooperate in broad-spectrum weed control; e.g., highly competitive pastures, caring about neighbours, and to keep relevant authorities from sitting on their hands.
- Interested local residents who applied for (and received) an Envirofund grant to save a large paddock trees.
- Desert Uplands build up and Development Group - working for the people of the region. Has done a lot of environmental good.
- Mornington Peninsula Vignerons Association - concerned about community relationships, water quality, spray drift issues, runoff etc.
- Small close-knit group directly affected by proposed council changes to land usage.
- Nyngan Rural Survival Group to fight unfair and unnecessary land clearing and land use controls.

- Landcare type community group - combined membership from all local sporting, social and industry groups as well as Government representatives.
- Water Action group for the saving of the Lower Lakes of the Murray-Darling Basin.
- Water care group. Monitor and work towards managing underground water resources.
- Wild River Committee - concerning the Queensland Government's Wild Rivers Legislation.
- Woodvale Environmental Group representative at mining meetings.
- Women on Farm group.
- A group of affected/concerned residents of the area trying to reduce the detrimental impact of the local extractive sand mining and sandstone mining.
- Environment and Property Protection Association to help protect farmers and their land from local seam gas exploration and the damage it causes.
- A trees-on-farms group.

3.4.6 Place, social capital and environmental conservation

To explore the subjective as well as objective factors predictive of sustainable practices, the relationship between environmental conservation practices and individual characteristics of respondents and their properties, measures of place attachment, social capital, and participation in conservation groups were explored.

- **Place attachment**

Questions regarding what farmers valued about country life revealed that the farm and country values and ways of living were most valued (see Figure 2.7). Attachment to place implies that individuals with a strong attachment to an area will oppose environmental degradation (Vorkinn and Riese, 2001).

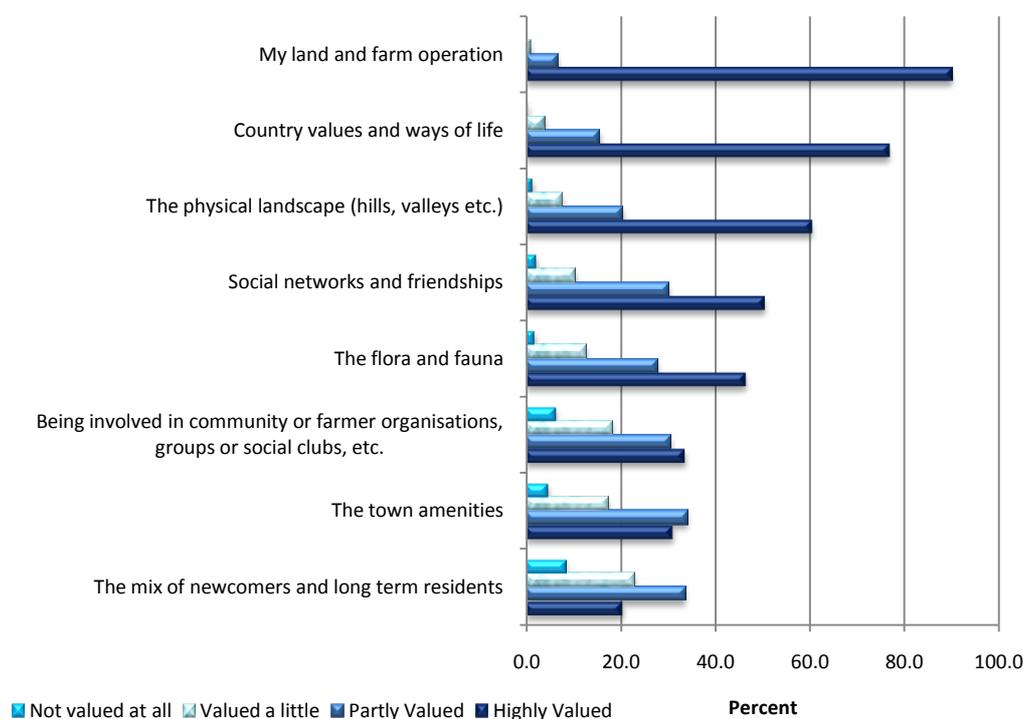


Figure 2.7: Place attachment (N=1248)

High levels of place attachment were significantly related to whether farmers had preserved a place on their land for environmental conservation ($\chi^2=15.71$, $p<0.0001$) or whether they were involved in environmental conservation groups ($\chi^2=15.19$, $p<0.0001$) (See Figure 2.8).

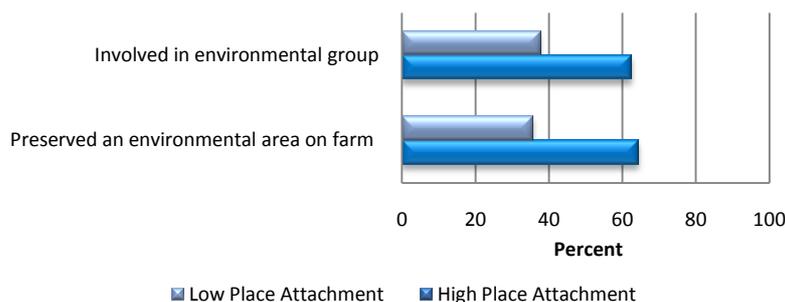


Figure 2.8: Place attachment and sustainable practices (N=1248)

There were no differences found in degree of attachment to place between states or the degree of remoteness as defined by the Australian Geographical Classification Code (ABS 2006a). This finding suggests that place attachment is related to an individual’s subjective attachment to his/her immediate environment.

- Social capital**

A measure of the participant's belief in their local community's level of social capital drew upon a scale developed by Sampson, Raudenbush and Earls (1997) that measured ‘collective efficacy’.

Overall the levels of social capital were reportedly very high. However, half of the respondents reported there were cliques within their community. Previous studies have reported cliques to be characteristic of rural communities in Australia (Dempsey 1990; Poiner 1990). However cliques can disrupt social capital and limit collective action for natural resource management.



Figure 3.9: Social capital (N=1248)

- Social Change**

The greater proportion of participants (73.1%), reported social change in their community. Another 306 (24.8%) reported no change and 26 (2.1%) could not say. Of those who reported change, the sale of farms and loss of farm families from a district were the most commonly observed changes, reflecting the farm adjustment process that has accompanied drought and economic decline (see Figure 2.10). Yet in other areas, there are increasing numbers of hobby/lifestyle farmers.

Newcomers to a region can disrupt social capital or they can make a significant contribution to the community in leading the way in environmental conservation.

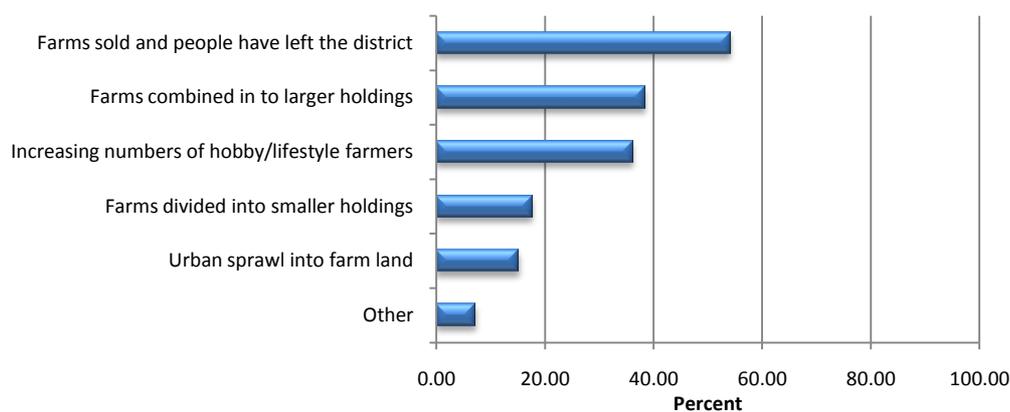


Figure 2.10: Social change in farming communities in the past five years (N=1248)

Only 64 respondents (5.1%) considered these changes to be positive, 472 (37.9%) described the changes as negative while 289 (23.2%) believed they were neither positive nor negative.

3.4.7 Factors predicting environmental conservation on farms

To identify those factors that are most predictive environmental conservation on farms a logistic regression was conducted with a model similar to Munasib and Jordan (2005). Predictors selected for the analysis included the objective and subjective factors identified by Pannell et al (2006) which included the number of environmental problems experienced on farm, a measure of attachment to place and social capital identified as participation in community environment groups, collective efficacy, age, gender, education, size of property, level of equity in the farm business, off-farm income, the length of time on the property, and if they planned on passing the business onto their children. Adherence to social norms was measured by one attitude statement that “Abiding by environmental laws and regulations is the right thing to do”. Note: low scores indicated a positive response for variables: motivation norm, place attachment, succession, off-farm income, collective efficacy, and social change.

As virtually all farmers had indicated they had implemented at least one type of best practice management practice on farm, there was little variability in this variable for effective analysis. Therefore, the dichotomized dependent variable employed was whether or not participants had preserved a conservation area on their land. This activity is an example of beyond compliant behaviour.

All scores were standardised to permit comparisons of diverse distributions within the analysis. The equation was significant. Table 2.3 displays the findings. Social capital as defined by involvement in community conservation groups was the strongest predictor. This finding mirrors that of Munasib and Jordon (2005). Social capital as defined by collective efficacy was not important. Neither was social change. Values and attitudes to the environment were significant predictors. A commitment to the belief that compliance with environmental laws and regulations was ‘the right thing to do’ was strongly predictive of conservation behaviours. Place attachment was an important predictor as were plans for intergenerational transfer of farm ownership. The more environmental problems experienced on farms, the more likely farmers would have a conservation area.

Table 2.3: Logistic regression coefficients predicting place-based environmental conservation

Variable	Beta Scores	Standard Error
Involvement in community groups	-.456***	.090
Motivation norm	-.326***	.094
Place attachment	-.176*	.092
Succession planned	-.168*	.086
Number of environmental problems	.201*	.089
Off-farm income	-.134	.094
Collective efficacy	.010	.091
Length of time on property	-.166	.109
Social change in area	-.090	.093
Land area	-.132	.134
Equity in farm business	.086	.087
University degree or equivalent	-.024	.084
Gender	-.167	.098
Age	.208	.104
Constant	.072	.087
-2 Log-Likelihood	821.77***	Pseudo R2=.16

* $p < 0.01$ ** $p < 0.001$ *** $p < 0.000$ (two tailed tests)

3.5 Discussion and conclusions

The findings highlight that weeds and pest animal management is an ongoing and serious concern for Australian farmers. ABARE (2006) also found in their national survey of farmers that weed and pest animals were the main cause of land degradation. The ABS survey of NRM on farms found that in 2006/2007 farmers spent \$1,574 million controlling weeds, which was more than pests (\$768 million) and land and soil problems (\$649 million) combined. Of all expenditure on weed management, nearly two thirds (\$982 million) was spent on herbicides. The total cost of managing these problems was \$2,991 million, or an average of \$21,094 per business (ABS 2008b).

Drought and reduced water availability were other major problems for farmers within the study. Drought disrupts cropping and breeding programs, and threatens the viability of farming operations. There is increased risk of serious environmental damage, particularly through vegetation loss and soil erosion. Plants and animals and water quality are also threatened (BOM 2009). Therefore

drought exacerbates environmental problems on farms but also limits the ability of landowners to respond.

Despite these obstacles, the findings of this study revealed that Australian farmers have a strong commitment to environmental sustainability. Almost all of the respondents had implemented at least one type of best management practice on farm. The ABS national survey of natural resource management also found that almost two thirds of farmers had improved their natural resource management to increase productivity, for farm sustainability, and to improve environmental protection (ABS 2008b).

More than half had preserved a conservation area on their property, an activity that is beyond compliance with regulatory requirements. The motivation for this activity was to preserve native fauna and flora as well as aesthetic value for the enjoyment of the landowners. Patrick et al (2009) found in a case study of the Walgett shire in northern New South Wales that local farmers had implemented many activities to improve or maintain the environmental quality of their land without financial, social or government encouragement. Many had conserved environmental areas of their property for both public and private good reasons. However the present study found that in preserving a conservation area, farmers faced problems in maintaining the area particularly with pest management.

A lack of time and money, and drought conditions were cited as the main obstacles to implementing more environmentally sustainable practices. As Pannell et al (2006) noted, landholders dealing with drought and low returns have less discretionary income to invest in conservation, particularly where those practices do not deliver any efficiency or productive gains. Increased work load with drought or off farm work can also limit the time required to implement new innovations (Cary et al 2002; Webb, 2004; Pannell et al 2006).

The analysis conducted to identify those factors most predictive of environmental conservation activities supported Pannell et al's (2006) conclusion that subjective perceptions rather than objective factors were more predictive of adoption. Commitment to a social norm that doing the right thing for the environment was important. This finding reflects that of Munasib and Jordon (2005). Vanclay (2004) maintains that farmers generally do conform to a notion of 'good farm management'.

A strong attachment to place was also associated with more conservation activities. Attachment to a particular place conceptually involves care and concern for the place (Vorkinn and Reise, 2001). Attachment evolves between an individual and a specific physical environment and each place as a unique history amongst its inhabitants (Cheng et al, 2002). However some landholders may be attached to degraded places. The history of European settlement of Australia's rural areas saw many settlers take up land where they camped because it had a water source or was available. Thus subsequent generations became attached to 'heartbreak blocks'.

The analysis revealed that the desire to retain the property within the family was a significant predictor for conservation practices. Vanclay (2004) also notes that a desire to pass a farm onto children is associated with an investment in conservation but it can also be associated with powerful expectations and obligations to sustain a farm operation against all economic reason.

The objective factors were the number of environmental problems experienced on farms – the more problems reported, the more likely a farmer would preserve an area for the environment. This finding suggests that more problems indicate a heightened awareness or a need to undertake more preventative activities to reduce environmental degradation.

The other significant objective measure was involvement in local conservation groups. This variable was included to measure social capital. Munasib and Jordon (2005) also found a strong relationship between involvement in such groups and pro-environment activities. However they caution that

there can be reverse causality in that farmers who have preserved conservation areas may want to be involved in groups of people with similar interests.

Less than half of the respondents had received financial support for conservation activities either through direct or indirect government grants. Industry recommended best practice management practices were reported by 57% of respondents. This supports in part Geno's (2000) assertion that pressure from industry is taking over Landcare as the main influence on farmers' adoption of sustainable practices. According to the study findings, Landcare remains important but membership of informal community environmental groups is growing across rural Australia. Reeve (2001) found no differences in farmers' attitudes to the environment between those who were members of Landcare and those who were not.

The findings suggest that informal community groups should be encouraged to increase adoption of sustainable practices on farms. Ostrom (1998) suggests that sustainable practices on farms might be encouraged by promoting social norms that emphasise mutual benefit/reciprocal benefits of such practices, and by efforts to build the mutual trust within community groups (Marshall 2004a; Marshall 2005).

4 Environmental Crime on farms

4.1 Introduction

The best intentions of landowners to sustain their farm environment can sometimes be undermined by factors outside of their control or the deliberate or inadvertent actions of others. One of the main aims of this study was to explore the nature and extent of activities that negatively impact on farm operations. In many cases, these activities can be legally defined as environmental crimes.

Most discussions of environmental crime discuss the large scale pollution of rivers or oceans where there is no clear victim. One of the main aims of the present study was to conduct the first study of environmental crime from a more micro, place-based perspective, namely those incidents that occur on farms where individual farmers are victims. In this chapter, a summary of the findings of the investigation into the nature and extent of environmental crime victimisation on farms is provided. Opportunity theory (Cohen, Kluegal and Land, 1981) was employed to identify ecological factors that are predictive of environmental crime victimisation. The perceived seriousness of these offences and the level of reporting offences to authorities were also explored.

4.2 Background

Environmental crime is a serious and growing worldwide problem. Catalysed by increasing scientific and public concern about environmental degradation, governments and legislators have been pressured to respond. Criminologists are also turning their attention to environmental crime and environmental criminology as important areas of research (Clifford, 1998; White, 2003).

Environmental crimes include a wide range of illegal activities such as pollution, the dumping of toxic waste, illegal logging or the exploitation of natural environments. These offences can cause permanent and extensive harm to ecosystems with associated economic and human health impacts (Blindell, 2006). Finding a sufficient, all-encompassing and generally agreed upon definition of environmental crime has proven difficult. There are a number of reasons for this. First, the study of environmental crime is a relatively new field of inquiry (less than 30 years) (Wiernik, 2006). Second, individualised harm and causation can be difficult to identify. Many of the incidents that cause environmental harm are extremely diverse and occur at both local and global levels (White 2003). Furthermore, crimes may remain undiscovered for years after the act (Wiernik, 2006). Victims may be few or many and victims may be non-human as well as human, which is problematic for traditional criminal law (Wiernik, 2006). Most importantly, many of these actions or incidents may not be legally defined as criminal (Clifford, 1998; White, 2003; 2007) and, even when they are, there can be a degree of moral ambiguity surrounding the activity which is contrary to the more mainstream definitions of crimes as morally blameworthy. Clifford (1998) suggests that rather than environmental crime, the term 'offences against the environment' should be used. Clifford defined

this as ‘an act committed with intent to harm or with a potential to cause harm to ecological and/or biological systems and for the purpose of securing business or personal advantage’.

Most discussions of environmental crime typically refer to environmental degradation at the macro level, such as the large scale pollution of rivers, waterways or oceans where there is no clear victim (Williams, 1996). The purpose of the present study was to examine environmental crime or ‘offences against the environment’ from a more micro, place-based perspective, namely those incidents that occur on farms that negatively impact upon individual farms and their owners. The aim was to offer an alternative perspective of environmental crime as similar to more traditional human-as-victim crimes, rather than an obscure victimless offence.

The research is exploratory in nature, designed to conduct the first comprehensive study into the unique and little known topic of environmental crime victimisation on farms and provide theoretical interpretations of its origins. The relationship between victimisation and the physical characteristics of farms were examined using an opportunity theory framework. Understanding the relationship between place and environmental crime is important in its own right, but it is also essential for the development of a more complete understanding of the nature and pattern of environmental harm that occurs within rural areas. Weisheit and Donnermeyer (2000) note that discussions of ‘environmental victimology’ have rarely been considered in rural settings in industrialised nations. The few studies which have been undertaken have been performed in underdeveloped countries (e.g., Perrolle 1993; Williams 1996). This is a serious oversight because agriculture in Australia, Canada, UK and the US is big business (Lobao and Meyer, 2001) and environmental crimes which occur in rural areas may have detrimental and far reaching impacts for farmers and for food and water security, as well as economic stability and environmental sustainability. Additionally, preventing and investigating environmental crimes may be more difficult in rural communities where there may be fewer resources for identifying and responding to offences, a situation which only reinforces the need for additional research in this area (Weisheit and Donnermeyer, 2000).

4.2.1 Farmers and the environment

Farmers have traditionally been seen as guardians of the natural environment and providers of food for society (Lowe and Ward 1997). Farmers often describe themselves and their peers as ‘stewards’ or ‘guardians’ caring for the land for future generations (Beedell and Rehman 2000). They argue that farmers necessarily care for the environment as it is essential for the sustainability of their farm operation (Patrick et al 2009). Yet across the industrialised world farmers are often stigmatised as ‘environmental vandals’ (Lowe and Ward 1997).

Social change in rural areas more recently has seen people relocate from urban to rural areas seeking a ‘tree change’. Where farmers are surrounded by new neighbours with differing values, life experiences and expectations they often find themselves facing criticism for their farming practices (Ward et al, 1998). As described in Chapter Three, some farming activities can inadvertently damage the environment, such as the over extraction of water and depletion of groundwater, run off from intensive livestock operations or misuse of chemicals which can pollute soil or waterways, soil erosion or degradation, or the destruction of wildlife habitat (Reichelderfer, 1991).

It can be difficult to apportion blame for environmental harms emanating from farming activities. For example, there can be uncertainty about the sources of pollution. Contaminants from non-point sources cannot easily be traced to agricultural activities (some could originate naturally) or to a specific parcel of land or farmer (Reichelderfer, 1991). Nevertheless, increasing concerns about the risks of farming practices to the environment have pressured Australian industry groups to develop voluntary environmental codes of practice to demonstrate that the environmental risks from farming are being addressed (Geno, 2000). The challenge for the agricultural industry is to minimise the impact upon the environment while maximising production (FIFA 2002). Governments too are under increasing pressure to demand that expectations of environmental husbandry are met, and

are drawing on more traditional regulatory instruments, including regulation but also criminalisation, in order to achieve the ends desired (Bartel, 2005).

The best intentions of landowners to sustain their farm environment can sometimes be thwarted by factors outside of their control or the deliberate or inadvertent actions of others. Williams (1996) distinguishes between environmental casualties as those who suffer as a result of natural disasters which are due to chance, and environmental victims who suffer due to the deliberate or reckless human act (or act of omission). Australian farmers are frequently environmental casualties, for example in the case of bushfire. However, they may also be environmental victims if such a fire is deliberately lit or if neighbouring land is not sufficiently protected from bushfire. The aim of the present study was to examine the character and extent of environmental crimes when the victims are individual landholders and their farm operations have been adversely affected by the actions of another.

The study builds upon previous research on property crime on Australian farms (Barclay et al, 2001, Barclay and Donnermeyer, 2002) which found 69% of the 620 respondents to a mail survey of farmers in New South Wales had experienced some type of property crime over the previous two-year period. The most common types of crime were trespassers and illegal hunters and thefts of tools and other small equipment, livestock and fuel. Other reports concerned offences that impacted upon the farm environment. For example, six per cent of respondents had discovered cannabis growing illegally on their land and 11 per cent were victims of rubbish or waste dumping.

Like most environmental crime, human actions that negatively impact on the environment on farms include a wide and varied range of unauthorised or illegal activities. For the purposes of the current research, only the most common types of environmental crimes or transgressions that occur on farms are examined and these are described below.

- **Unauthorised access to private rural lands** Trespass and unauthorised hunting: entering private rural lands without agreement from the landowner is a common offence in Australia. While these offences are not strictly environmental crimes, they can cause environmental harm. Offenders are responsible for littering, arson and other damage to native vegetation and habitat, as well as damage to crops, vandalism, failure to shut gates, disturbance or accidental killing of stock and wildlife. Dogs can sometimes become lost thus adding to the growing wild dog problem in rural areas. Some urban dwellers believe they have a right to enjoy nature irrespective of land ownership and may come into conflict with landowners who are keen to protect their property and their privacy. Statutes proscribe the unlawful entry of persons onto private property. It is also an offence to deliberately leave a gate open, or cut or damage a fence to allow animals to escape (Barclay et al 2001).
- **Illegal fishing** Illegal fishing threatens the economic and social benefits that legitimate fisheries and aquaculture bring to small rural communities. These offences occur in national parks and on private farm land. In the past ten years there has been an increase in organised crime at the systematic illegal harvesting and trafficking of fish stocks such as Golden Perch and Murray Cod from the Murray Darling Basin. Financial rewards are motivation for offenders. Offenders use wire traps, explosives, set and cross lines. Drum nets target fish during breeding season when they are most vulnerable (Fisheries Victoria 2006).

Some local residents and tourists to a region may take undersized or out of season fish for their personal consumption and only commit offences when an opportunity arises and the risk of detection is minimal. Some become regular offenders using local knowledge (such as the whereabouts of local police or fisheries officers) to reduce the risk of detection. These offenders

usually have established outlets to sell their catch, such as local pubs, shops or sporting clubs (Fisheries Victoria 2006).

- **Illegal rubbish dumping**

The illegal treatment, storage or disposal of rubbish or hazardous waste is a threat to public health, crops, livestock, wildlife and the environment. Dumping or wind-blown rubbish on farm land can injure or kill livestock, pollute waterways cause land degradation, damage to plant and animal species, and can impede biodiversity and revegetation, alter drainage courses and increase susceptibility to flooding and erosion, increase fire risk, physical and chemical hazards and pest infestation. It is an offence to dump pollutants either on land, or in drains, water ways or into the atmosphere. The motivation for these offences is avoidance of rubbish tip fees or ease of disposal (Barclay et al 2001).
- **Drug production**

The isolation of rural areas and the low numbers of rural police encourages drug laboratories or cannabis cultivation in national parks and on private properties where there are large areas of bush that are rarely frequented by the owners. This can ultimately impact upon the availability of drugs in rural communities as well as in cities (Barclay et al 2001).
- **Illegal water diversion**

The pumping, damming or diversion of water from river systems, dams or bores without a licence or not in compliance with licence conditions causes changes to flows, can reduce water access to neighbouring farms, stock access and riparian zone management, and ignores compliance with regulations (NSW DWE 2008). Water diversion can also cause flooding on neighbouring land. Kingsford (2007) using satellite images of key rivers and flood plains along the Murray Darling Basin in north western NSW found more than two thousand kilometres of earthworks. While some of the channels and levees have been authorised, others were illegal and were diverting water into irrigation and farming.
- **Water pollution**

Effluent from dairies, or run off from irrigated pastures or grazing livestock can pollute waterways or wetlands (NSWDWE, 2008).
- **Water theft**

Water theft denies access to a scarce resource for other licensed users or for environmental flows. Drought has seen an increase in offences. In 2008, in one irrigation region in Victoria, there were 240 cases of water theft investigated (ABC 2008). One of the major concerns is water meter tampering and non-compliance with legal requirements. Sticks, turtles or frozen fish can be used to obstruct irrigation meters. It is often difficult to prove theft beyond reasonable doubt (NSWDWE, 2008). The farming community strongly disapproves of water theft. As water has become more expensive and scarce they readily report infringements. In South Australia the maximum fines for stealing water from the river has been increased by 3,000 per cent from 70,000 Australian dollars to AU\$2.2 million for corporations while fines for individuals rose from AU\$35,000 to AU\$700,000.
- **Misuse of chemicals, pesticides and fertilisers**

Where agricultural and veterinary chemicals are used or disposed of in a manner that causes actual or potential contamination of land, animals or plants outside of the target area or actual or potential environmental harm or harm to human health and safety (within or outside the target area). This can be due to spray drift from aerial or ground spray rigs or contaminated run-off causing damage to crops and pastures or livestock, or unacceptable disposal of unused or waste chemical causing environmental and water contamination (PIRSA 2009).

- **Bush Fire** Bushfires can be caused deliberately or accidentally. Lack of bush fire prevention on neighbouring land increases fire risk. Burning-off and harvesting operations are farming practices that create fire risk.
- **Timber theft** The theft of timber can range from people entering property and cutting firewood without permission through to the theft of valuable trees. It is an offence to steal or destroy dead wood lying on land that is privately owned or remove logs from a national park for sale. Illegal logging is a serious threat to forest resources and can upset the ecological balance within the forest. Financial rewards are a strong motivation for this type of offence. Thefts are also hard to detect particularly when the timber is located in large forests and/or in remote areas (Barclay et al 2001).

4.2.2 Toward a theoretical explanation of environmental crime in the rural context

To structure the research approach, a theory of environmental crime victimisation was explored. In previous studies of property crime victimisation on farms (Barclay et al. 2001; Barclay and Donnermeyer, 2002), routine activities theory (Cohen & Felson, 1979) proved to be appropriate to guide the research. Routine activities theory defines crime as an event that occurs when motivated offenders and available targets and opportunities for committing offences converge in space and time in the absence of capable guardians (Cohen and Felson, 1979). The theory defines crime according to the everyday activities and lifestyles of those at risk of being victimised and therefore provides an understanding of the practical reasons why property crimes occur on farms (Smith, Frazee & Davison, 2000). Mears et al (2007) in a similar study of farm crime victimisation in California elected to use opportunity theory, which integrates routine activities theory with lifestyle victimisation theory (Hinderland et al., 1978). Lifestyle victimisation theory posits that variation in lifestyles across different social groups creates varying exposure to criminals and criminal opportunities and therefore varying rates of victimisation. Both theories explain crime as criminal opportunities that are determined by the routine activities of potential victims (Miethe and McDowall 1993).

Cohen et al. (1981) drew upon both routine activities and lifestyle theories to delineate five factors that contribute to victimization at the individual or ecological level.

- *Exposure* is the “physical visibility and accessibility of persons or objects to potential offenders at any given time or place” (Miethe and Meier 1994). The terrain and density of vegetation on a property can create varying degrees of exposure for potential victimisation.
- *Proximity* is the heightened vulnerability of a place if it can be more easily reached by offenders. Farms located near public roads or highways and in closer proximity to urban centres are more vulnerable to illegal rubbish dumping (Barclay et al 2001; George Street Research 1999).
- *Guardianship* refers to formal social controls, such as police and regulators, and informal social controls, such as family members, neighbours and other community members who protect property by keeping watch (Bennett, 1991). Poor guardianship leads to higher rates of offending. For example, remoteness and distance between properties in Australia increases the chance of environmental crime occurring because there is little likelihood that neighbours will observe offenders. Guardianship is also reduced by rapid social change in rural Australia which reduces the ‘density of acquaintanceship’ (Freudenburg and Jones, 1991) among rural residents meaning that it is less likely that they know everyone in their community (Barclay et al. 2001).
- *Target Attractiveness* refers to the physical or symbolic features of property targets that attract potential offenders (Cohen et al. 1981). It is difficult to speculate what features of a farm would entice environmental offenders. However they would be encouraged by

offences that are rewarding and easy to get away with. The ease of access to a farm, the specific physical features that would enable a particular offence and a lack of guardianship would make a property an attractive target. This factor thus contains elements of the previous three factors.

- *Defining properties of crimes* highlight the unique situational aspects of different crimes. Some offences are easy to commit and require less knowledge of victim routine activities than do others. The diversity of environmental crimes suggests that there will be differences in the rate and modus operandi of offences. In addition offences are more likely to occur where regulations are difficult to enforce and where the risk of prosecution and punishment is seen as remote (Smith and Anderson 2004). In farming districts, policing is hampered by a lack of time, sufficient staff and resources. Many rural districts are so large and diverse that they are difficult to police effectively (Barclay et al. 2001). In the case of environmental crimes, inadequate resources for regulators reduce their ability to monitor rural areas. Not every instance of non-compliance is or can be prosecuted, which reduces the deterrent effect of the legal system (Smith and Anderson 2004).

Mears et al (2007) combined multiple individual-level measures of these dimensions of opportunity theory to examine property crime on farms in California. No environmental crimes were examined. Opportunity theory partially accounted for variation in agricultural crime victimisation depending on the type of crime. For example, there was little relationship between *exposure* and property crime. The authors called for further research to investigate how the key dimensions of opportunity theory should be conceptualised and operationalised in rural contexts and further test the theory's robustness.

The present study employed a similar approach to Mears et al (2007) to explore environmental crime with different independent variables to account for Australian physical and cultural characteristics. It was hypothesised that the opportunity theory risk factors: exposure, proximity, attractiveness and lack of guardianship would be significantly related to greater levels of environmental crime victimisation.

4.3 The survey

In the questionnaire, participants were asked whether they had been a victim of various types of environmental offences and how often this had occurred. They were asked to rate the seriousness of the offence, whether they had reported the incident to police or to other authorities, whether they had discussed the problem with neighbours and who or what they blame for these offences.

Several measures were employed to assess the risk factors for victimisation as defined by opportunity theory.

- *Guardianship* was measured by the presence on the farm property of farm owners, workers or neighbours on a scale of 1 to 4 (*All, sometimes, rarely or none of the time*) and farm size. The smaller the property, the greater the guardianship ability because it is more likely that more of the property would be visible from the main house and yards (Barclay et al 2001). Guardianship at the community level was assessed using the *Collective Efficacy* scale (Sampson, et al., 1997). Respondents were asked how strongly they agreed (also on a four-point Likert agree-disagree scale) that: *People around here are willing to help their neighbours; This is a close-knit community; People in our community can be trusted; People in our community do not share the same values; and People in this community generally don't get along with each other.* The last two statements were reverse coded. The alpha rating for tests of reliability for this scale was 0.81 which is more than adequate given that Nunnally (1978) has indicated 0.7 to be an acceptable reliability coefficient.

- *Proximity* was measured by the distance of the property to a public road or highway, and from the nearest town and the degree of remoteness as defined by the Australian Geographical Classification Code (ABS 2006a) which compares locations by accessibility to goods and services and social interaction.
- *Exposure* factors included the terrain and vegetation cover on a property. Terrain and vegetation determine visibility and therefore the effectiveness of guardianship over the property. Farmers' descriptions of the terrain and vegetation on their land were categorised according to whether the terrain was (1) flat, (2) undulating, or (3) hilly and whether the density of their vegetation was (1) low (grasslands or cultivation), (2) medium (scattered trees), or (3) dense (bush or trees). These categories were the most common types of descriptions provided within the sample. Location next to a national park or waterway were also used as measures of exposure to access via these means (1=Yes; 2= No).
- *Target attractiveness*: This factor was difficult to conceptualise. However, the measures for the proximity and exposure factors also constitute target attractiveness for offences of an environmental nature. Low levels of guardianship will create target attractiveness for more deliberate offences such as trespassing, illegal hunting and fishing, rubbish dumping and timber theft. We concluded that the inclusion of a number of relevant independent variables would allow the analysis to reveal the factors predictive of target attractiveness.
- The one-page *close-of-survey* form contained the same key questions pertaining to environmental crimes victimisation as in the main survey. Responses to both surveys were combined for analysis of key questions while more complex analysis was confined to main survey data only.

4.4 Results

4.4.1 Environmental Crime on Farms

Of the total sample of 1926 respondents to the survey, almost half (47%) reported experiencing some type of environmental crime over the previous two years. There was a total of 1811 reported incidents (respondents could indicate more than one type of crime) (See Figure 3.1). Trespassing and unauthorised hunting were the most frequently reported crimes on farms. Damage to fences, riverbanks, soil surface and vegetation from four wheel drive vehicles and motorbikes were common complaints. Similar results were found in previous studies of property crime on Australian farms (Barclay et al. 2001); Anderson and McCall 2005). These crimes together with illegal fishing comprised 40% of the total number of reports. The remainder were incidents that were specifically environmental. Chemical spray drift and the dumping of rubbish were major concerns. Rubbish also became a problem if it was blown from roadsides into creeks or across paddocks. Other types of environmental crime reported by respondents included poor farm management by neighbouring farmers, particularly weed or pest animal infestation (6%), pollution or loss of groundwater caused by mining exploration and mining activities (reported by 10 respondents), feral, dumped or stray cats and dogs that caused environmental damage and stock losses (6 respondents). The fact that respondents defined such acts as 'crimes' is interesting and suggests that regard for environmental offences is evolving as appreciation for environmental harm grows.

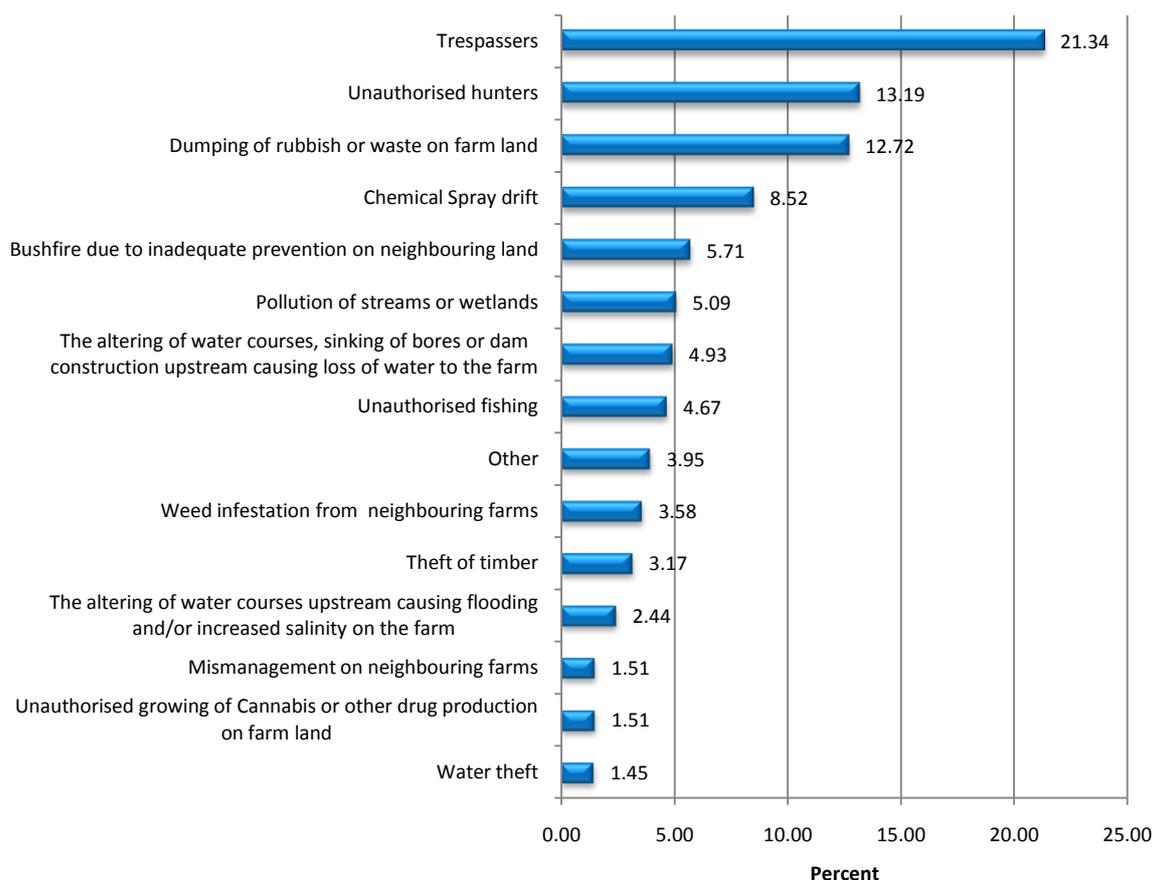


Figure 3.1: Proportion of incidents of environmental crime (N=1926)

Note: More than one category could be selected.

4.4.2 Reporting environmental crime

Within the main survey sample (N=1248), of the 1514 reported incidents, only 381(25%) were reported; either to the police (199 (13%)) or to other authorities (182 (12%)). Reports of trespassing and illegal hunting were more likely to be reported to police than to environmental authorities (See Figure 3.2). This is possibly due to the fact that there are now laws and more police powers in place in most states to address these types of offences. These offences were also more likely to be discussed with neighbours demonstrating the need for collective efficacy to address these problems in the community.

The theft of timber, the discovery of drug production on farm land and some reports of rubbish dumping were the other types of offences reported to police. Illegal fishing was not reported to police but to other authorities. Yet these actions would constitute trespass. All of the other types of offences were reported to regulatory authorities.

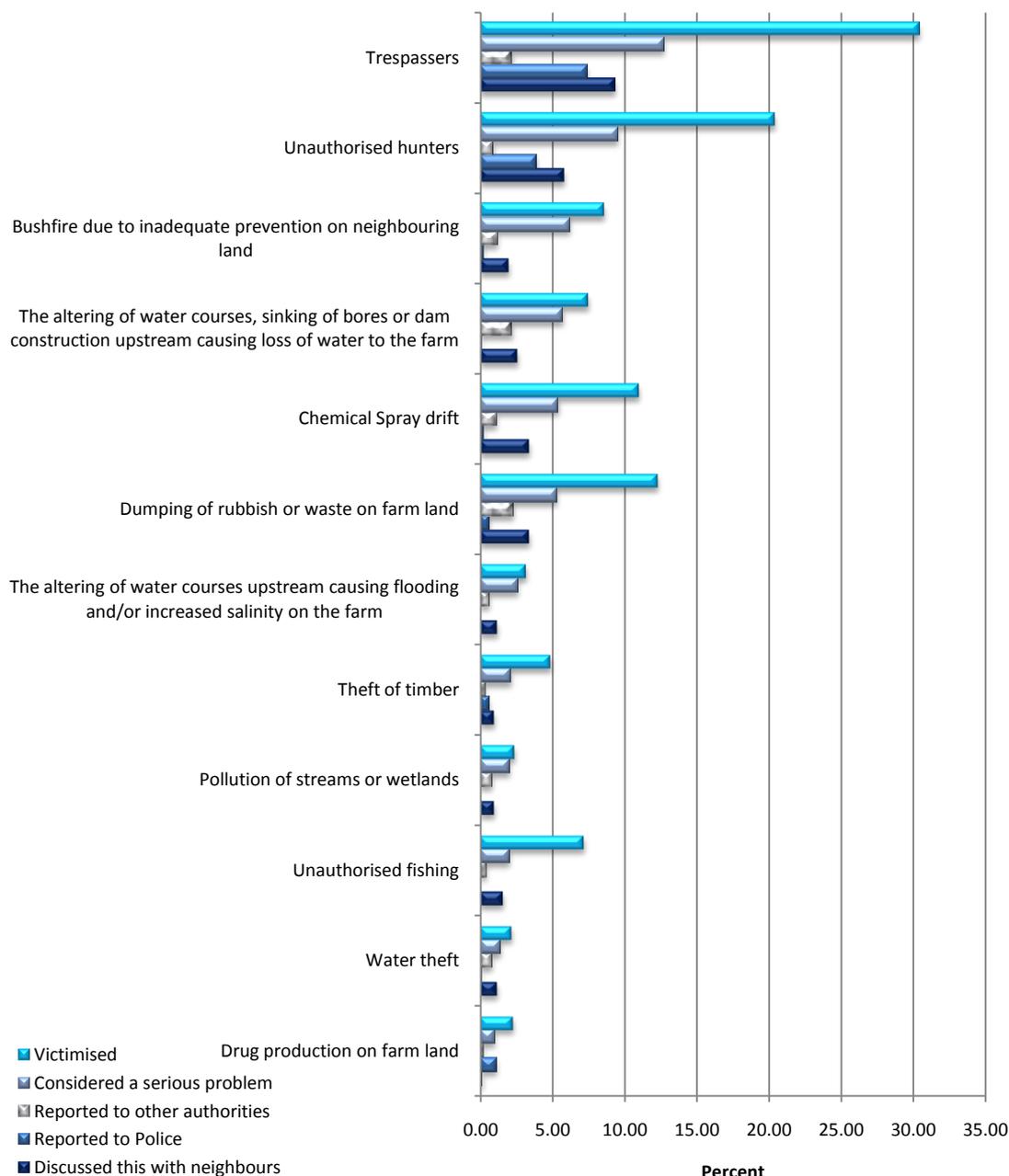


Figure 3.2: Farmer reactions to incidents of environmental crime (N=1248)

The most common reason for non-reporting was that the victims believed the offence was not serious enough (See Figure 3.3). This is the most common reason for non-reporting for most crime (Biles and Braithwaite 1979). Crime on farms is universally under-reported to police and for many of the same reasons. This is one of the biggest obstacles police face in dealing with farm crime (Barclay 2003a). Barclay (2003a) found that farmers failed to report crimes because they believed the incidents to be trivial or that the police would be unable to assist. Other reasons included the amount of time between a criminal event and its detection. Some farmers were afraid of reprisal.

The nature of crime within the context of farming communities is unique in many ways and can impact upon a victim's decision on whether or not to report a crime. In the present study the need to maintain social order without appealing to formal law were strong motivations for not reporting incidents. These factors are more predictive of not reporting environmental crime on farms than they were for not reporting property crime on farms (Barclay 2003a).

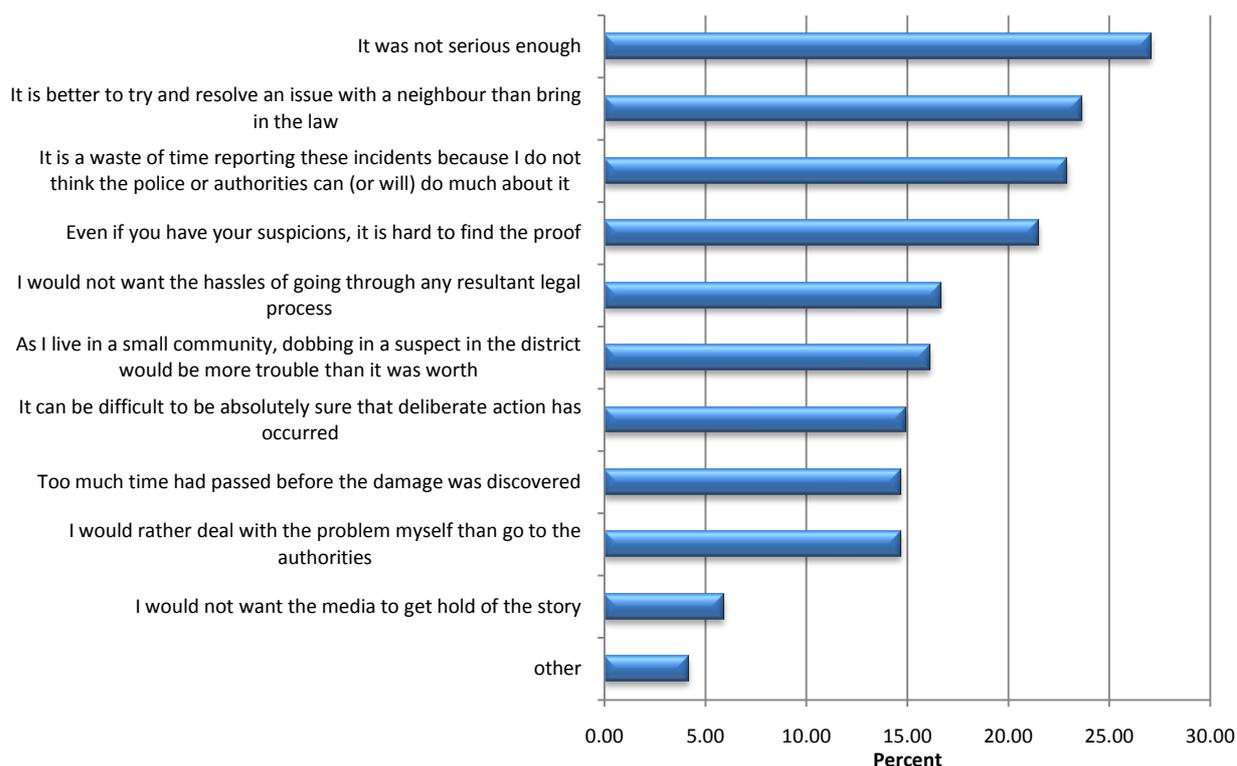


Figure 3.3: Reasons for not reporting environmental crime (N=1248)

Respondents’ ratings of the seriousness of an offence were related to their victimisation experiences. However, when their ratings of the seriousness of an offence were assessed as a proportion of the number of reported offences it was revealed that although trespassing, hunting and fishing were the most common offences, relatively fewer victims considered these as serious problems (Figure 3.4). The most serious victimisation experiences were water related offences. This is likely to be due by the persistent drought and reduced water availability, particularly in irrigation districts. Other perceived serious offences included bushfire and chemical spray drift.

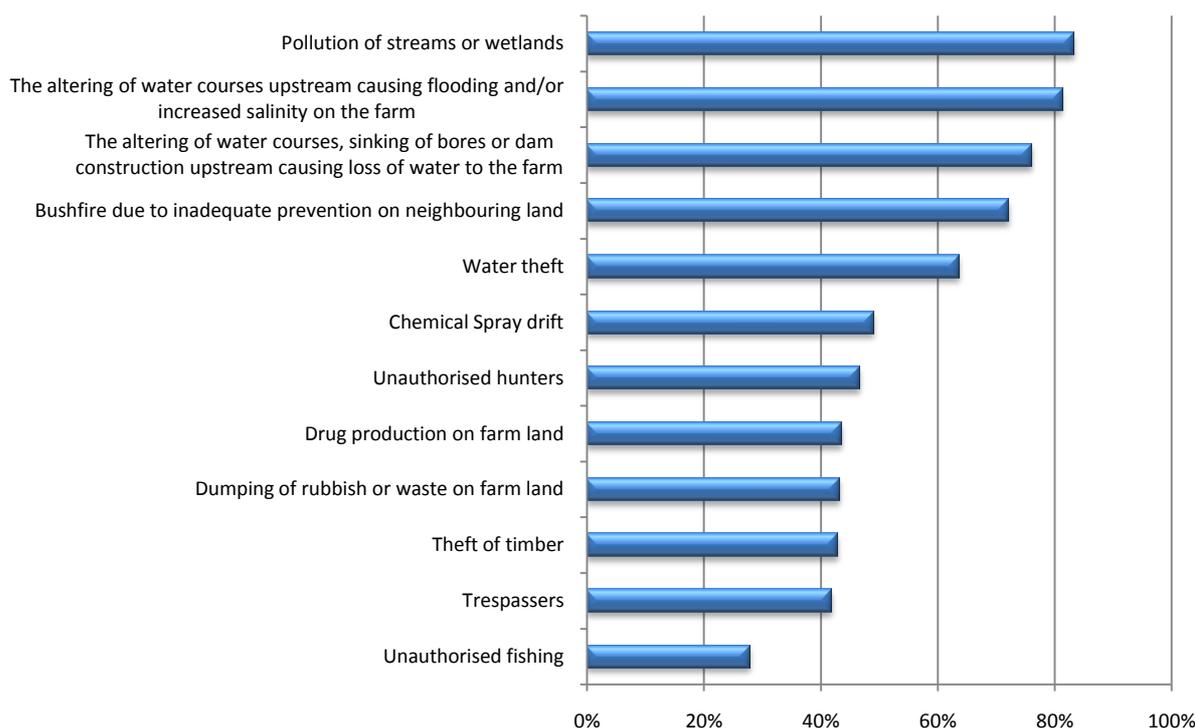


Figure 3.4: Perceived seriousness of crime relative to reported victimisation (N=1248)

4.4.3 Blame

Farmers were asked whom or what they blamed for environmental crime in their district. These questions sought to gather some understanding of the factors that motivate offenders to commit offences. The 387 (31%) participants who responded to this question offered varied responses but there were some apparent themes which are summarised in Table 3.1. A full list of participants' responses is provided in Appendix 2.

Rubbish dumping was a concern for several respondents. One wrote:

We have seen an increase in roadside rubbish since local tip now only open two days a week, plus you now have to pay to use the facility. We often pick up and bag the rubbish and then we get charged!

Another called for free access to council rubbish tips.

I think the Council should have free dumping. They try to control illegal dumping by having two full-time officers and a pick-up but it is not cost-effective. I believe if the dump was free and perhaps have more than one, it may solve the problem.

Many respondents referred to the presence of mining in their district and their concerns for the impact on the environment, as the following comments reveal:

Mining activities create dust fallout of heavy metals on surrounding agricultural land.

Mining in the near future over large areas will have a huge impact and pits, voids, open cuts will be left to do so much damage.

Chemical spray drift is a common problem but one that is perceived to be due to accidental causes rather than deliberate intent.

Most drift is of a minor nature (crop damage along fence line); occasional other damage is accepted as next year it could be me that damages a neighbour's crop!

Table 3.1: Farmer attitudes towards who or what to blame for environmental crime (N=1248).

Social Factors	(%)	Ecological Factors	(%)
Government policy or inaction	16	Bushfire: Lack of bushfire prevention; inability to control burn roadsides; or poor monitoring of controlled burn-off in national parks or forests.	6
Ignorance (offenders)	9	Lack of access to land for hunting	5
Financial stress	5	Urban sprawl or close proximity to towns/city	4
A lack of respect for property rights	5	Mining: environmental damage/ reduced water supply	3
Neighbouring farmers	5	Timber theft: cost of firewood	2
Tree changers/Hobby farmers	4	Lack of care when spraying chemical	2
Young people/boredom	4	Drought	1.3
Lack of police	3		
Rubbish dumping: due to costly council tip charges	2		

4.4.4 Determining vulnerability to victimisation

To explore the ecological characteristics of farms that influenced a farm's vulnerability to victimisation six binomial logistic regressions were conducted to identify which of the opportunity theory risk factors would be predictive of victimisation for the most commonly reported environmental crimes. Only reported crimes of 10% or more were analysed. Some smaller variables were combined. The six types included (1) trespassing, (2) hunting and fishing (combined), (3) rubbish dumping, (4) chemical spray drift, (5) water (a combination of flooding, loss of water, water theft and pollution), and (6) overall victimisation. The dichotomised dependent variable was whether or not a farm had been victimised. Eleven independent measures were used for each of the risk factors associated with opportunity theory as described above. Scores were standardised to allow comparisons of diverse distributions within the analysis. All factors were entered simultaneously to identify significant predictors.

The results highlight the variation in the predictive strength of the opportunity risk factors for different types of environmental crime. Table 3.2 summarises the logistic regression coefficients predicting victimisation for those computations that were significant. Bonferoni adjustments were applied to reduce the possibility of Type One error. Consequently, this process eliminated significance for some relationships. These relationships are presented but are reported as trends in the data.

Table 3.2: Logistic regression coefficients predicting victimisation (N=1248).

	Trespassing		Hunting and Fishing		Water theft, diversion or pollution		Dumping of rubbish		Total victimisation	
Variable	Beta Score	SE	Beta Score	SE	Beta Score	SE	Beta Score	SE	Beta Score	SE
Exposure										
Terrain	-.162*	.087	.017	.095	-.191	.119	-.124	.123	-.048	.080
Vegetation	.320***	.090	.075	.097	.153	.121	.108	.127	.224**	.080
Bordered by creek	-.266***	.087	-.299**	.098	-.541***	.139	-.504***	.143	-.242**	.077
Bordered by national park	-.066	.082	-.151*	.084	-.071	.105	-.035	.112	-.137	.083
Proximity										
Distance from town	-.018	.081	.000	.071	1.021*	.485	-.005	.115	1.160	.454**
Distance from road	.032	.085	.010	.094	-.240	.325	-.117	.257	-.014	.090
Distance from highway	.000	.106	.252*	.104	.110	.146	-.281	.174	-.031	.106
Remoteness	.070	.095	.315***	.097	-.463	.164	.183	.128	-.097	.097
Guardianship										
Farm size	.252*	.138	.134	.101	.005	.120	.194*	.098	.087	.153
Presence	-.002	.096	.034	.100	.047	.122	-.085	.162	-.020	.087
Collective efficacy	.375***	.086	.194***	.091	.274**	.113	.344**	.118	.304***	.081
Constant	-.847	.084	-1.245	.092	-2.043	.128	-2.184	.132	.296	.080
-2 Log-Likelihood / Pseudo R2	874.68***	R2=.10	770.97***	R2=.10	550.08***	R2=.11	507.42***	R2=.09	983.17***	R2=.10
N=	756		756		756		756		756	

*p<0.05; **p<0.01; ***p<0.001 (two tailed test) (Note Bonferoni adjustments means only significance at .01** can be accepted)

For the *Guardianship* factors, the data suggests that larger farms are more vulnerable to trespassing and rubbish dumping. As Barclay et al (2001) found, smaller farms that have more guardianship ability are less likely to be victimised. The majority 1123 (91.7%) of the respondents reported that

someone was living or working on their property all of the time. However, this direct measure of on farm guardianship (presence on farm) proved not to be significant for any of the offences. Guardianship at the community level was far more effective. Poor collective efficacy (indicated by high scores) was associated with each type of offence.

For *Proximity* measures, there were 152 (12.3%) properties that were bordered by a national park; 783 (63.6%) had a creek, stream or river frontage to their property and 467 (37.8%) had irrigation. The majority of properties within the sample (90.6%) had a public road less than 10 km from their boundary. Just over half (55%) had a major highway within 10 km and 39.3% per cent of properties were located more than 20 km from a town, 11% were more than 50 km from town, while 35% were within 10 km. The analysis revealed that remoteness and distance from major highways were significant predictors for illegal hunting and fishing. This suggests that offenders seek out isolated regions where they are less likely to be observed. Water offences occurred in areas some distance from town.

Exposure measures were highly significant. This is contrary to the findings of Mears et al (2007) which found little relationship between exposure and property crime on Californian farms. Clearly environmental crimes are influenced by environmental features. Trespassing was significantly related to dense vegetation and location near a waterway. Trends indicate that trespassing occurs more on flat terrain. Hunting and fishing were more prevalent on properties adjacent to a national park. This validates many of the participants' claims that pest animals are a problem on national parks and impact on neighbouring properties, rendering them more vulnerable to illegal hunters.

Some findings were predictable, such as proximity to a creek or river for hunting and fishing and for water offences. Rubbish dumping was also associated with proximity to a waterway. Several participants commented that rubbish floating down creeks and rivers was a problem.

For overall victimisation, proximity to a creek, river or other waterway was a strong predictor of victimisation as was dense vegetation. This suggests that target attractiveness would include properties with these characteristics. Collective efficacy was also highly significant.

However, the Pseudo R² for all equations was small indicating that there are a number of other factors that are causal in environmental crime on farms. Furthermore, the equation for chemical spray drift was not significant. Further research is needed to explore this type of crime and those factors of target attractiveness that are predictive of victimisation.

4.5 Discussion and conclusions

This study was exploratory in nature and is merely the first step towards understanding the impact of environmental crime upon individual farms operations. The findings revealed that just under half of Australian farmers experience some type of environmental crime. These results should be interpreted with caution as respondents are likely to have over-reported their victimisation experiences in a first time unbounded (first time) survey of this type within Australia (Reiss 1980).

Few victimisation experiences were reported to police. The reasons for this reflect the perceived seriousness of these offences as well as the nature of farming. Victims of water related offences were more likely to consider these crimes as serious, than were victims of the more common offences of trespass or illegal hunting. Persistent drought and severe water restrictions have heightened concern about water access.

There appears to be preference for maintaining community cohesion over reporting offences to authorities. The social norm denoting a need to work out problems between neighbours over bringing in the law and the awareness of the need to live within a small community where everyone knows everyone else were strong reasons for not reporting offences. These social variables were less of concern in previous studies of property crime on farms (Barclay 2003a).

The study has raised many more questions. Further research is vitally important to identify other types of environmental crime, victimisation at the individual level on farms as well as other businesses, the vulnerability characteristics (attractiveness) of potential targets and environmental crime prevention strategies to improve guardianship on farms and within communities.

An objective of this study was to explore the application of opportunity theory to the analysis of environmental crime victimisation on farms. The risk factors of exposure, proximity and guardianship proved to be effective predictors of victimisation. However, there were different patterns in the relationships between the various risk factors with different types of environmental crimes. This is consistent with the findings of Mears et al (2007). Opportunity theory posits that different ecological factors are associated with different types of crimes. More research is needed to explore further social and environmental determinants of environmental crime victimisation to clarify the opportunity framework risk factors for particular environmental crimes. For example, the findings suggest that target attractiveness denotes large remote properties with close proximity to a waterway and dense vegetation. Further research is needed to verify the characteristics of farms that render them attractive to offenders.

The finding that community level guardianship or 'collective efficacy' is significantly related to lower victimisation than is farm level guardianship has implications for future policy. Farmers can be victims of environmental crimes as well as offenders. While social capital is characteristic of many small communities, future policy and programs could focus upon building collective efficacy within farming communities. Landcare community conservation groups have played a significant role in environmental conservation throughout Australia. The study findings suggest that there is a continuing need for community-centred approaches to natural resource management and environmental crime prevention. This is also particularly important in growing 'tree change' communities where there is a greater possibility of conflict between existing and new farmers. The fact that the infestation of weeds and pest animals due to mismanagement on neighbouring properties was defined by the respondents as 'crime' reveals the strong feelings farmers have about these problems. The time and financial cost of pest management is significant. More closely settled regions, particularly those with increasing numbers of hobby /lifestyle farmers, may require additional attention by policy makers.

As the comments of respondents within this study indicate, and as other studies have shown (Cummins and Barclay 2007), farmers resent being cast as environmental vandals. With less blame and a more collaborative approach, farmers may be more likely to institute best management practices on their farms and work together with their neighbours and the wider community to maintain informal social order to control environmental deviance.

This finding also suggests that further research into understanding environmental crime would benefit from further exploration using social control theories, particularly collective efficacy. Rural communities are not homogeneous (Barclay and Donnermeyer 2007) and comparisons of environmental crime victimisation and levels of social control between communities may reveal important insights into crime prevention and informal social norms pertaining to the commission and prevention of these types of offences. The process would inform possible modifications of theories to account for environmental crime.

The social reality of crime is constantly being created (Quinney 1970). With increasing public concern about climate change and environmental degradation, certain actions that negatively impact the environment are increasingly likely to be labelled deviant. This study has selectively focussed on incidents which more closely fit the traditional profile and construct of crime as human-as-victim centred. However, in the future, more activities may be labelled as crimes, not necessarily because the human-as-victim requirement is supplanted, but because more activities will be appreciated to cause harm to humans due to the environmental damage occasioned. The control of weeds is an ongoing and costly problem for landholders. The labelling of weed infestation as a crime

by some participants demonstrates the depth of feeling about deliberate, careless acts or negligence that increase weed problems for landholders. The perceived seriousness of water related offences is likely to lead to pressure on legislators to respond.

The involvement of police and other enforcement agencies in these matters may increase in the future. Currently, police are involved only when environmental incidents include acts that can lead to prosecution under current statutes, for example, cannabis production, and trespass and illegal hunting. However, in the future, laws proscribing environmental crimes may become more common and with greater community acceptance and political will the role of the police and enforcement agencies will become more important. Currently, a number of regulatory agencies are involved in regulation and compliance. To what extent police in rural areas with strained resources will *want* to be involved in policing environmental crimes is unknown. Nevertheless, the future retention of police in small rural communities, particularly one officer stations, may depend on officers demonstrating their ability to police environmental matters (Adcock, personal communication 2008). Grabosky and Grant (2000) argue that no one institution, government or private, will be able to prevent environmental crime. They recommend that a combination of institutions and regulations working in concert would be more effective and may reduce the necessity for environmental enforcement. This again suggests that collective efficacy, incorporating informal and formal social order, may be the most effective means against environmental crime. The role of community cohesion and social norms in maintaining social order in natural resource management is explored in the next chapter.

5 Order without law: Understanding cultural determinants of natural resource management

5.1 Introduction

For as long as people have managed natural resources they have engaged in collective action (Pretty and Ward 2001). These forms of association originated as clan or kin groups and now manifest as conservation groups such as Landcare or water users groups (Pretty and Ward 2001). Cooperation in human societies is mostly based on social norms or enforced through formal laws. Social norms are standards of behaviour based upon widely shared beliefs about how individual group members should behave (Ellickson 1991). Informal laws can be just as powerful behavioural determinants as formal laws. Informal sanctions may be coupled with, and therefore reinforcing of, formal legal sanctions. However informal sanctions may drive contrary behaviour where the regulated community hold fundamental disagreements with the content and/or process of law.

In the previous chapter, collective efficacy within a community was found to be effective for preventing environmental crime within a community. Yet, a number of respondents to the survey identified neighbouring farmers as responsible for incidents that incurred negative environmental outcomes on their land. Previous research Bartel (2003) has identified difficulties in securing compliance with some environmental laws and regulations, such as those governing land clearance, evidenced by past regulatory failure, non-compliance and in some situations, active social resistance.

Regulated communities are complex and non-uniform creatures and there is a need to elucidate the range of perceptions and behaviours to discover underlying reasons and organising principles. The informal and formal do not operate in isolation of course: they interact. It is imperative therefore to investigate the significant trade-offs that may be made between possibly competing self-interests, and the perceived “community” and the broader “public” interest. The present study sought an understanding of the prevailing social norms and attitudes that govern individual and collective natural resource management within rural communities.

In this chapter, the relationships between neighbouring farmers which impact upon environmental conservation at the local community level are discussed and participants’ recommendations for the best options for natural resource management are presented. Data were drawn from the mail survey as well as from follow-up telephone interviews conducted with some respondents to gather more understanding of the nuances within farming communities that determine conservation practice.

5.2 Background

5.2.1 Informal order

Farming communities are often idealised as cohesive, safe, caring, and friendly places to live (O'Connor & Gray, 1989). This is largely because of their small size, less densely clustered populations and greater residential stability (Weisheit & Donnermeyer, 2000). Residents have strong social ties, know each other well, and share common values and norms of trust, mutual support, reciprocity, and obligation that enable them to work together. These qualities are defined as 'social capital' (Coleman, 1990; Putnam, 1993).

It is impossible to understand the complexity of human cooperation in natural resource management without understanding how social norms operate. Residents of small, integrated communities work out interpersonal agreements for achieving desired outcomes. These agreements are usually informal, often unspoken and sometimes may not be consciously acknowledged. They are made possible because people know each other well enough to be able to predict and depend upon each other's behaviour (Freudenburg, 1986). Within small communities these informal social norms and emotional obligations contribute to maintaining social order (Wilkinson, 1991). Social order depends upon the prevalence and interdependence of social networks in a community and in the span of collective supervision or the 'collective efficacy' that the community directs towards local problems (Sampson & Groves 1989; Sampson, 1996). Emotional obligations and strong group norms sustain informal social order and restrict individuals from behaving in ways that do not conform to group norms. Norms prescribe behaviour that is normal as well as behaviour that people should mimic to avoid being punished (Ellickson, 1991:126).

Ellickson (1991) notes informal social norms evolve within small communities to be utilitarian, functioning to maximise the welfare of their residents and to minimise the costs to the community as a whole. When individuals violate norms, formal and informal norms, that are endorsed by people whose opinions they value, they risk embarrassment or a loss of respect. Threats of shame; a self-imposed punishment, and threats of embarrassment; a socially imposed punishment, function as sanctions to reduce deviant behaviour and increase compliance with the law (Grasmick and Bursik 1990). Socially imposed punishments can include negative gossip, strong exclusionary responses and intolerance from other community members (Ellickson, 1991).

In Chapter Three, the analyses identified a norm that it was important to do the right thing for environment. Barclay et al (2004) in a study of property crime on Australian farms identified several other important norms prescribing behaviour within farming communities. One widely held norm in Australia is the adherence to a traditional or 'absolutist' concept of land ownership where landowners hold absolute property rights with all the privileges that ownership and control over land bestows (Reeve 2001). Accordingly people who wish to access private farmland must seek the landholder's permission to enter, abide by the conditions of entry and show respect for the property. Adherence to a norm of property rights implies a norm of trust that people will respect a farmer's private property and do the right thing (Barclay et al 2004). In the previous chapter, trespassers and unauthorised hunters caused the most offence in this regard. This norm is likely to affect landowners' perceptions of what constitutes environmental crime as well as compliance with formal environmental laws and regulations.

Barclay et al (2004) add that absolute ownership leads to another norm that land holders are ultimately responsible for the management of their land and farm operation. This necessitates cooperation with neighbours in establishing and maintaining fences and informing them of any activities that may impact on neighbouring land. Farmers are expected to be good neighbours, support each other and be involved in their local community. Membership of a group or network often entails reciprocity: obligations (e.g. to assist others in times of distress) as well as rights (to call upon assistance) - which may not always be convenient. Putnam (1993, p. 172) defines reciprocity

as “a continuing relationship of exchange that is at any time unrequired or unbalanced, but that involves mutual expectations that a benefit granted now should be repaid in the future”. Reciprocity is essential to the survival of farming communities in Australia where bushfires, floods and droughts are a common occurrence (Barclay et al 2004).

Reciprocity can have positive and negative aspects. Negative reciprocity can involve mirroring whatever non-cooperation one experiences (as in ‘an eye for an eye’) or it might involve an alternative penalty applied according to the degree of non-cooperation and its circumstances (e.g., expressing disapproval or cutting off social ties) (Marshall 2004a). Ostrom (1998) modelled reciprocity and trust as positively reinforcing one another. This is because compliance with reciprocity norms implies trust that the compliance will be reciprocated. Reciprocity grows when increased compliance with this norm is observed (Marshall 2004a).

Barclay et al (2004) found any disputes between neighbours are expected to be resolved without involving the law to achieve outcomes of mutual advantage that sustain a cooperative neighbourhood. “Dobbing in” a person to authorities is widely considered to be “un-Australian”. Disputants only turned to the law when the social distance between them increased, such as when one party was clearly an outsider to the community (Barclay et al 2004). In the previous chapter this norm was reported as an important reason for not reporting environmental crimes to authorities. A participant within a study of Australian irrigators’ land and water management (Marshall, 2003) commented,

“In the country if you alienate your neighbour you can’t just go a hundred metres and find another one. That’s it. You’re boxed in”

Barclay et al (2004) found farming communities employed a system of negative gossip to maintain social order and to sanction individuals who deviated from norms. Gossip was used to reproach poor farm managers and those considered to be less than honest. Sometimes this tool was used against victims to ensure accusations of theft against a resident were dealt with privately (Barclay et al. 2004).

Most farming communities are aware of those who deviate from social norms within their community. In Barclay et al’s (2001) study of farm crime, farmers easily identified local identities as likely offenders. Freudenburg (1986) notes that small communities often condone a certain level of impaired functioning. Barclay notes one farmer who occasionally appropriated his neighbours’ stock through poor farming practices was forgiven because he was well-liked and accepted as part of the community. No such allowances were made for newcomers to the community who were regarded as ‘outsiders’ (Barclay et al 2001; Barclay et al. 2004).

Informal social norms tend to be tacit and exclusive. Newcomers often lack the ability to learn the rules and unwitting breaches can jeopardise their acceptance into the community. Breaches of local norms cause resentment and feelings of powerlessness amongst landowners which can cause them to withdraw offers of friendship and inclusion within the community (Hall and Pretty 2008). Rapid social change in rural Australia evidenced by a number of farmers leaving farming due to drought and economic decline in some areas, counterbalanced by the tree change phenomenon in others, disrupts social capital. Declining social capital removes the networks, and trust essential for creating, updating transmitting and sanctioning social norms (Hall and Pretty 2008).

However, Barclay et al. (2004) found that even within some highly cohesive, stable rural communities, some types of crime (e.g. livestock theft) were allowed to persist and the reporting of such crimes to police was proscribed. Police complained that a code of secrecy operating in rural communities prevented them from obtaining information required to secure a warrant and target offenders. Many farmers who were victims of crime at the hand of a neighbour suffered in silence. Some were placed under pressure to keep the peace, and not accuse someone in the community of theft under threat of exclusion from the community. Some victims were judged by the community to be deserving of their victimisation. It appears that some norms while benefiting the majority can be

harmful to some. Portes and Landolt (2000) and Putnam (2000) explain that social capital can be inhibiting as well as constructive. If social capital is a resource available through social networks, the resources that some individuals claim may come at the expense of others. 'Outsiders' can be excluded. Social capital can restrict individual freedom and initiatives and can demand conformity; applying 'downward levelling pressures' and emotional and physical persuasion to remain within the group.

These same cultural practices and social judgements are likely to be extended to environmental management as well as environmental crimes within rural communities. However, these practices may vary according to the type of activity. For example, there may be strong disapproval of water theft but ambivalence towards unauthorised land clearing.

5.2.2 Social Norms and natural resource management

Well-functioning communities are a necessary condition for effective environmental management (Gross 2007). A community of people, who can work together, discuss and accept different points of view regarding natural resource management will achieve outcomes that are more broadly accepted. Rural communities are aware of the necessary ingredients for social sustainability. These include: *Cohesion*: the ability to cooperate and work together, *Community mindedness*: active participation, *Neighbourliness*: a friendly and supportive community, *Acceptance*: of different points of view, ideas, and newcomers, *Community life*: participation in social cultural and recreational activities, *Attachment to place*, *Inclusiveness*: open to assistance from outside the community, *Community support groups*: volunteers and a sense of community, *Communication networks*, and *Population stability* (Pepperdine 2001, cited in Gross 2007).

However, Hardin's (1968, p. 1244) article "The Tragedy of the Commons" highlighted the way open access resources are subject to collective action dilemmas— rational self-interest can lead individuals to outcomes that are inferior to those they could achieve if they worked together. Given these nuances within rural communities, how effective are communities in managing natural resources?

Governments have recognised their limitations in securing environmental sustainability and have turned from traditional 'top-down' models of centralised natural resource management that rely on government planning and management to a return to management by local citizens at the regional level. The goal is the concentration of management efforts on a single geographical unit with citizens central to the development and implementation of NRM strategies. This is a worldwide trend with around 60 countries moving to decentralisation in environmental management. This approach is considered more effective because local communities are closer to environmental problems and solutions than are remote governments and its policies and regulations (Lane, 2006).

However the model assumes that it is possible to identify a particular area for managing natural resources or a community of common interest such as a catchment or a bioregion. Yet environmental problems vary greatly across a region and do not respect jurisdictional boundaries. Furthermore, defining a region in terms of a community overlooks the impact of social variables of gender, ethnicity, class, age or farming approaches that can divide a community. While communities offer local knowledge and understanding, there is a danger of regional boards becoming parochial in their management strategies and priorities. Local management is further complicated by the increasing amount of public land and natural resources which creates issues of accountability (Lane 2006).

Reeve (2001) in a study of changes in Australian farmers' attitudes to the environment found that between 1991 and 2000, farmers had gained a greater appreciation of the policies of environmental organisations but their support for organisations such as Landcare had declined. There is also less support for various policy instruments aimed at addressing the problems of land degradation and making agriculture more sustainable, particularly policies that may increase costs for farmers.

However there was increased support for policies involving public subsidies for preventative or remedial measures against land degradation (Reeve, 2001).

A number of studies have examined the effectiveness of natural resource management by informal groups at the community level. Marshall (2004a) examined how irrigators within four adjoining irrigation districts in south eastern Australia implemented land and water management plans following a move by the state government to devolve responsibilities to a co-ownership by the irrigators. The government hoped that this move would encourage irrigators to cooperate with its policies. The irrigators had resented the Government operating the schemes unresponsively to their practical requirements. They objected to a culture of “them and us” where the Government set down the law and the irrigators merely paid the water bills and did what they were told. Under the new management structure, irrigators were able to collectively show that they were effective managers and would not tolerate people that did the wrong thing. Increased trust and feelings of ownership of the hierarchy regulating them made the irrigators more likely to take action against deviant farmers.

Previously it was seen as the Government’s water, and it was a bit of a sport trying to rip the Government off. But when it’s your own system, then they are ripping you off. ‘As more and more farmers take it up, I think greater pressure will be brought to bear on the ones that aren’t doing it’.

Compliance with informal as well as formal regulations was ensured through graduated sanctions as one irrigator described.

Our approach has been, first, education, second, encourage by incentives, third, make them aware that there are sticks in the cupboard and, fourth, you pull the stick out and use it. Murray Irrigation has got the ultimate stick of being able to turn someone’s water off. We seek to use that as sparingly as possible. But there are individuals who will always try and get around us. And anyone who does, by stealing water for example, is hit pretty hard.

The study concluded that farmers’ preparedness to see under-complying farmers sanctioned might be improved if they had access to information about how other farmers are complying (Marshall 2004a). The examination of the interplay of formal and informal laws in the management of natural resources within the social environment of rural communities was a major focus of the present study. Another was to seek farmers’ opinions on is the best management structure for optimal conservation outcomes in rural communities.

5.3 The present study

5.3.1 The survey

Questions within the study gathered data on the relationship between environmental conservation within rural communities and social norms and values. Measures included:

- **Land use conflict and maintaining social order**

Negotiations between neighbours in environmental management were explored by asking participants if land use changes on farms impacted on neighbours and how this was handled. Participants were also asked if land use changes on neighbouring farms had impacted on them and how this was managed.

- **Responsibility for NRM.**

Participants’ views on the norms of responsibility for natural resource management were explored.

- **Optimal NRM.**

Participants' views on the best management structures for natural resource management were sought. Participants also rated existing structures as to their effectiveness.

The data were drawn from participants' responses to the mail survey along with their written comments as well as from telephone interviews where more detailed data were gathered on how farmers negotiate disputes over environmental issues within the structure of small farming communities.

5.4 Results

5.4.1 Managing neighbourhood disputes

- **Impact on participants from land use changes on neighbouring farms**

There were 311 respondents (24.9%) who reported being affected by land use changes made by neighbours or others in their district. The following are some of the most common issues. (A full list of changes on neighbouring farms and their impact is presented in Appendix 3).

- **Pest animals**

Overall pest animals were defined as a major impact from neighbours activities for 202(65%) of the respondents. One farmer wrote:

Heavy stocking rates on neighbouring property have driven more kangaroos to feed on our pasture, also causing more damage to trees and fences. The impact is less feed for commercial production, cost of fence repairs, poor regeneration where roos camp.

Another farmer added that:

Fox control measures are much less effective when not all landholders participate.

The conversion of farming land to blue gum plantations contributed to increased problems with pest animals and birds, weeds and reduced water run-off to neighbouring farms (reported by 46 respondents (3.7%). One farmer wrote:

Land next door was sold to a blue gum company now planted out in trees. Weeds (thistles) blow across onto our land like it's snowing. There's now bloody kangaroos, hares and rabbits coming onto our land, eating our pastures and damaging our fences.

Another stated:

Blue gum tree farms have provided a safe habitat for foxes to breed in. We have losses of newborn lambs, invasion of native revegetation areas and impact on fauna.

State or national parks or forests create problems for neighbouring farms with increased pest animals (31 respondents (2.5%). Two respondents commented:

Since National Parks resumed 23ac of my property, it has become a fire hazard and there are problems with feral animals – foxes, town dogs and noxious weeds. Because National Parks won't burn, we are just waiting for one big bushfire.

State Pine Forests lack of control of blackberries and other weeds and pests. This has increased our cost in controlling blackberries and other weeds.

- **Hobby farmers**

With increased numbers of hobby farms or lifestyle blocks in many rural areas, poor farm management causes infestation of weeds, pest animals and disease such as ticks or lice on neighbouring farms (20 respondents (1.6%). In response to an associated question, 43% of survey

respondents agreed with the statement: *Hobby farmers have no idea about how to properly maintain the environment on their land.*

One respondent claimed hobby farmers increased the risk of... “fire, weeds, vermin, increase in price of farming land and rates, spray drift, and lice from infected sheep”. Another stated:

Properties are not maintained because of lack of water and because people buy properties for lifestyle (hobby farmers). There's more feral animals; more weeds (thistles, blackberries etc.)

Another noted divergent farming approaches cause problems.

Being organic farmers, the neighbours' sheep contain lice and other parasites which contaminate our sheep. Also weeds have spread due to their non-usage of weed control.

The introduction of olive groves or vineyards on neighbouring land limits farmers' ability to control weeds with chemical sprays and lowers water tables, and spreads seedling olive trees (11 respondents (0.9%):

Neighbours threats of legal action re overspray onto vineyards is inhibiting proper weed management.

- **Urban encroachment**

Urban encroachment leading to complaints from neighbours about normal farm practices (noise, odour etc.) was an issue for (5 respondents (0.4%).

Freehold block has been changed from farming to urban. Urban development has increased rates, caused us to change from bananas and pumpkins and melons to only cattle because of complaints and threats about spraying these crops.

Another recommended education for neighbouring communities:

The previous farm I managed for 22 years was very much impacted by urban sprawl and associated problems; e.g., people uneducated (or just plain ignorant) of farming practices. I think there is a real need to educate non-farm people about the day to day problems of farming, and the fact that the vast majority of farmers are probably more environmentally concerned (and acting on environmental problems) than the general population.

- **Mining**

Mining on neighbouring land results in a reduction in water table and loss of water to farm dams, noise and dust (8 respondents (0.6%). One respondent reported that coal mining caused: “Coal dust and noise and power lines traversing the land”. Another farmer wrote:

A lack of water in creek which runs along border of my property partly caused by extractive industry (Sand mining). It also causes excessive noise and dust and road traffic. Visual pollution!

Water access is often linked to concerns about mining:

Because of the huge amount of water the mine uses/bore fields when drilling, damming creeks, purchasing large amounts of water from Lucerne holders along river at big prices, water is becoming a scare commodity for landholders below the mine

- **Water**

Dams or irrigation development by neighbours have decreased water flows or in other cases caused flooding and crop damage for 17 respondents (1.4%). One farmer wrote:

Neighbour (hobby farm) has built a dam on creek - less water in drought. Community is up in arms – He didn't really need to dam.

Similar issues had increased problems of salinity for another farmer.

Damming of watercourse upstream reduced flows downstream. Our property is entirely dependent on water sources from property dams. The impact increased salinity in dams resulting from lack of flow which is necessary to dilute salts introduced by spring on the property creek line.

Flooding was an issue for another:

My property is situated on the outer edge of a major floodplain. Floodplain development by irrigators has raised water levels on my property. I now have less high areas to keep my stock alive during floods. This means those areas become severely over-grazed during high floods.

- **The downside of conservation**

Conservation activities can cause a negative impact for neighbouring properties. The introduction of wildlife corridors has increased pest animal numbers on neighbouring properties (12 respondents (1.03%). A farmer wrote:

Excessive planting of wildlife corridors has increased fire hazard through an inability to access and control bushfires and increased invasion of pest animals, particularly kangaroos, which we are not legally allowed to control. It reduces our stocking rates.

One vineyard owner stated:

Neighbour feeds kangaroos, silver eyes and parrots. This has significantly increased numbers which have caused damage to the vineyard. Vines get damaged, less grass, damaged fences, and bush is heavily eaten out by kangaroos.

Sustainability is difficult if neighbours do not share the same commitment.

A neighbour has 6000 acres and I doubt that there is a standing dead tree left on it. I think the more biodiversity the more good insects, birds, animals, mixture of trees (as long as it is not impinging your agricultural production) the better. There were areas of Stringy Bark timber where he has cleared everything out underneath and has cleared (what I would consider) timber illegally. He opened up a wind tunnel under those trees into my place. That has had some effect on me. The reason for doing it is to make his place nice so he can sell it. The shire came and had a look and apparently said he could remove a couple of trees that were deemed dangerous. He ended up cleaning up all the dead trees, not just two or three that could have been dangerous – plus all the other dead and a few live trees. The Shire manager said “you can’t get anywhere with people like that. We don’t have the time, resources or money to do anything about upholding the issue”.

Another farmer reported problems with maintaining best practice standards on land he had leased to another farmer.

The neighbour is a third generation professional farmer and he had a very good farm, better country than mine. When he leased my place he ran into drought and he kept driving it harder and harder until finally I had to say look I’m going to terminate this lease if you don’t back off a bit. He got very upset because he felt it was his right to keep driving the land until it rained again. Eventually we sorted out our differences and I think he has modified his attitude. I stuck with him because in the middle of the drought I thought well if I throw him off, I’ve got no return. There doesn’t seem to be any acknowledgment that the long term damage he was doing was going to be my problem. I think that the general attitude is that when they lease short term, I’m just going to get everything out of it that I can and then leave.

- **Impact on neighbouring farms of land use changes on respondent’s property**

When asked if the respondents themselves had made land use changes to their property which elicited any reaction from neighbours, 208 respondents (16.7%) reported they had. Of these 116

(9.3%) reported they had a positive response, 63 (5%) had a negative response and 19 (1.5%) had both positive and negative reactions from their neighbours. (A full list of neighbours' responses to land changes on participants' farms and their impact is presented in Appendix 4). The types of changes reported varied from property development to different types of farming to environmental conservation activities.

- **Positive responses**

One extensive project had good feedback from neighbours.

We cleaned out 2kms of blocked creek, returning 1000 ac of runoff to a Lake; this runoff was artificially diverted direct into the sea 30 years ago. Lake dried up 06/07, reportedly a first in 100 years; becoming a 500 ac clay pan; very unsightly; all hope the lake refills.

There was a strong theme within the reports of the importance of community acceptance of what a farmer did on his/her property. For example, respondents reported:

...We moved to no-till and stubble retention - the positive comments are encouraging

...We planted lots of trees as shelter and shade for the environment many years ago. Lots of people admired and began planting - we were very pleased.

...We implemented erosion control and rehabilitation. We are pleased that neighbours recognise our effort.

...We have had positive comments about the vegetation we have established. It made us feel proud, enthusiastic, and grateful.

...We changed from continual grazing to rotational grazing -Pleased that others thought we were doing the right thing; i.e., better land/grass management and better productivity.

...We have got 3 areas that have been fenced off and have not been stocked. There are other areas that have been planted with tree strips or replanted native timber. People who saw the property 25 or 30 years ago have said how much the trees have grown. It makes you feel that your time and efforts have been worth it and I would hope that in terms of value of the property it has been maintained.

Several farmers saw themselves as modelling correct behaviour to encourage others. Clearly altruism is a motivating factor.

...Improving pastures, improving fencing, planting trees and seedlings. Very satisfying, nice knowing that it affects more than just us.

...With drought conditions/lack of irrigation water we grew a lot of maize to enhance water usage and grow a large tonnage of harvested feed. It was very satisfactory to achieve good milk yields in adverse conditions and fellow farmers visit to talk about the success.

...Implemented planned grazing, use goats on weeds, organic practices. Some neighbours took it up, some then started to look at own practices.

One understood that there was a need for innovators to lead the way and that uptake of new practices took time.

Farming for fun versus grazing for profit - was one comment. Curiosity from neighbours about our pasture cropping. New ideas need to be proved to be accepted!

- **Negative responses**

Negative responses from neighbours can also facilitate change. One farmer reported:

Many years ago we had a small sand mining operation on a property which we no longer own. The negative reactions from the neighbours made me think and reassess the widespread deleterious impact of such operations in or near watercourses.

Another grazier had switched to Dorper sheep but complaints from neighbours saw him change back. He wrote: "You need a 10 foot concrete wall to control them; they wandered everywhere!"

Another farmer had also changed due to a desire to maintain social cohesion.

We have given up growing grain sorghum due to the problems of weed control "in crop". Growing and rotating Lucerne more, for soil nutrition, grazing and hay. It's nice to be on good terms with all neighbours, even crop growers.

Some just ignored neighbours negative reactions.

Some neighbours think revegetating corridors is a waste of land. Didn't bother me as I knew I was doing the right thing.

Another believed he could talk his neighbours around.

We are fencing out waterways, replanting erosion areas. I don't care what they think - I know I'm right. I'll try to change their attitude by friendly discussion.

Many of the reports of complaints from neighbours concerned the differences in opinions about farming activities between long time farmers and newcomers to a district. In many of these cases the newcomers are lifestyle farmers. For example, one farmer reported that having spread manure onto his land neighbours complained about the smell. He described the complaints as petty. Others reported that urban sprawl was creating complaints about farming activities.

Non-farm neighbours have objected to most things we do as farmers; e.g., use underground water, use machinery that makes noise, vehicles that make dust, use chemicals etc. We feel put out and annoyed at their wasting of our time, especially as we had taken all reasonable steps to protect their interests.

One other farmer noted his frustration.

Received complaint (written) about colour of farm shed! So trivial! Too much interference in other people's lives.

Another stated:

We put in protective canopies (netting) for exclusion of hail, birds and fruit bats (flying foxes). This is a rural shire with 4th and 5th generation farmers. New residents should be aware of farming practices before they choose to live in the shire.

One other noted the tension within a community that disputes create.

Managing water and salinity. Open-minded people very supportive. Close-minded people have been terribly destructive. Caused impact physically and mentally. Also caused tension within the community.

Fifteen respondents noted that received negative reactions from their neighbours when they changed their production type, particularly if the new enterprise was viticulture or organic farming. Concerns appear to be related to chemical use, particularly herbicides. One farmer wrote:

Expanded high-density horticulture, viticulture vegetable growing, and value adding to horticulture. We were extremely angry about anonymous complaints to Council (all complaints dismissed)

Others noted that tensions softened over time.

Initially some negative response at growing grapes rather than sheep and cattle, but now most are quite happy to drink the wine. I ignored it. It is now 18 years ago, so no longer an issue.

- **Mixed responses**

Other farmers had to deal with both positive and negative responses.

We did some stream-side revegetation. Some neighbours were impressed by the aesthetic appearance. Others were worried by the possibility of tree limbs and litter choking the waterway.

5.4.2 Maintaining social order

Farmers were also asked for their suggestions on how to manage these situations. Many of the participants stressed that farmers are making positive changes to their land management practices to improve the environment on their land as well as in their local community. One comment that was a common response was:

Farming is not a high margin operation farmers I know are doing the best they can. No one sets out to wreck their farm.

However, there was acknowledgement that some farmers are financially stressed and are unable to do as much as they would like to – or should do. There is also considerable concern about lifestyle farmers and others new to the industry that lack sufficient knowledge about best practice management generally as well as contextual local knowledge essential for sustainability. A common tact was to lead by example rather than confront landowners who were not doing the right thing. One respondent reported that environmental improvements he had made on his property included revegetation of areas, fencing off stock from native vegetation areas and water conservation. He added he was: ‘hoping we are providing neighbours with motivation to improve their own properties’. Another farmer who had implemented biodynamic practices was ‘pleased to see they noticed the difference between their land and mine’. Another reported his neighbours had followed him planting trees for water table reduction and shelter. One was pleased that his efforts ‘had positively influenced whole community’. As noted above, there appears to be a certain degree of altruism in these approaches.

Much adoption has traditionally occurred through farmers “looking over the fence”. Participants’ comments indicate that this tradition persists.

The fact that farmers look over the fence and see what the others are doing, I think there is some pressure there to make some changes. Looking at my neighbour – good bloke, good neighbour but he would not be an environmentalist but you see him planting trees. Virtually all the neighbours have planted some trees or fenced off some regrowth etc. I think they are much more inclined to do it now than they were 10-20 years ago.

One farmer stated that leading by example was the optimal way for achieving change.

If you want to achieve something, the first thing you don't do is be a tall poppy. You just quietly do it and people adopt it, or not, as it pleases them. We established trees in every paddock, mainly for stock protection. I think people have picked up a few cues from us – my neighbour wasn't into tree planting but now he has put quite a few trees in. I was talking to another neighbour who was not exactly a sensitive environmentalist and I said to him that I thought that farms with trees were going to be worth more money in the future and now he has got a lot of ground prepared for tree planting. I don't think it was the environmental issue with him, I think it was more the suggestion of the dollar value.

Several participants recommended that field days were ideal for disseminating this information but often the newcomers do not attend. One participant stated:

There was a problem with bad weeds in the district so we ran a field day with the best presenters. About 25-30 farmers came. But it didn't really attract the “new” farmers. We believe that by running field days this might spark the need to do something. I only discuss problems with small of number of neighbours because there are not many “old” farmers left in the district. Pointing the finger doesn't achieve the desired result. Field days seem to be most successful method and DPI have run some sessions.

Another agreed:

A lot of people are still nonplussed wanting to know what to do. So much knowledge out there and most of it is academic. The system needs showcase farms, but they need to be farms that are successful. Neighbour won a national award recently. These people should be paid to open their farms for other people to go and see. Most farmers actually see and believe, not hear and believe.

One participant was concerned that real estate agents mislead buyers or lack knowledge themselves of environmental issues in their area. This is one sector of the community that could be educated to disseminate information to buyers new to farming as an occupation and as a lifestyle.

Real estate agents give false or misleading information to people that buy properties. There's a property down the road here that has just been subdivided, and people we know have gone to look at a property there, we were told it is no problem you can put a pump in the river and get water. No talk of water permits or the fact it is bedrock not sand, which could be a problem. And they were talking to people who have never been on a property before in their life and knew nothing. They rang me about it and I just said to them you better ring water resources first to find out where you can pump out of that river without a permit because we need a permit here and we are up river.

One participant maintained education targeting new farmers/lifestyle farmers was essential.

Guide book in simple language on vegetation management issues regarding permits for land clearing etc. needs to be made available to all landholders. Smaller holdings and those new to agriculture need to get real info about animals etc. pest management and issues that larger holdings know about by experience. Some things smaller ones just simply don't know! e.g., animal health, weed control, simple things like stock rates/acre etc. Lantana, rubbervine are declared noxious weeds not "get there one day" or a pretty vine/bush growing in the paddock! Parthenium is not just a weed that came up after we mulched the 5 mango trees. It will die down soon!! Not their fault - simply don't know!

One preferred the big stick approach was necessary for the few people who do the wrong thing.

There always appears to be 1 or 2 farmers in most districts who do the wrong things in terms of farm management and land management. Unfortunately these types won't and don't listen to anybody and won't be represented in any of these surveys because they (a) couldn't be bothered; (b) aren't very literate; (c) are absentees. It's also unfortunate that some of these types of farmers come under the media spotlight.

Other participants urged improvements in extension:

We need more information. I know Agforce is doing a good job doing what they are doing, I went recently to one of their seminars on land clearing and alternatives and I was really impressed but there weren't enough people there. I think a lot of people are put off because it's Agforce, or it's someone else or another organisation. Why can't I just turn up at the DPI and just talk to them? Why can't they have someone come out to me and I'll show them what I want to clear, more field officers sort of thing -more hands on people that know what they are talking about to come out and I can say 'I want to clear this paddock, what can I clear and can't clear, do I need a permit for this or that'.

When asked how the community managed landholders who were not doing the right thing, one farmer reported that the local Catchment Management Board had been effective in dealing with these issues.

I might approach the person and encourage them to do something to about it. But you can't really be too pushy, otherwise people will become obnoxious. The catchment board is more likely to set an example rather than putting pressure on farmers. Our biggest weed problem would be blackberries. The catchment group gave everyone spray to use. This was a big incentive.

Another argued CMAs should have more power.

Measures taken by authorities to bring these bad farmers into line often get the good farmers offside. RSPCA inspectors are allowed unconditioned access and prosecution powers - these should also be given to CMA's for land "abuse" cases.

One respondent suggested bounties could provide incentive for change.

Payment for recycling cans, bottles etc.; like in South Australia - 5c per item tidy up the landscape - may it worthwhile. Bounty system for feral animals; e.g., foxes, pigs, wild cats, wild dogs; e.g., \$1 per fox, \$3 per pig. Agencies will know exactly how many are killed and much it costs.

One participant urged a review of Drum muster.

Drum-muster is just the agricultural chemical industry flip-passing its problems to the purchaser of their product and then basically passing it back to the councils who signed up for drum muster. Drum muster are collecting somewhere between 25 and 30% maximum of what they are putting out into the community. Most farmers don't realise it but they actually pay for drum muster when they buy their chemicals but the other problem is of course that many products that we use aren't registered for Drum muster. There is probably only 50% of the products we use actually in 5, 10, 20 litre containers, plastic or tin, that are actually registered for drum muster. Council tips are not open all the time and not all tips are registered to handle chemical containers either. I prefer the European model where the manufacturer or the re-seller maintains the responsibility for that container. I'm happy enough to pay a deposit on it, and return it to the re-seller. That is the easiest path because you are going from them buying stuff off you all the time to, take your empty containers back to them, and let them deal with it from there.

Another believed improvement will come as new generations of younger farmers who are more environmentally aware extend their influence.

Old people live in the past. Young educated people have the energy to think and bring about change and some changes will be good.

It is evident that maintaining social order in managing natural resources in rural communities is a complex and often frustrating task for landholders. Therefore, who should be responsible for ensuring compliance with informal and formal regulations governing natural resources? This question is explored in the next section.

5.4.3 Responsibility for natural resource management

To assess farmers' beliefs and the social norms regarding the responsibility for environmental management on farms, participants were asked to rate property owners, governments and other agencies according to the degree to which they believed they were responsible. Responses ranged from *Mainly Responsible*, *Partially Responsible* to *Least Responsible*. Figure 4.1 presents the farmers' responses.

The majority believed property owners were mainly responsible and governments and other agencies were partially responsible. This finding reflects traditional views of property right and informal social norms that expect that farmers be responsible for the wellbeing of their property (Barclay et al 2004). Surprisingly industry bodies were seen as being least responsible. Yet industry bodies have been proactive in establishing best practice standards for sustainable production that necessarily include conservation practices.

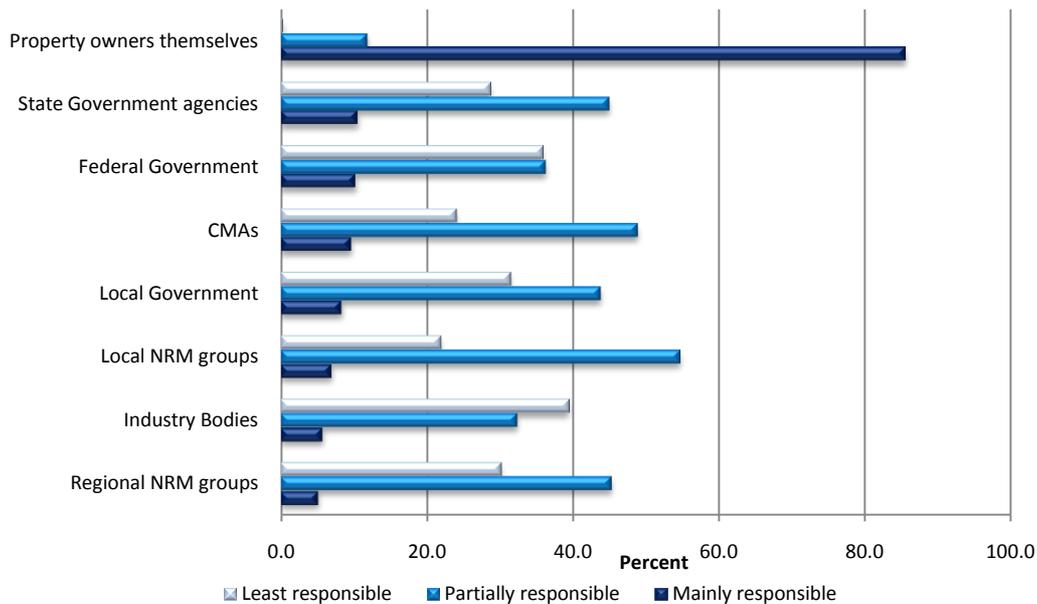


Figure 4.1: Perceptions of responsibility for environmental management on farms (N=1248)

5.4.4 Effective natural resource management

Participants’ views on the effectiveness of natural resource management at the local community level was explored (See Fig 4.2). First participants’ rated the effectiveness of various agencies for environmental resource management. Farmers were asked to rate on a five point Likert Scale how effective they believed each group was. As found earlier, individual landowners were rated as the most effective followed by local farmer and local community groups.

It is evident local ownership of natural resources is preferred. One farmer stated that farmers need encouragement to take on this role.

Farmers need to be encouraged to take the lead by appropriate education incentives (money or whatever) because if farmers don't own up to the issue they're not going to do the job and if they don't feel a real ownership of the issue. I think it's important that the education carrot be pushed more so farmers will actually want to take the lead but they will have to be in a financial position to be able to do that. At this point in time the reason we are doing this \$16,000 project is that we had some spare cash. Every situation is different.

Another agreed:

If society wants farmers to care more than we already do the Government should give a 2% to 5% tax deduction for all Landcare work. Farmers are conscious of environment and Landcare as their sons usually become farmers and need the farm to be viable.

Another suggested:

Encouragement and assistance always works better than enforcement. Make it easy and encourage people to participate! If you want to attract an interest in something put dollars in front of the arrangement. Returns from farming are often poor, if not negative. Financial assistance or reward will always have a strong response and if the country wants action they have to be prepared to pay for it.

He added:

Bureaucracy often destroys good ideas and support bases; i.e., country fire brigade support, Landcare groups, regulation to obtain and carry out fox and rabbit baiting etc. All well intended, but very poor ongoing results and permanent damage to grassroots support.

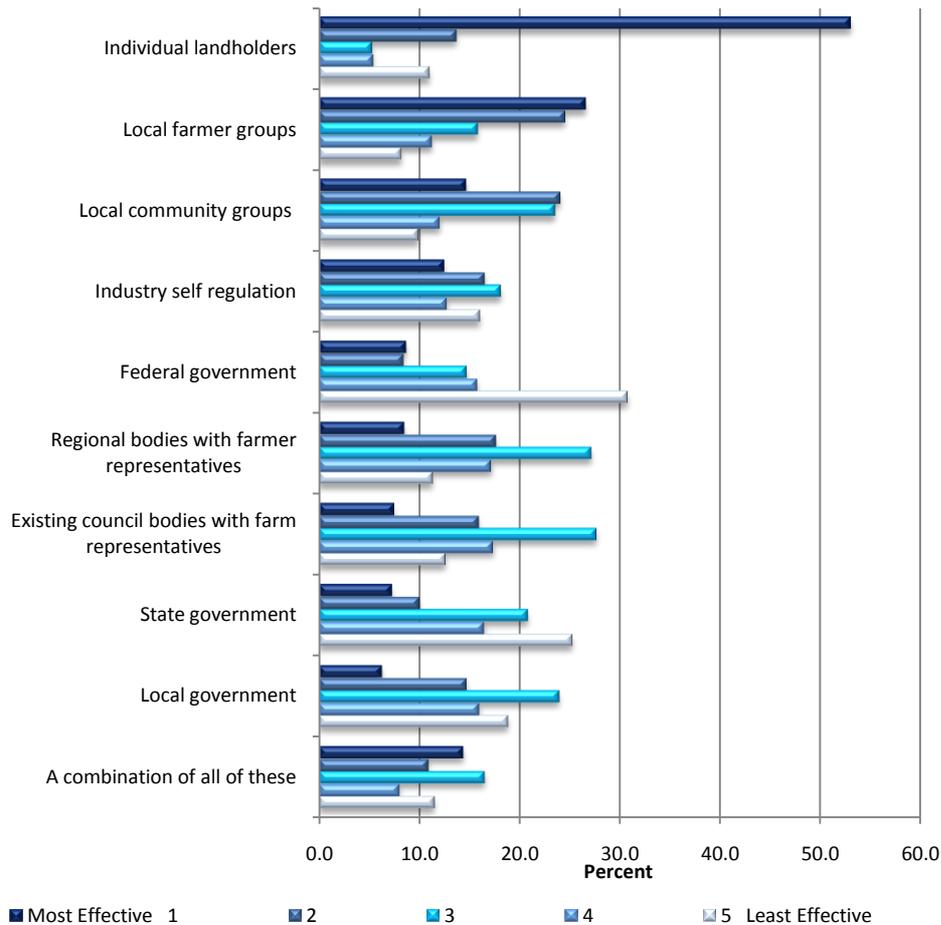


Figure 4.2: Ranking of effectiveness for natural resource management (N=1248)

Many farmers reported that they were disenchanted with Landcare. One wrote:

Landcare projects are heavily biased by larger landholders and inadequate accountability by regional bodies to monitor delivery of monies and project objectives.

Another stated:

Landcare began here in the mid 80's, and it was run by a large group of farmers and they did a whole farm planning course. If you look at those farms today, the impact of the whole farm planning on those farms is quite obvious. Since then most of these real farmers have left and we have a new group running Landcare and they are blockies or "townies" and hobby farmers. The whole focus has changed. For example, we did a lot of tree planting back 10-12 years ago used direct drilling and sprayed once when planting and then again prior to seeding. We used a direct seeder with two people, used about \$300 worth of seed in an afternoon and got 5,600 trees. The Catchment boards are now quoting \$5-\$7 per tree to plant and think that's a reasonable way to do it. I was looking at grants the Landcare group got in last 12 months - \$20,000 and I can't see what they have done with it. In the mid-80s we got \$20,000 worth of fencing material and you can see the impact of that grant. I've sat on our catchment board for years and the Government is not getting value for money that's been spent in terms of action on the ground. We are not involved in Landcare anymore. A lot of these people in Landcare now are greenies - they are in your face about what we do. We have had another horrendous drought this year and I know we are overstocked and they are in our face about the issues of the drought and this is the last thing we need. It's like a group of farmers that have a totally different set of values.

5.5 Discussion and conclusions

The findings have highlighted a number of environmental problems that cause conflict between neighbouring farmers. Weeds and pest animals are primary concerns, as is access to water; a salient problem within drought ridden regions. In some situations, landholders are powerless to manage negative impacts from neighbouring land owned by national parks or state forests or mining companies. This leads to considerable frustration and anger that legislation governing farming activities is perceived to not apply to these land users.

Many farmers were motivated by altruism to lead by example and benefit the wider community and were proud when they received positive responses from their neighbours for their conservation efforts. Recognition, by peers and the community of conservation efforts by landholders are a powerful incentive particularly for socially motivated farmers (Greiner et al. 2009).

There appears to be consensus that leading by example is also the best way to change behaviour in landholders who are not managing sustainably. Farmers prefer not to approach neighbours directly about problems. As found in previous studies, the need to sustain cohesion within rural communities is an important social norm. Several respondents noted that the way farmers farm their land is their business. This also reflects the norm that landholders are ultimately responsible for managing their land. "A 'quiet word' is had only when a neighbour's practices become a serious problem for a farm operation.

However, social change caused by a movement of farmers out of farming, a growing trend of hobby/lifestyle farmers, and urban encroachment has resulted in a greater diversity in land uses which can exacerbate conflict within communities. Farmers' efforts to lead by example are not always acknowledged by newcomers. Farmers' are willing to be inclusive and share their knowledge and advice with newcomers but often their efforts are in vain. Persistent problems with weed and pest animal management which emanates from neighbouring land are costly for landholders and can result in the withdrawal of offers of friendship, which can alienate newcomers from a community.

There is a strong need for government at all levels to target educational programs for farmers new to the industry and hobby or lifestyle farmers to ensure they are aware of local environmental problems and the necessary practices for sustainable farming as well as the pertinent environmental laws and regulations. Real estate agents could be targeted in educational programs or even by regulation to ensure that they do not give false or misleading information that may affect future land management. This group may also be a conduit for providing information to buyers of farmland.

The norm denoting responsibility for land management to the landowner was reflected in participants' views on the optimal structure for NRM in rural communities. Many are disenchanted with Landcare and it appears that social change is responsible for the withdrawal of farmers from these groups. New farmers, lifestyle farmers and non-farmers with different ideas are taking a leading role in Landcare leadership and many traditional farmers are feeling alienated. There is also widespread disillusionment with the dissemination of grant funds. Landcare was introduced in 1990 in response to nationwide concern about land degradation. There are now around 4000 Landcare groups across Australia. Landcare has been successful in motivating volunteers to work together address environmental problems within their local catchment. However while significant environmental improvements have been made, problems with land degradation persist and with rising concerns about climate change, and food security for a rapidly increasing population, the management of natural resources remains paramount. Current management structures including Landcare will need to adapt to meet these challenges (ABC Landline 2010). As Brett De Hayr National Landcare Facilitator stated:

Landcare never went away but its time may have come again. Landcare may play a very significant role going forward, because it's clear that we can't do what we need to do in isolation any more (ABC Landline 2010).

These issues were explored in depth in the case studies conducted in Part 2 of this research project.

6 Farmers' perceptions of Climate Change

6.1 Introduction

Dorothea Mackellar's famous Australian poem "My Country" describes her love for "a sunburnt country, A land... of droughts and flooding rains" (Mackellar, 1908). The poem reflects the extremes that are characteristic of Australia's climate. Australian farmers have managed these extremes by developing some highly adaptive land management systems, although persistent drought over the decade has seen many leave farming (BRS 2006). Scientists are concerned that accelerating climate change will expose farming systems to unprecedented extremes that will affect not only the profitability of agriculture, but also the way it is managed, including the way environmental conservation is managed (BRS 2006).

There is very little empirical evidence on the way farmers across Australia view climate change and their adoption of recommended practices to prevent land degradation. The present study sought to fill this gap through an analysis of a subset of data from a nationwide survey of environmental conservation on farms. Two aspects of the data were examined. First, farmers' attitudes and beliefs, including perceptions of risk concerning climate change were analysed to develop a four-fold typology of risk perception. Risk perception is defined as the perceived likelihood of negative consequences to oneself and society from climate change due to global warming (O'Connor et al, 1999). Second, using this typology, the degree of environmental conservation of farms was examined. This research is exploratory in nature, acknowledging that there are a number of factors influencing farmers' perceptions of climate change. The findings are detailed in this chapter. It begins with a review of previous studies of the impacts of climate change for agriculture.

6.2 Background

The past decade has seen extensive research into climate change (Garnaut 2008; IPCC 2001, 2007, CSIRO-BOM 2007). Using climatic modelling CSIRO-BOM (2007) projected that climate change is likely to result in reduced rainfall in southern Australia, decreased snow cover, increased average temperature and evaporation rates, more severe weather events, drought, increased wind speed and fire risk, mean sea level rise and increased storm surges.

Some studies have conducted vulnerability analyses to assess a region's level of exposure to climate change risks and adaptive capacity to cope (Grothman and Patt, 2005; Nelson et al 2008; Sietchiping 2006; Swanson et al 2007; Walcott and Wolf, 2008, CSIRO-BOM 2008). Others have focused upon the effects of climate change upon a particular agricultural industry and the ways in which producers will need to adapt to maintain productivity (Smit and Skinner 2002, Howden et al 2007). For

example, Sposito (2006) found the grains industry was one of the most vulnerable industries to climate change particularly in the Victorian wheat belt which has been subject to unrelenting drought and socio-economic decline. John et al (2005) modelled the effects of climate change for an extensive dryland farming system in south-western Australia and found that climate change could reduce farm profitability by 50% or more which will in turn affect the capacity of farmers to adopt practices recommended to prevent land degradation.

A review of the literature found very few empirical studies of Australian farmer's perceptions of climate change. Case studies of 23 Australian farmers' innovations to manage drought which began in 1999 (Blackadder 2005), found climate change was rarely discussed in 1999 but by 2004, farmers acknowledged that climate change was the cause of increasing climate variability and were developing different ways of dealing with this uncertainty. As a part of a large study of wool grower's management practices, Thompson (2008) found that farmers varied in their acceptance of climate change and in the type of information their perceptions were based on – such as climate records and their own farming experience. She concluded that not all producers accept that current climate trends are indicative of permanent climate change, and consider the current changes to be normal climate variability (Thompson 2008).

A study of four drought affected communities in New South Wales and Victoria (Milne et al 2008) also found high variability in people's perceptions and a great deal of uncertainty. While most of the 148 participants (76 of whom were farmers) were open to the idea that climate change could be a reality, many believed the causes of climate change were natural rather than an outcome of human activities. Several felt bombarded by conflicting information about climate change and doubted the accuracy of the sources. They expressed optimism that the drought would break and things would return to normal (Milne et al 2008). The study found people were motivated to respond to climate change if they believed there was an immediate risk to their livelihood or community wellbeing, or wanted to respond to the challenge to overcome the impacts of change such as drought, or held a sense of moral responsibility to reduce greenhouse gas (Milne et al 2008).

For a number of reasons, not all farmers will believe in climate change or accept the reality of anthropogenic global warming and adopt recommended land management strategies to counteract climate change impacts. Hayman and Alston (2001) found that crop producers in Northern NSW trusted traditional farm management practices. They viewed climate as drier and more unpredictable than the long-term climate records indicated. They rejected, or were yet to adopt, regular soil testing or the use of climate forecasts or decision support programs, relying instead on simple rules of thumb based on readily accessible data such as past grain protein content and cropping history.

Farmers' uncertainty about climate change is exacerbated by the overwhelming and occasionally conflicting scientific information (Milne et al (2008)). In this they are no different than the rest of the population (Etkin and Ho 2007). The annual "Who cares about Climate Change" survey of NSW residents found that although public concern has increased since the initial study was conducted in 2003, over half of the population were confused or incorrect about the actual causes of climate change and 5% knew too little about the issue to respond. Pro-environmental behaviours were linked to environmental concern rather than knowledge (NSW DECC 2008). Buckeley's (2000) survey of residents of the city of Newcastle found participants' understanding of climate change drew upon scientific information as well as local knowledge, personal values and moral responsibilities. She concluded that measures to encourage behavioural changes to better respond to the impacts of climate change will benefit by taking public understanding of the issue into account (Buckeley 2000). This also applies to the farming community. Samson (2006) recommends that the process of managing climate change risk should be producer driven rather than being imposed by outside organisations. This will require a sound understanding of the world view of producers to incorporate that understanding into future policy and practices to reduce the impacts of climate change.

Investigations into farmers' perceptions of climate change overseas reveal similar issues. A survey of UK farmers revealed 63% were actively combating climate change by improving energy efficiency, reassessing fertiliser requirements and reducing fuel consumption, and 12% were investigating new business opportunities to respond to climate change (Farming Futures 2008). Focus groups with 53 farmers in Alberta Canada (Stroh consulting 2005) found differing levels of concern about climate change. Half of the participants had changed their operation due to climate change although their goals were limited by financial constraints. Farmers hoped communities would stop blaming farmers for global warming and work with them to reduce the impacts of climate change. They also hoped governments would reward farmers for improving their management practices. In Mexico and in Argentina, Wehbe et al. (2006) found that local context, existing practices, and farmers' perceptions were important for the development of adaptation options to climate change. O'Connor, et al (1999) in a study of 1225 Americans found risk perceptions are important in predicting a willingness to address climate change.

6.2.1 Aim and hypotheses

The review of the literature highlights that farmers' acceptance of the reality of climate change is related to their active engagement in land management strategies to counteract climate change impacts. However, perceptions of climate change are clouded by uncertainty. The aim of the present study was to further explore that relationship using a social-psychological approach. A fourfold typology of risk perception was developed to examine the relationship between perceptions of climate change risk and conservation practices given the uncertainty of how, when, or where climate change impacts will occur.

The research is exploratory in nature, acknowledging that there are a number of factors influencing farmers' perceptions of climate change. However, the study sought to assess perceptions of risk against a range of other factors to identify the effect of risk perception on behavioural responses. It was hypothesised that farmers who accept the reality of the risk of environmental damage from climate change but also consider they have some measure of control over the risks will be more likely to be involved in environmentally sustainable activities and conversely, farmers who reject the reality of the risk of environmental damage from climate change and believe they have little control over climate induced environmental damage will be least likely to be involved in environmentally sustainable activities.

6.3 The survey

- **Perceptions of Climate Change:**

The literature revealed that farmers dismiss the notion of a permanent and increasing change climate because climate variability is a fact of life. Responses to open ended questions within the present study confirm this fact.

I am [a] fourth-generation farmer and my son farming with me, fifth. We have climate variability, not climate change.

I have seen the [19]30 and [19]40 droughts and as far as I am concerned these last few years are not in the same course as the 1930 or 40s. In those years there was no irrigation and we used to get dust storms and it would go pitch-black dark about 4 o'clock. One wouldn't see the sun set. Our boundary fence was sanded up on New Year's Eve 1938-39 with sand. We used to catch rabbits on foot. All these science professors talking about climate change don't know what a drought is. 13 Jan 1939, Black Friday, the temperature went to 119 degrees at home. The birds came under the verandah and settled on the water bag to try and get a drink. From 1946 to 1967 we had a good run of years and we had another good run of years from 68 until these last

few years. This climate change is only book education. In the 30-40s, the Murray River stopped running. Anyone could walk over it. But it did return to a beautiful river and still is.

Other comments suggested that while they believed that climate change was part of natural variability, they were also more willing to consider an anthropogenic influence:

I believe climate variability and climate change are the same thing. Our impact is a very complicated science of which there are still conflicting theories. I do believe carbon is a factor but one of many factors brought together.

Therefore to clarify whether or not respondents believed in climate change, the following question was devised and rigorously piloted.

People have a wide range of opinions on climate change caused by increases in greenhouse gases produced through human activities. Please indicate how much you agree or disagree with the following statement.

'I don't believe there is any such thing as climate change because climate variability has always been a normal part of farming in Australia'.

Farmers rated the statement regarding their belief in the reality of climate change on a four point scale ranging from *Strongly agree* to *Strongly disagree*.

- **A typology of risk perception:**

Respondents were then asked to indicate their level of agreement to five statements pertaining to environment risks from the impacts of climate change also on a four point *Strongly agree / Strongly disagree* scale. These questions were designed to elicit an understanding of how farmers' perceive and cope with the prospect of environmental degradation as a result of climate change when there is little knowledge of how, when, or where this may occur. This instrument drew upon a scale devised by Lehman and Taylor (1987) which produces a fourfold typology of locus of control by perception of risk of a climatic event. This scale measures responses along two axes: one of appreciation of the reality of the risk and the other whether the risk is controllable. An individual's risk perception attitudes may be plotted along these axes, for example someone might be very concerned about the risk of damage from climate change, yet they may also believe they have some measure of control over their ability to reduce the potential damage. This typology was then used to analyse the responses to questions on environmental conservation behaviours.

6.4 Results

6.4.1 Belief in climate change

There was little consensus amongst respondents to the statement which expressed an outright rejection of climate change (Fig 5.1). A high proportion of farmers were undecided.

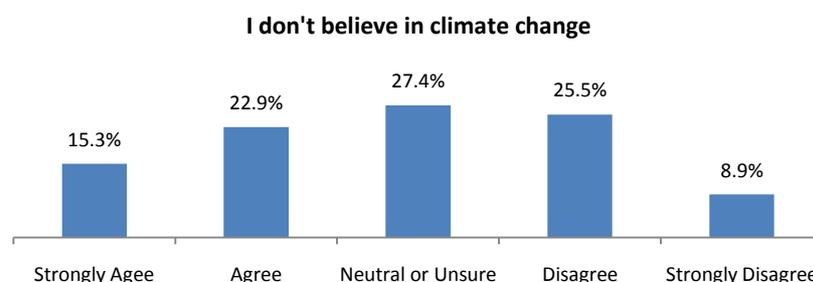


Fig 5.1: Attitudes to climate change (N=1926)

There were no significant differences between belief in climate change and gender, or education. However, younger farmers were significantly more likely to believe in climate change than were older farmers ($\chi^2=16.06, p<0.05$). Fig 5.2 shows the proportional responses to the question within each age group.

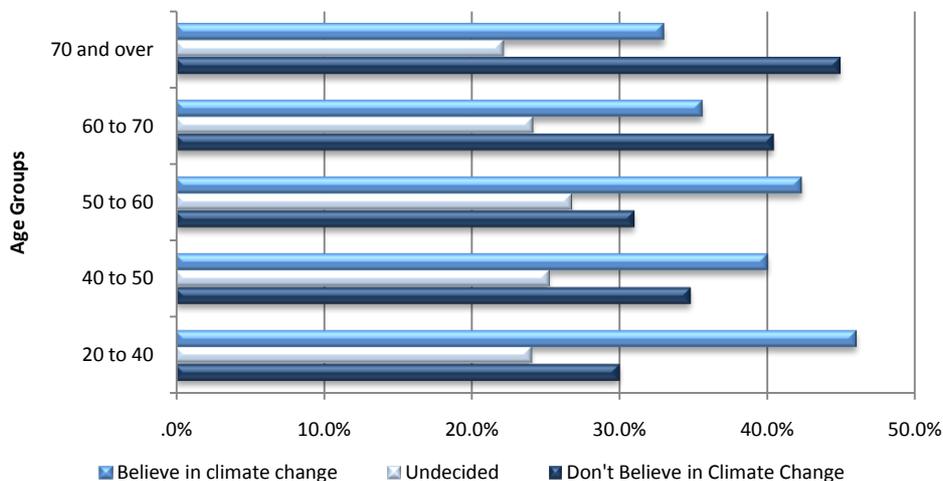


Fig 5.2: Belief in climate change by age (N=1248)

There were significant differences in belief in climate change across industry types (Fig 5.3). Farmers (croppers) were less likely to believe in climate change than graziers or mixed farming operators ($\chi^2=13.2, p<0.01$). There were no differences between different grazing industries but there were between cropping industries ($\chi^2=14.4, p<0.01$). More cereal growers did not believe in climate change while those growing fodder crops were more likely to be unsure. More grape growers accepted climate change as a reality.

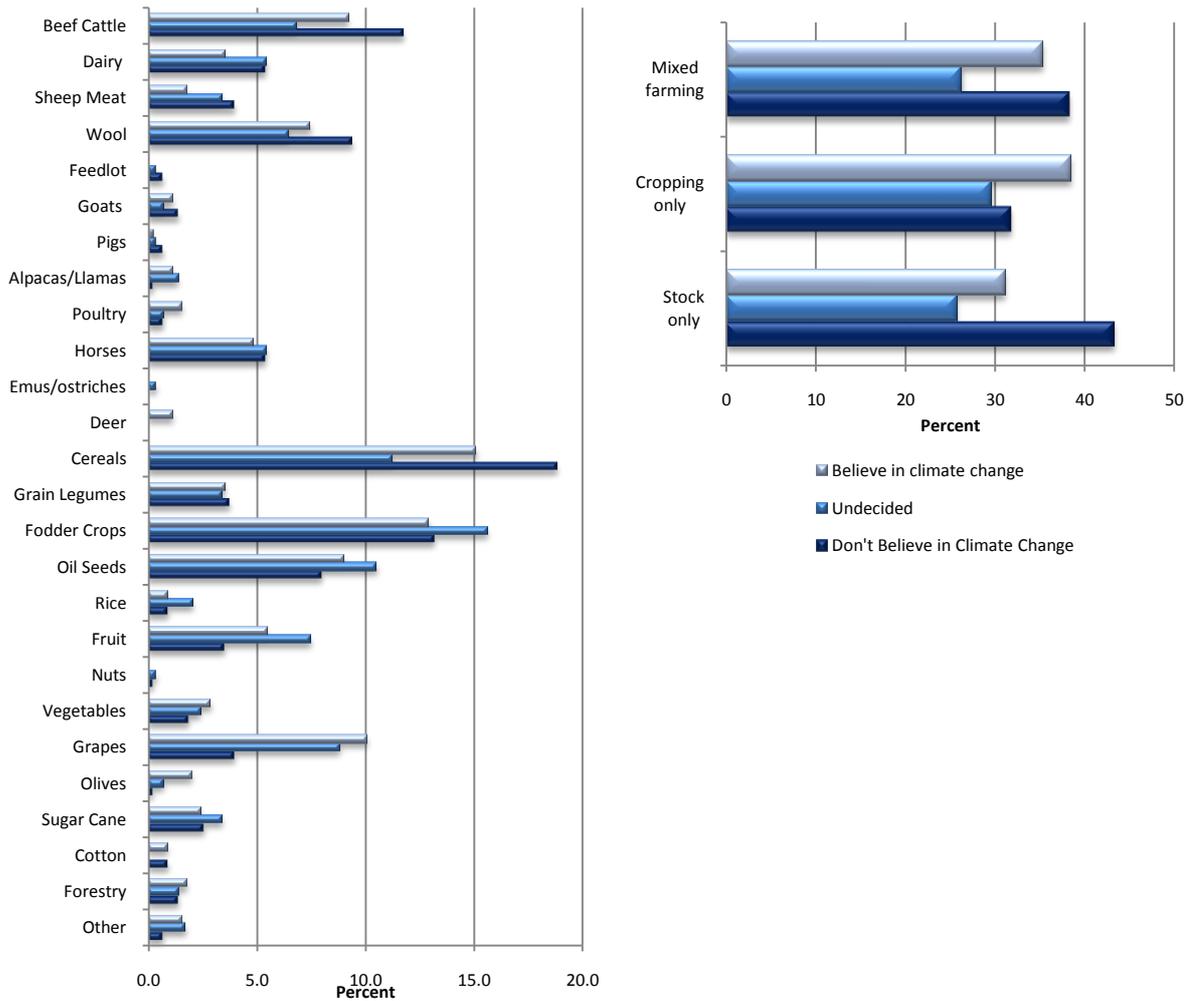
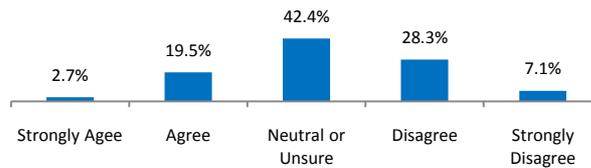


Fig 5.3a and 5.3b: Belief in Climate Change by industry (N=1926)

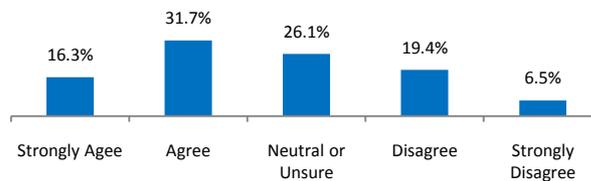
6.4.2 A typology of perceptions of climate change risks

Drawing on a risk perception scale devised by Lehman and Taylor (1987), respondents were asked to rate seven statements pertaining to the risks to the environment from the impacts of climate change on a four point scale ranging from *Strongly Agree* to *Strongly Disagree*. These questions were designed to understand how residents perceive and cope with the probability of environmental damage when there is no knowledge of how, when or where such an event might occur. Figures 7.a to 7a.b display the responses. Figures 5.5.a to 5.5.b display the responses.

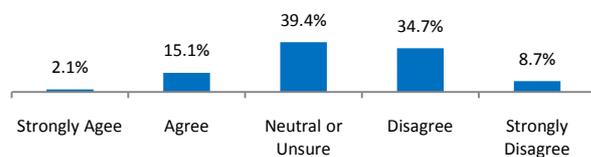
There might be some environmental damage from climate change but it won't be too bad.



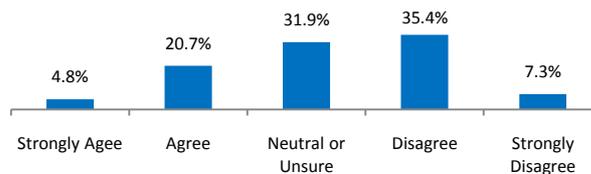
The possibility that environmental damage from climate change is occurring here in Australia has been greatly exaggerated.



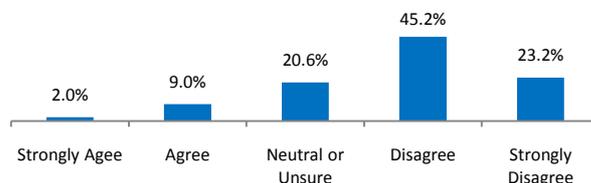
There will be environmental damage from climate change, but damage is likely to be limited and quickly dealt with.



I think environmental damage from climate change is inevitable and there is little anyone can do about it.



I really haven't thought much about the possibility of environmental damage from climate change.



Figures 5.5a to 5.5e Attitudes to Climate Change risk (N=1248)

The items rating perceptions of risk of environmental damage as a result of climate change were then analysed to generate a typology of risk perception. Tests for reliability proved the alpha rating for reliability for this scale was then 0.71, which is more than adequate given that Nunnally (1978) has indicated 0.7 to be an acceptable reliability coefficient. A hierarchal agglomerative cluster analysis was performed to group respondents according to their similarity in their scores around the mean. The use of standardised scores permitted comparisons of diverse distributions within the analysis. Ward's minimum variance cluster analysis was employed with dissimilarities between scores defined by squared Euclidean distance. The analysis clearly indicated the presence of four clusters. Quick Cluster was then used to refine the solution using interactive reallocation (k means).

Fig 5.6 displays the standardised means of the various measures of climate change risk perception across the four clusters. The responses by cluster to the question relating to belief in climate change is included for interest.

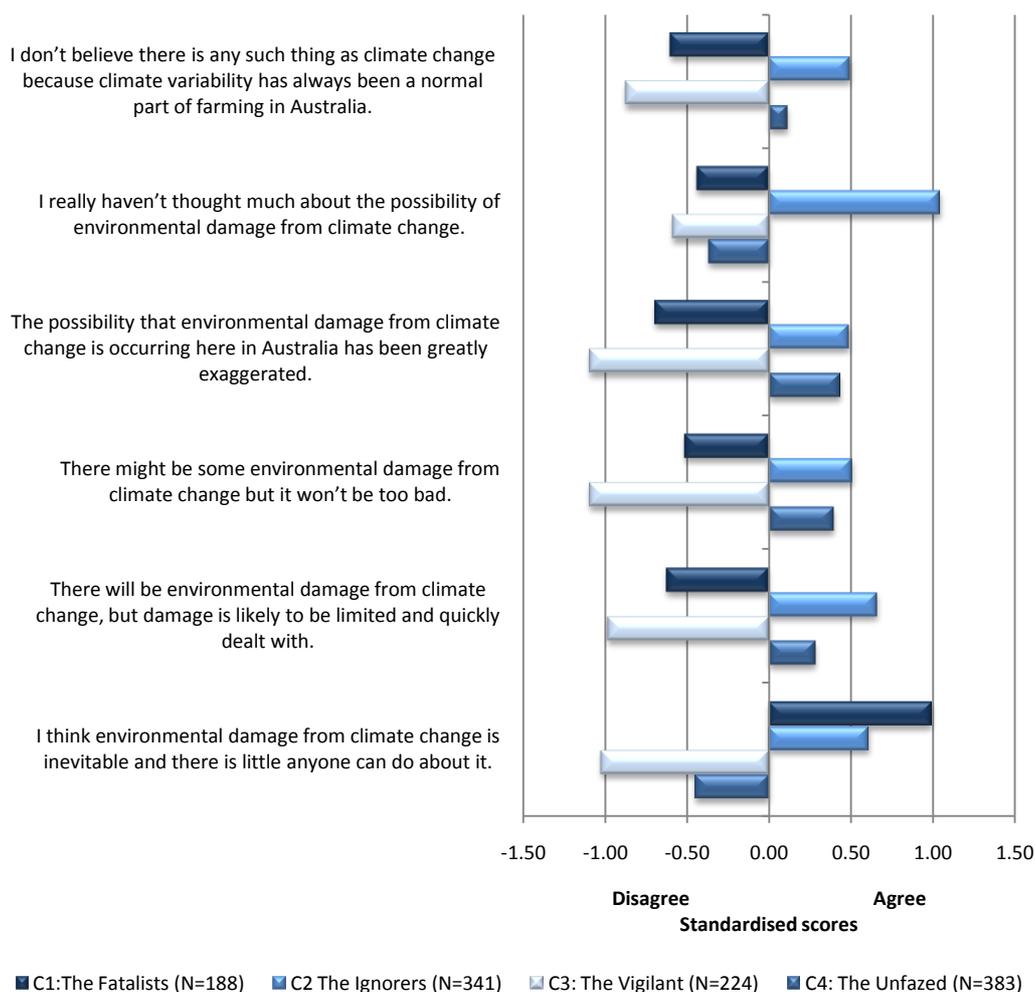


Fig 5.6: Cluster profile for climate change beliefs and risk perceptions (N=1248)

The profile of the typology¹ is as follows:

- Cluster One: **The Fatalists** (N=188) **strongly believed in the reality of climate change**, had thought a lot about the problem and were most concerned about the impact of climate change. They believed potential environmental damage will be significant, that the threat has not been exaggerated and the impact would be long lasting. This group believed the threat was **uncontrollable**. As this comment reveals:

The Simpson Desert was once a green fertile landscape - climate change from natural causes is ongoing - we are as effective as ants in the face of nature.

- Cluster Two **The Ignorers** (N=341) **did not believe in climate change and consider the risk is exaggerated**. They were the least concerned and had not thought about the likely environmental damage that might occur. However they believed that if climate-induced environmental damage did occur, it would not be significant. Yet they were more likely to think the threat of environmental damage was **uncontrollable**. One participant stated:

¹ Cluster names are subjective interpretations of the data provided to simplify the findings.

This place was covered in ice a million years ago so you'd have to be pretty stupid to say there hasn't been climate change but I don't think this drought is climate change. We're 80% below our normal rain fall but Queensland was 60% under water a month ago.

- Cluster Three **The Vigilant** (N=224) **believed in the reality of climate change** and were most concerned about the impacts, had thought a lot about the possibility of environmental damage, believed the risk had not been exaggerated and ensuing damage would be significant and enduring. This group believed the threat was **controllable**.

I think climate change is a natural phenomena and here to stay, but we have to lower the greenhouse gases. Research into crops that will grow as the climate changes.

- Cluster Four **The Unfazed** (N=384) **did not believe in climate change and consider the risk is exaggerated**. They had thought about climate change impacts but are unconcerned. They believed any environmental damage that might occur will be minor and quickly dealt with. This group also believed any possible damage was **controllable** as this comment indicates;

I have thought a lot about all this climate change rubbish. Climate has changed in continents over the past millions of years and it always will (over millions of years) but it has nothing to do with man.

There may be climate change but it is not caused by man. What unmitigated pride for anyone to suggest that man can alter the climate one way or another. All this nonsense about greenhouse gases, global warming, and climate change is just that - nonsense. The whole reason is to increase taxes and increase the bureaucracy. It is the greatest confidence trick pulled on man. Remember Y2K: planes to fall out of the sky. Paul Erlich's prophecy of standing room only on earth by the year 2000. These people, whoever they are, play on the gullibility of the general public.

Expressed schematically the groups would roughly (this is a diagrammatic indication only) plot along the axes as in Fig 5.7.

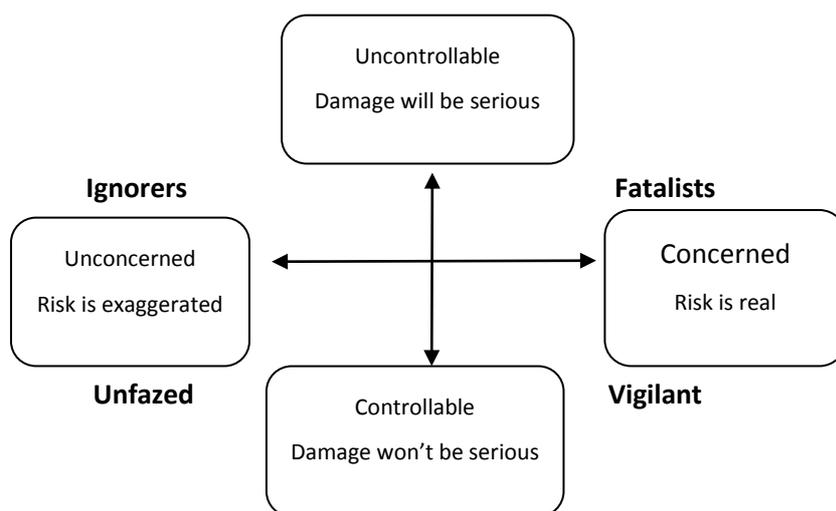


Fig 5.7: Typology of climate change belief and risk perception profiles

The clusters were evenly apportioned across the States. There was no difference in the proportions of mixed, stock only or cropping only farming operations. Clusters Two (Ignorers) and Four (Unfazed) had greater proportions of males while Cluster Three (Vigilant) was more likely to be

female. There were significant differences in age groups ($\chi^2=28.98, p<0.01$). Cluster Four (The Unfazed) had greater proportions of older farmers, Cluster Two (The Ignorers) had a normal curve of age groups while Clusters One (The Fatalists) and Three (The Vigilant) had greater proportions of younger farmers (Fig.5.8).

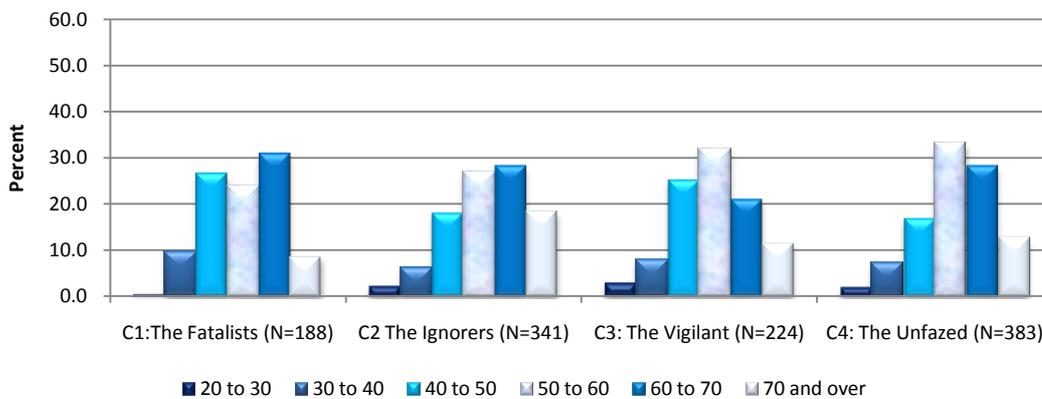


Figure 5.8: Age by Climate Change groups

6.4.3 Relationship between perceptions of climate change risk and conservation practices

Cross-tabulations revealed a significant difference between the clusters and whether farmers had preserved a place on their land for environmental conservation ($\chi^2=29.92, p<0.0001$), had introduced a number of best-practice land management practices ($\chi^2=31.3, p<0.05$), or whether they were involved in environmental conservation groups ($\chi^2=13.55, p<0.01$) (See Fig. 5.9).

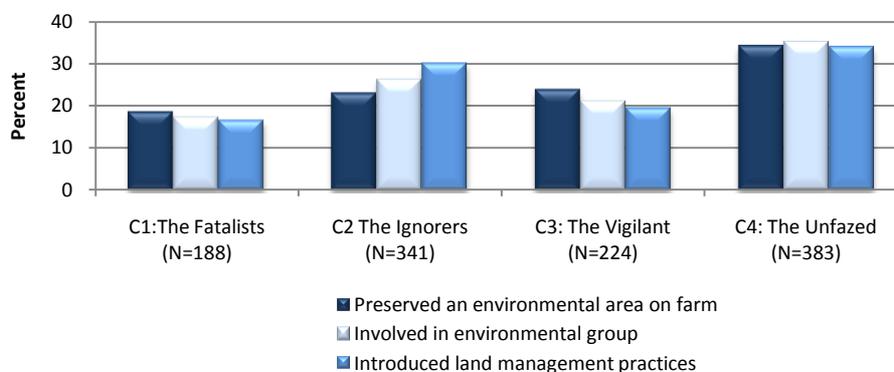


Fig 5.9: Climate Change beliefs and environmental activity

Previous studies using this typology of risk perception have demonstrated that people who believe they have some sense of control over a potential threat were more proactive in precautionary behaviours (Barclay 2005). In the present study this would indicate that the Vigilant and the Unfazed (despite the latter’s disbelief in climate change) would be most active. However, the findings are not that clear. As predicted, the Fatalists, who strongly believed in climate change but thought the risk of environmental damage from climate change was uncontrollable, were the least likely to be proactive in environmental conservation practices, and the Unfazed, who believed the risk was controllable, were the most active. However, the Ignorers, who believed the risk of the impacts of climate change was uncontrollable, were just as likely to be proactive and the Vigilant, who were the most concerned and believed they had some control, were the second-least active. Other factors are clearly influencing participation in environmental conservation activities far more than concerns about climate change.

To explore this further, a logistic regression was conducted to identify the factors that are most predictive of environmental conservation practices. In particular, the regression analysis sought to identify the unique contribution of a belief in climate change. The dichotomized dependent variable was whether or not farmers had preserved an area on their property for environmental conservation. Predictors selected for the analysis were: belief in climate change (high scores=acceptance), attachment to place (low scores=higher attachment), age, gender, level of education, size of property, production type, the length of time on property, whether it was previously owned by relatives. The environmental problems experienced on farm (drought, pest animals etc.) (1=have problem; 0=no problem). Participants were asked what prevented them from implementing environmental improvements on their property and these variables were also included in this analysis (1=is an obstacle; 0=no obstacle). These predictors were selected because associated analysis as part of this study found these factors were predictive of conservation areas on farms.

The equation was significant. Table 5.1 displays those variables that were significant predictors of maintaining a conservation area. Belief in climate change was a positive predictor as was attachment to place. Older age groups were also more likely to preserve an area. However, post hoc tests revealed that while those aged under 45 were less likely to be actively involved and those aged over 65 most involved, there were mixed findings for those aged in between. It is likely that younger farmers are more actively involved in off farm work with little time to devote to environmental conservation while older farmers have more time.

Two environmental problems that encouraged the preservation of a conservation area were the degradation of creeks, rivers or waterways due to sediment, the clogging of weeds, or stock damage and the loss or fragmentation of habitat on a property. Those factors that were *least likely* to prevent environmental conservation practices on farm included climatic extremes such as drought, small property size and lack of interest.

Table 5.1: Logistic regression coefficients predicting environmental conservation

Variable	Beta Scores	Standard Error
Belief in climate change	.237**	.081
Attachment to place	-.185**	.080
Age	.228**	.091
<i>Environmental problems:</i> - Degradation of creeks etc.	.175*	.085
- Loss of habitat	.248*	.025
<i>Reported obstacles:</i> - Lack of interest	-.156*	.083
- Property is too small	-.519***	.090
- Climatic extremes (drought)	-.170*	.086
Constant	.074	.211
-2 Log-Likelihood	1012.25***	Pseudo R2= .21

*p<0.01 **p<0.001 ***p<0.000 (two tailed tests)

6.4.4 Other influences

Comments made by farmers revealed some insight into other influences on attitudes to climate change. One influence is perceived inconsistency in Government policy. Several participants noted the pressure on farmers to change their practices while little attention is given to other industries, such as mining:

It would seem that there are two sets of rules - one for mining companies and urban development and one for farmers. The land degradation caused by coal mining in Central Queensland, for example, is devastating and the very productive land that has been destroyed will never be restored to a useable and productive state. Trees can be pushed over by mines, mines constructed on floodplains. Land clearing by landholders is vastly different to that allowed by mines.

Or transportation:

Because we live on an evolving planet, we must expect environmental change. Didn't we once have dinosaurs and an inland sea? How simple man is when he tags "natural evolution" with a tag of "environmental change". Both are the same and natural. What isn't natural is jet planes and power plants and vehicles - they are earth's natural pollutants. Who will put up their hand and demand all jets and rockets be grounded which should happen now - today - if we are at all serious about environmental contamination - and we should be.

Many commented negatively and critically on the politics of climate change.

What part of the current climate is caused by man and what is a normal cycle of a natural climate changing? This Government can't explain so they blame all of climate change on man.

Regarding climate change, I think it is a load of hype for Governments and Authorities to use as a platform or excuse (to push something or reject it).

There was also a lot of criticism of proposed policy responses, especially carbon trading, and for many it was the changes to be introduced by government which were of more concern than changes to the climate.²

...Government has no idea of the effect of climate change regulation on the rural sector. We will lose prime agricultural land for tree planting for carbon and we will become uncompetitive on international markets.

...Carbon credit trading will be a huge impost on agriculture and food production. By signing the Kyoto Agreement Australia will produce less and the land will stay exactly the same - changing naturally. Carbon credit trading is a new business for corporate wealth.

Farmers also appear distrusting of government initiatives to address climate change impacts. Attitudes to governments' role in environmental management was compared across clusters which revealed that the Ignorers and the Unfazed were significantly more distrustful than the Vigilant group ($\chi^2=103.71$, $p<0.001$) (See Fig. 5.10).

² At the time of the survey, Carbon taxes were still a prospect for farmers. Since that time, agriculture has been excluded from future Carbon Tax policy.

“Government environment agencies are more interested in catching you for doing the wrong thing, than helping you do the right thing”.

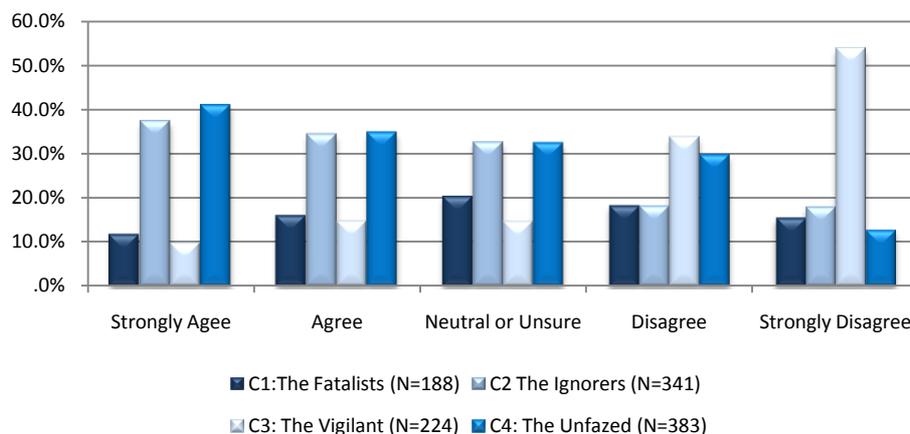


Fig 5.10: Attitudes to government's role in environmental management

Farmers called for governments to work with, not against farmers to achieve positive outcomes from new land management initiatives to combat climate change.

Climate change may or may not be real, but this does not alter the need to properly manage the climate we are already living with. Politics has never yet solved real problems, because of its very nature and structure. At best it will be a short-term "popular" decision, at worst a badly designed concession to big corporate interests and populist global lobby groups. Real solutions and real landscape transformation can only happen if driven by willing land stewards.

The only real way to deal with drought or climate change/variability is for rural people to diversify their businesses so that they are not totally climate dependant or reliant on perennial plant growth or production where seasonal rain is essential. These activities should become more opportunistic. Governments should recognise that off-farm income or investments will be a part of the more resilient approach and should not disadvantage any "on-farm" assistance or recognition of public benefits derived from those who manage our landscape.

6.5 Discussion

This study has shown that not all farmers are convinced about the reality of climate change. Many perceive climate change to be just a normal part of climate variability characteristic of farming in Australia. This finding accords with similar conclusions made in Thompson's (2008) study of wool growers and Milne et al's (2008) study in New South Wales and Victoria. In this study belief in climate change varied by industry and by age. Cereal growers were less likely to believe in climate change, those with fodder crops were more likely to be unsure and grape growers were more likely to accept climate change as a reality. Older farmers were both more likely to preserve environmental areas and not to believe in climate change. The latter finding reflects that of the "Who Cares about Climate Change" state wide survey of NSW residents where people over the age of 55 were significantly more likely to not believe in climate change than those aged under 45.

There were wide differences in levels of concern and understanding about climate change. It had been hypothesized that environmental conservation on farms would be linked to farmers' perceptions of risk of environmental degradation caused by climate change. This proved to be only partly the case. While a four-fold typology demonstrated the variance in perceptions of risk among farmers, some farmers who were *more* concerned about climate change risks were actually *less*

likely than others to undertake environmental conservation on farms. This means other factors must be involved, a fact that was acknowledged at the beginning of this study.

Overall, farmers in Australia appear to be very committed to performing environmental activities. Over 98% of farmers in this study had instituted at least one sustainable land management practice. But this does not appear to be related to fears about climate change. This may be compared to the findings of the Alberta Canada study where over half of those in had changed their operation due to climate change (Stroh consulting 2005) and over 70% of UK farmers were taking action (Farming Futures 2008). However, as Stroh Consulting (2005) found, and Wehbe et al (2006) also in Mexico and Argentina, other factors apart from climate change were important in motivating or limiting actions: such as financial constraints, apportionment of blame, government approaches to reward as well as punish, local context, existing practices, and farmers' perceptions.

In this study, setting aside an area of environmental conservation was associated with belief in climate change, but it was more strongly associated with the extent of environmental problems experienced (positive association); drought and property size (both negative associations). This finding is consistent with others studies that highlight that resources constrain what farmers can and cannot do on their land (Vosti and Reardon 1995). It may be that people who are experiencing and are appreciative of environmental harms may also be more likely to attempt to ameliorate such harm by preserving an area on the farm.

Contrary to the NSW DECC (2008) study of climate change attitudes, which found pro-environmental behaviours in the general community were linked to environmental concern (but not knowledge) the findings of this study agree with Reeve (2001) who found that farmer attitudes towards the environment were not predictive of behaviour. As Vanclay (1992) maintains, it is simplistic to assume that awareness of an issue will elicit responses of a particular kind because differences in perception and in situational contexts influence a landholder's decision making about what, if any, action to take.

The major factors that impact on perceptions of risk from climate change include uncertainty about climate change itself, its impacts and what can be done and poor information (Etkin and Ho 2007). Risk judgements tend to be influenced by past experience and the imagined impact of future events. Climate variability is an ever present reality for Australian farmers and therefore farm management has always been conducted within an uncertain environment. Therefore Australia's climate may itself be working against farmer's adaptability to climate change; as drought reduces farmers' financial capacity to adopt practices and climatic extremes render anthropogenic climate change irrelevant.

What may be of greater concern to Australian farmers is the perception that measures to ameliorate climate change are being unfairly borne by farmers, and at great expense, while other sectors, including those which may also be heavy greenhouse gas producers, as well as general consumers, need also to share the blame and the responsibility for change. Previous work by the authors (Bartel, 2008; Cummins and Barclay, 2007; Martin et al, 2007) suggests that where farmers and governments are at odds over land management that new ways of interacting need to be sought and adopted if better and more effective, and more socially, as well as more environmentally, beneficial outcomes are to be secured. We need to recognise, as Bukeley (2000) has counselled, the *different* understandings which farmers hold.

The findings presented here have implications for future policy and extension programs. A focus on climate change education may be advisable but so also would providing support for farmers on smaller holdings and to those experiencing drought so that they may also perform environmental conservation activities. Education about climate change should first recognise farmers' existing understandings, with a focus perhaps on the differences between the past and the future, including the causative factors, to differentiate natural climatic cycles from anthropogenic climate change, while being careful not to confuse or create further uncertainty. There may be a likelihood of

increasing incidents of extreme climatic events but farmers already experience these, so forecasts need to be compared to the climate histories which farmers' already know and focus should be placed on preparedness for unprecedented higher temperatures, reduced rainfall and persistent drought, and on areas such as the Murray Darling Basin which is forecast to be affected by all three. Involving farmers more in the development of policy responses may also assist in reducing the suspicions farmers carry towards government action. As Cummins and Barclay (2007) previously found, farmers resent being singularly blamed for environmental degradation and prefer a shared fate approach to dealing with environmental dilemmas which have been created by many and will need efforts similarly spread amongst many if damage is to be ameliorated or prevented. Future government programs may be more effective overall if there is less focus on blame and more on contributions from the wider community. Without blame, and with more of a shared fates approach, farmers may be even more likely to institute best- practice management practices. It should be noted that current Government policies and programs such as "Farm Ready" do recognise farmers' resistance to climate change and seek to address these issues. However, these findings suggest that many farmers remain very sceptical of current policy which will inhibit the successful adoption of new extension programs.

This was a strong and frequent finding in the case studies conducted as part of this research. It was evident that there is a social distance between farmers and government regarding these issues with people holding extreme positions in both camps. For every older farmer who farms traditionally and refuses to consider the concept of climate change, there are younger, well-educated farmers who agree with climate change and remain productive despite persistent drought and actively work to address the potential risks on their land and within the community. Likewise within government there are many dedicated extension people who live and work with the farming community and understand how farmers think and act. These people are respected by their community and are well placed to influence the more resistant farmers to adopt new land management practices with more resources. There are also some within government who dismiss farmers' values and opinions on environmental management preferring a legalistic approach to ensure compliance with new initiatives. Farmers are aware of this which further distances them from government aims. A more collaborative approach is needed whereby government is seen as listening to and working alongside farmers to address the same goal; to safeguard the environment.

6.5.1 Conclusion

Agriculture occupies 60% of the Australian continent. Therefore farmers' perspectives are critical in determining future policy responses desired to achieve environmental goals. Australia's history of climatic extremes seems to have worked against building Australian farmer's preparedness to accept and respond to climate change. Incremental longer-term trends may be rendered invisible by the "noise" of severe perturbations in climate which farmers in Australia have grown accustomed to dealing with over generations. However, it is the belief of the authors that this experience-related knowledge should not be ignored and needs to be accepted and incorporated into government initiatives to deal with the climate change impacts. To do otherwise would risk further alienating farmers from the climate change dialogue.

Propensity to institute environmental conservation on farms is less related to attitudes towards climate change than was hypothesised at the beginning of this study. Neither belief in climate change nor in controllable risks were strongly determinative of on-farm environmental behaviours. Farmers in Australia are adopting practices irrespective of personal beliefs in climate change and so governments may be counselled to focus more strategically on support for these activities, especially where financial pressures and Australia's extreme climate again acts to stymie activities. Adopting a shared fates approach in working with farmers but also the wider community would also assist in reducing the social distance between farmers and government so that farmers will be more open to participating in the global discussion on global warming.

7 Farmers' Attitudes to Environmental Issues: laws, regulations and compliance

7.1 Introduction

Environmental degradation is a widespread and costly problem in many agricultural regions in Australia. There is growing scientific evidence of the problem and increasing recognition and concern expressed by the public and by policy makers. Yet it is often difficult to translate concern into policy and even more problematic to use it to generate behavioural change in landholders. The dynamics of scientific knowledge and policy mechanisms and the ways these interact with personal beliefs and social norms are complex and regard must always be had for the sometimes competing forces at work. Humanity is presently facing relatively well-documented threats of climate change, land use conflict, desertification, extinctions, food, water and financial (in)security. However there is still some basic information about a critical part of the global system that is missing: information about the role of human beings in managing these threats.

It is this gap that this study addressed, by inquiring into the environmental attitudes and behaviours of Australian farmers. In Chapter Six, the analyses showed a belief in climate change was associated with conservation activities but other factors also influence landholders' behaviours. In Chapter Three, the review of the literature and the analyses highlighted the fact that landholders' adoption of sustainable practices is based on subjective perceptions or expectations as well as objective factors. A strong attachment to place and a commitment to a social norm of compliance with environmental laws and regulations were strongly associated with conservation behaviours. The intergenerational transfer of farm ownership was also important. These findings support Van clay's (2004) assertion that understanding the social nature of farming and the social basis of adoption of sustainable practices is essential if sustainability in natural resource management is to be achieved.

This chapter reports on the investigation of what landholders perceive and believe about environmental issues, including laws and regulations. In Chapter Three, it was clear that landholders do care about the environment but the study also sought to understand more deeply how farmers regard environmental practices and behaviours and government and environmental regulation. The findings discussed so far reveal that landholders have a range of views and exhibit a variety of behaviours in relation to environmental sustainability but they also share many attitudes. As shown in Chapter Six, many are sceptical about climate change and are resistant to nature preservation and restoration laws. Here it is further demonstrated that while most landholders appreciate their farm environment, many are also ambivalent about government interference. The findings presented and discussed in this chapter may be used to build understanding of the "people part" of the

sustainability equation and enable more effective policy for sustainability. In order to manage landscapes and achieve sustainability there is a need to understand natural systems but there is also a need to understand people.

7.2 Background

Since the beginning of European settlement of Australia, values, scientific knowledge and cultural understandings have changed the way people perceive and interact with the environment (SOE 1991). The Australian landscape, being so vastly different from Europe, was widely misunderstood by the early settlers. Over the subsequent two hundred years, land management was a 'massive geographical experiment' on the part of the new immigrants (Powell 1998, in Haw et al 2000). As a consequence there has been significant environmental damage in many parts of Australia. This has impeded agricultural production and reparation has been costly.

Society's expectations of farmers in relation to their environmental performance are increasing (Greiner et al 2009). However, while some recommended practices have been readily adopted by farmers, overall, the move to more sustainable practice has been limited (Pannell et al 2006). Vanclay (2004) argues that farmers' have positive attitudes about environmental management but they may have different views about what that management entails. He proposed 27 principles for understanding farmers' motivation to adopt sustainable practices. The principles emphasise the need to recognise that: farming is a social activity, farmers are a socially diverse group, there are social drivers in agriculture and there is a socio- cultural basis to adoption, including stewardship, succession and scepticism.

First, farming is a social-cultural practice rather than just a technical activity. It is a way of making a living beyond a mere occupation that is governed informed and regulated by social processes (Vanclay 2004). Second, farmers are a diverse population with different priorities, understandings, and values, different ways of working, and different problems. Therefore there are no clear strategies or solutions. Consequently policy and programs must address the needs of all styles of farming that exist (Vanclay 2004).

Third, a commitment to do the right thing towards good farm management or stewardship is a strong motivator (Vanclay 2004). This was a significant predictor in the analysis in Chapter Three. However, different farmers have varying notions on what constitutes good farm management. Individuals determine good management practices through interaction with other farmers, extension officers and access to information via the media. In addition, environmental issues are conflated with farm management issues. Furthermore, profit making does not determine adoption of new innovations although financial stress can limit options (Vanclay 2004).

Fourth, most farmers have a desire to pass on their farm to the next generation in a better condition than they received it. This overrides any rational economic decisions about sustainable practices because any efforts are considered worthwhile (Vanclay 2004). This was also a significant factor that emerged in the analysis in Chapter Three. However the motivation for conservation may decline when children fail to take up the offer to take on the farm. For farmers, the social dimension of sustainability of farming means sustainability is meaningless unless it involves the ability to remain on the farm (Vanclay 2004).

Fifth, farmers may have reservations that the sustainable practices promoted by various agencies are sustainable or profitable. There are numerous examples of the failure of some practices promoted in the past. Consequently, today's farmers are sceptical about stated claims of proposed practices. For example, land clearing may be considered to be land improvement while other groups in society, such as conservationists or extension officers, may consider these actions to be causative of land degradation. There may be divergent opinions between scientists and extension officers and farmers on what defines degradation which in reality is a value judgement about what is an

acceptable rate and direction of change. Therefore the problem is not farmers' wrong attitudes but one of conflicting views about what is meant by 'good farm management.'

7.2.1 Previous studies of landholders' attitudes to the environment

As highlighted in Chapter Three, landholders' values and attitudes regarding environmental conservation do influence adoption of sustainable practices on farms. Other studies have found similar relationships.

Greiner et al. (2009) in a study of 94 graziers in the Burdekin region in Queensland found a significant relationship between grazer motivations and risk attitudes and the extent to which they adopted conservation activities and the types of conservation activities they selected to adopt. Adoption was associated with those graziers who possessed lifestyle and conservation goals and were intrinsically motivated to adopt conservation practices. However, graziers with high economic/financial and social motivation displayed low levels of adoption and required external incentives. While financial incentives remain important, they are not absolute. Recognition, by peers and the community of conservation efforts are a powerful incentive particularly for socially motivated farmers. Greiner et al. (2009) conclude that the design of conservation policies and programs should be guided by a better understanding of the wide range of motivational profiles and risk perceptions of farmers, which may vary between industries and regions.

Lawrence et al (2004) in a study of sustainable natural resource management on beef grazing lands in the Fitzroy Basin, Central Queensland, found decisions about land management are made in the context of social factors such as the global political economy, a shared culture of knowledge, meaning, and tradition. Graziers considered environmental sustainability and farm economic viability to be inter-related. Many challenged scientific knowledge regarding the condition of the environment, believing it to be exaggerated. Government regulations regarding vegetation management were viewed as anti-producer with many losing confidence in governments and consequently losing their willingness to cooperate. Tough times on the land had forced farmers to seek ways of increasing production which often included unpopular practices such as clearing or overgrazing. Some who had trialled innovative land management practices experienced negative comments from others.

In another study with 42 farmers in Queensland's Fitzroy Basin, Fielding et al (2005) examined the farmers' behavioural, normative, and control beliefs in relation to intentions to manage riparian zones on their property. The study found intentions to manage riparian zones were associated with a favourable cost-benefit analysis, greater perceptions of normative support for the practice and lower perceptions of the extent to which barriers would impede riparian zone management.

Haw et al (2000) in a study of farmers' perceptions of and responses to salinity in the Tragowel plains in Victoria found farmers' different interpretations of risk resulted in a diversity of responses. Furthermore, a threat may be acknowledged as a problem in a district but not on an individual property. The level of response was governed by financial security but also a pattern of inter-generational farm transfer. The constant progressive nature of land degradation problems like salinity meant that they often took second place to more salient and immediate farm management issues which compromised the effectiveness of responses.

Reeve and Black (1993) and Reeve (2001) conducted a study of changes over time in farmer attitudes to environmental issues based on two national surveys of primary producers conducted in 1991 and 2000. The questions within the two surveys reflected the rural environmental issues that had received the most attention in the rural media in the twelve months preceding the survey. The study found that by 2000, farmers, irrespective of Landcare membership, had gained a greater appreciation of the complexities and uncertainties of environmental issues, and fewer were inclined to believe there are simple solutions (Reeve 2001).

The main changes in attitudes between 1991 and 2000 were:

- increasing concern overall about chemical residues in agricultural produce and about the environmental and health effects of agricultural chemicals, but with those who are regular users of chemicals, such as cereal or fodder crop producers being less concerned and showing relatively little change over the period,
- decreasing concern overall about the seriousness of land degradation, but with decreases in concern in Queensland, New South Wales and Tasmania being partly offset by increases in Victoria, South Australia and Western Australia,
- increasing awareness that farm practices have impacts beyond the farm boundary, and increasingly favourable views nationally towards consideration of the wider public interest in farm decision-making, although the trend was the reverse in Queensland, and
- increasingly favourable, but slightly more polarised, views about conservation, while there is less support for conservation organisations and their activities (Reeve 2001).

Farmers were less in favour of policies likely to increase costs in farming, but were supportive of policies involving public subsidies for preventative or remedial measures against land degradation. There was very strong support for farmers being compensated for loss of income or autonomy of decision-making due to measures taken in the public interest. However, this compensation should be a matter of degree, i.e. when the loss of income is relatively small, there should be no expectation of compensation. There also appears to be widespread acceptance that a major transformation of agricultural landscapes will need to occur if farming is to be sustainable (Reeve 2001).

7.2.2 Attitudes and behaviour

While farmer attitudes have been shown to be linked with adoption of sustainable practices, the relationship between attitudes and behaviour is not clear. In a review of the literature Stanley, Clouston and Binney (2005) discussed three major drivers or constraints to natural resource management: historical, economic and social. They noted that although relationships between succession plans, stewardship and other attitudes had been associated with conservation behaviours other factors were often also involved. It is noted again that farmers are a diverse group both socially and attitudinally, the factors multiple and the relationships complex. Stanley et al (2005) recommend that extensive surveys are required in order to understand specific constraints better and to tailor regulatory programmes to suit. Gill, Crosby and Taylor (1986) suggest that environmental concern is more likely to have an indirect rather than a direct influence on behaviour and this influence can be mediated by intervening variables, such as those discussed in Chapter Three. The authors conclude that this weak relationship then demands insight into understanding farmers' attitudes and finding ways to strengthen the link to positive behavioural response.

7.3 The Present Study

The purpose of this section of the study was to examine farmer attitudes to key environmental issues including environmental laws and regulations. Participants rated a series of attitude statements concerning various environmental concerns on a five point *Strongly agree / Strongly disagree* scale. Seven statements were drawn from a longitudinal study of farmers' attitudes to the environmental and land management issues conducted in 1991 and 2000 (Reeve and Black 1993; Reeve 2001). The wording of the statements mirrored that of the previous studies. The purpose was to measure the changes that have occurred since 1999 and 2000 and 2008 in attitudes to key environmental issues.

A further seven questions were developed and trialled for the present study. These questions focused on attitudes to environmental laws and regulations, environmental crime and two emerging social issues; the increasing number of lifestyle farmers in rural areas and third-party rights of consumers of agricultural products.

Farmers' access to information about environmental regulations was also assessed. Lastly, farmers were asked about the problems regulations cause for farm businesses.

7.4 Results

7.4.1 Farmer attitudes to the environment

The first seven statements participants were asked to rate were drawn from a longitudinal study of farmers' attitudes to the environmental and land management issues conducted in 1991 and 2000 (Reeve and Black 1993; Reeve 2001). These items were selected as they closely reflected the focus of the present study. Their inclusion also allows for a comparison of attitudinal change on these issues over the past 18 years and to identify any new areas of concern for farmers. Chi-square analyses revealed all seven items had differences in the pattern of responses between 1999 and 2008 that were significantly different above the $p < .05$ level. Participants' ratings of the attitude statements are presented in Tables 6.1a to 6.1g.

Tables 6.1a to 6.1g: Attitudes to the environment (Source: Reeve 2001)

6.1.a: Most rural properties have some sort of land degradation whether it is soil erosion, damage to soil structure, die back, and weed infestation, pollution of streams or salinity. (N=1248)

Survey Year	Proportion of respondents (%)				
	Strongly agree	Agree	Neutral or unsure	Mostly disagree	Strongly disagree
1991 (N=2044)	43.0	46.8	4.3	4.3	1.6
2000 (N=1455)	40.1	45.3	6.6	5.8	2.1
2008 (N=1248)	29.5	48.5	12.4	7.6	2.0
% change					
2000-2008	-26.4	7.1	87.9	31.0	-4.8

There was a significant change in attitudes to this land degradation occurrence statement between 1999, 2000 and 2008 ($\chi^2=127.87$, $p < 0.0001$). Although 78% of people agreed that all properties have land degradation, this was a lower proportion than previous years. The number of people who were unsure doubled in percentage points. This decline in concern was noted in 2000 (Reeve, 2001). There was stronger agreement amongst members of conservation groups (65%) than those who were not members (35%) ($\chi^2=9.8$, $p < 0.01$). The least agreement was in South Australia while there was greater agreement in NSW and WA where land degradation is of serious concern.

6.1.b: Compared to industries like mining and manufacturing, agriculture has very little impact on the environment. (N=1248)

Survey Year	Proportion of respondents (%)				
	Strongly agree	Agree	Neutral or unsure	Mostly disagree	Strongly disagree
1991 (N=2044)	9.8	29.1	14.1	32.9	14.1
2000 (N=1455)	7.8	24.5	20.1	34.1	13.5
2008 (N=1248)	16.3	31.0	16.9	29.5	6.2
% change					
2000-2008	109.0	26.5	-15.9	-13.5	-54.1

There was a strong agreement with this industry comparison statement in 2008 given the increase in mining exploration in this country over the last decade. There was a significant change in attitudes over the period ($\chi^2=128.50$, $p<0.0001$). Respondents wrote:

...I'm very concerned over the destruction and devastation that mining is having over very productive agricultural regions. Hunter Valley is a mess and now they are starting on the Liverpool Plains and further north near Narrabri. How are they allowed to knock down and destroy vast areas when we cannot control invasive weeds and revegetation (pine), leading to soil erosion and degradation and feral pests?

...Exploration and extraction of coal and gas in our traditional grazing country is of great concern. We are worried about future economic, environmental and social impacts on our local community. It's already evident through footprint on landscape (clearing, traffic, fencing, drilling, saline runoff from coal seam gas plants, and resumption of land) and socially - drain of farm workers from our community, influx of some new people with values we don't share. Wear and tear on local infrastructure etc.

6.1.c: Farmers are the best persons to decide on how much of their land should be cleared. (N=1248)

Survey Year	Proportion of respondents (%)				
	Strongly agree	Agree	Neutral or unsure	Mostly disagree	Strongly disagree
1991 (N=2044)	19.3	44.6	17.2	16.5	2.3
2000 (N=1455)	15.9	39.5	21.7	19.2	3.7
2008 (N=1248)	22.6	31.0	21.7	21.1	3.6
% change					
2000-2008	42.1	-21.5	0.0	9.9	-2.7

Although there was stronger agreement with this responsibility statement in 2008, overall attitudes have changed little since 2001 although the differences were statistically significant ($\chi^2=80.38$, $p<0.0001$). Land clearance regulations caused considerable angst among landholders. These regulations may violate social norms of property rights and they may also be seen as counterproductive impositions in managing land for both production and conservation outcomes. The ongoing debate over the right to clear farm land, particular the right to clear woody weeds, which impede productivity and undermine environmental ends, has angered many farmers.

6.1.d: People who knowingly pollute the countryside are just as criminal as people who steal. (N=1956)

Survey Year	Proportion of respondents (%)				
	Strongly agree	Agree	Neutral or unsure	Mostly disagree	Strongly disagree
1991 (N=2044)	41.5	43.4	8.1	5.1	1.9
2000 (N=1455)	34.1	48.1	11.4	4.4	2.0
2008 (N=1926)	33.4	49.1	11.2	4.5	1.8
% change					
2000-2008	-2.1	2.1	-1.8	2.3	-10.0

This question asked respondents how closely a ‘brown’ environmental crime like pollution was viewed in comparison to a more traditional crime such as one against personal property. There is very little change over time in attitudes towards this statement although the analysis was significant ($\chi^2=38.94$, $p<0.0001$). The responses suggest that such acts are considered to be criminal even if for some offences there are no formal laws currently in place to define them as such. As laws are socially constructed (Quinney 1970), it is likely that social pressure will ensure more legislation is imposed in the future, and that these will be supported. Socially supported laws benefit from moral agreement and community regard. Land clearance laws, as evidenced by the responses discussed below, do not benefit from such agreement and regard.

The attitude statement includes a traditional component of crime, intent (“knowingly”), and thus excludes strict liability offences. These include some pollution offences as well as ‘green’ environmental crimes such as land clearance offences. Strict liability offences are sometimes considered somewhat apart from traditional criminal laws, as an exception, however the consequences may still be significant. For example illegal land clearance in New South Wales carries a maximum penalty of \$1.1 million. Strict liability pollution offences attract maximum penalties of \$1 million for a corporation and \$250,000 for an individual. The most severe penalties however are reserved for those pollution offences which include intent. These carry maximum penalties of \$5 million for the wilful act of a corporation (\$2 million for negligent acts) and \$1 million or 7 years imprisonment, or both, for the wilful act of a natural person (\$500,000 or 4 years imprisonment, or both, for negligent acts) (Protection of the Environment Operations Act 1997 (NSW)). The responses here may mirror the way in which the formal law views crimes of intent more seriously.

6.1e: Satellite photography and remote sensing should be more widely used to monitor whether land degradation is occurring on individual properties. (N=1248)

Survey Year	Proportion of respondents (%)				
	Strongly agree	Agree	Neutral or unsure	Mostly disagree	Strongly disagree
1991 (N=2044)	20.3	37.1	24.2	12.4	6.1
2000 (N=1455)	13.7	39.3	25.7	13.7	7.7
2008 (N=1926)	33.4	49.1	11.2	4.5	1.8
% change					
2000-2008	143.8	24.9	-56.4	-67.2	-76.6

There was a significant change in attitudes between 1999, 2000 and 2008 ($\chi^2=341.40$, $p<0.0001$) as to the deployment of remote sensing technology. There was far greater acceptance of the use of this technology for monitoring land degradation in 2008 than there was in previous years. It may be that acceptance of this new technology, like any other, requires some time. Farmers themselves may also have been exposed to the benefits and applications of the technology which hitherto have remained the preserve of experts. Facilities such as Google Earth and Google Maps (satellite view) have normalised and made widely accessible technology which was once only available to remote sensing specialists.

6.1f: If restrictions on clearing or irrigation water mean a loss of income for farmers, they have every right to be compensated. (N=1248)

Survey Year	Proportion of respondents (%)				
	Strongly agree	Agree	Neutral or unsure	Mostly disagree	Strongly disagree
2000 (N=1455)	34.1	33.4	16.6	13.2	2.7
2008 (N=1926)	45.1	36.9	12.6	4.8	0.6
% change					
2000-2008	32.3	10.5	-24.1	-63.6	-77.8

There was significantly more agreement and clarity in opinion on compensation in 2008 than there was in 2000 ($\chi^2=98.35$, $p<0.0001$). This may reflect the significant reductions in water availability due to prolonged drought and the subsequent reductions in water allocations for irrigators. The need to maintain costs for irrigation infrastructure and the inability to grow irrigation crops have meant many irrigators have faced financial stress. One farmer wrote:

I feel Government regulation on environmental issues is probably necessary - the problem is the Governments are asking farmers to be the environmental stewards of our Nation with no just compensation. Property rights denied should be fully-compensated at a rate equal to the opportunity cost; e.g., remnant veg cannot be cleared - the Government should pay to buy the land and compensate farmers for lost income over time.

There is growing coverage of this argument in the media which could attract further support. Reeve (2001) found that while there was strong support in 2000 for farmers receiving compensation for loss of income or autonomy of decision-making due to measures taken in the public interest, there was also substantial, but not majority, support for the view that compensation should be a matter of degree. The responses to this question may also be relevant for informing the debate as to compensation for land clearance and native vegetation protections.

6.1g: Talk about compensation for restrictions of land and water use is a threat to the goodwill that is needed if communities are going to work together to solve land degradation problems. (N=1248)

Survey Year	Proportion of respondents (%)				
	Strongly agree	Agree	Neutral or unsure	Mostly disagree	Strongly disagree
2000 (N=1455)	8.9	28.6	36.9	18.4	7.1
2008 (N=1248)	13.1	28.5	28.8	22.0	7.5
% change					
2000-2008	47.2	-0.3	-22.0	19.6	5.6

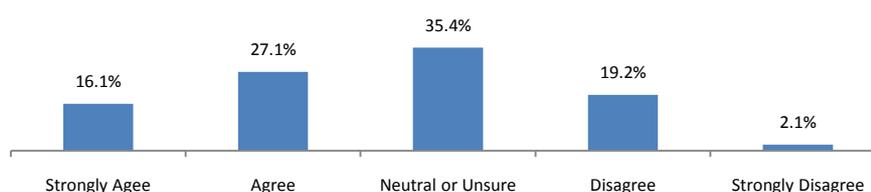
There was stronger and clearer agreement with this compensation context statement than previously although some disagreement remains. The chi-square analysis revealed the differences were significant ($\chi^2=28.71$, $p<0.001$). Respondents may have experienced dissonance in the need to agree with the right to compensation versus agreement with the social norm to sustain social cohesion at all costs.

7.5 New attitude statements developed for the present study

7.5.1 Current issues

The next two statements (Figures 6.1a and b) were developed to reflect current rural environmental issues and the focus of the present study.

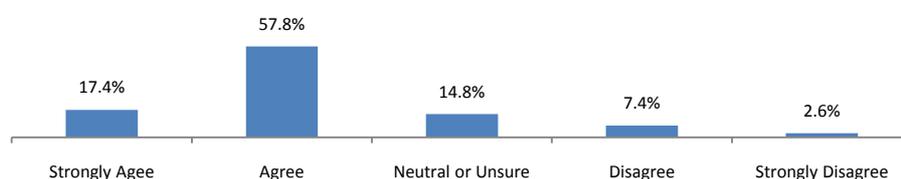
Figure 6.1a: Hobby farmers have no idea about how to properly maintain the environment on their land. (N=1248)



This statement was designed to identify the proportion of farmers who have a generalised negative opinion of management ability of hobby farmers. In interviews with farmers, it was evident that many of these perceptions are based upon actual negative experiences with hobby farmers as neighbours. However, in other cases these opinions arise from generalised perceptions of newcomers to a district who do not conform to local social norms and mores. The findings correspond with those found in Figure 3.7 that the mix of newcomers and long term residents within a community was the least valued aspect of rural life. The results indicate that a third of farmers view the farm management ability of hobby or lifestyle farmers negatively. The high proportion of those who were neutral or unsure reflected those who did not want to generalise across the population. Poor weed and pest animal control were common complaints. For example:

Neighbours or small hobby farmers are not controlling their weeds. Biggest problem is they don't control serrated tussock at all. It is just left and spreads to my place in the wind.

Figure 6.1b: Consumers and buyers of products have a right to demand a certain standard of agricultural production. (N=1248)



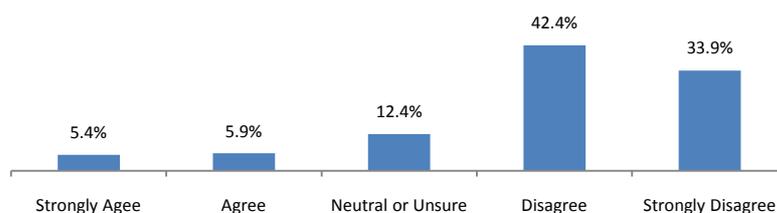
The strong agreement with this statement demonstrates the acknowledgement of the rights of consumers and the duty of care farmers must demonstrate to ensure food security. Concerns about maintaining quality control and biosecurity with the increasing numbers of food imports associated with free trade agreements are associated concerns for many farmers.

Third-party regulation has previously been identified as a potential source of regulatory power and control (Gunningham and Grabosky, 1998). The findings in the present study appear to suggest that this would be accepted by farmers.

7.5.2 Attitudes to environmental crime

Two additional statements explored respondents' definitions of environmental crime (Figures 6.2a and b). Both of these statements referred to 'green' environmental crimes rather than the 'brown' environmental crime of pollution discussed above. 'Green' environmental crimes are those relatively new to the regulatory ledger. Pollution was made an offence in the first wave of criminalization of activities which are aimed mainly at protection of the environmental rather than the more traditional concerns of criminal law.

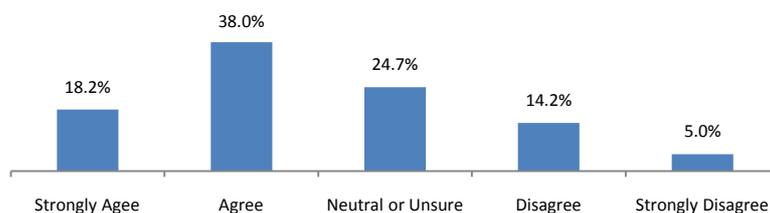
Figure 6.2a The high cost of irrigation water and tough times on the land makes the unauthorised taking of water justifiable (N=1248).



Moral condemnation of water theft was very evident. The findings suggest unambiguous disapproval of water theft, even in situations of dire need. Yet water theft is increasingly common, particularly in irrigation districts. As noted in Chapter Four, drought has seen an increase in water theft. In 2008,

there were 240 cases of water theft investigated in one Victorian irrigation district, an increase from 150 in the previous irrigation season (ABC 2008).

Figure 6.2b: Unauthorised land clearing on farms is wrong. (N=1956)



Land clearing is a contentious issue for landholders. The responses may reflect some response bias as it can be difficult for people to state written agreement with actions that are legally defined as criminal. The high proportion of 'unsure' responses concerning land clearing demonstrates a degree of conflict between acknowledgement of current regulations against unauthorised land clearing and a strong adherence to absolute property rights; the desire to clear land to more effectively farm land and/or belief in different philosophies of land and environmental management which run counter to dominant policies. As Vanclay (2004) noted many farmers may view land clearing as being 'land improvement' and it may even have been a condition of the lease historically. As one respondent wrote:

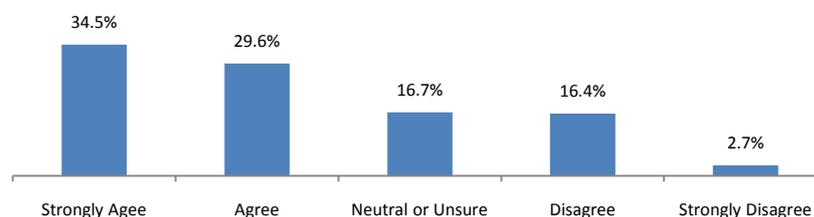
Not all laws are right - land clearing was perfectly legal until very recently and actively encouraged by Government...

Even if other groups in society (e.g. conservationists, extension staff, and agricultural scientists) regard some farming activities as causing degradation of the environment, landowners' understandings may be different. There may be a conflict of views about the right way to manage the environment, and about what constitutes 'good farm management' (Vanclay (2004)).

7.6 Attitudes to environmental laws and regulations

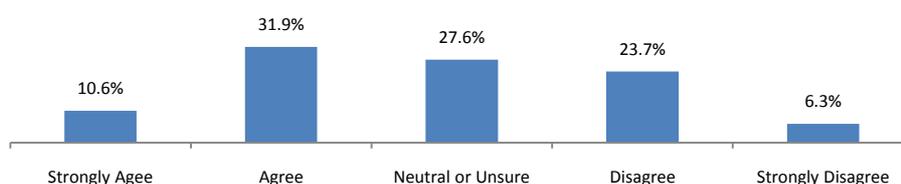
One of the specific aims of this research was to explore landholders' attitudes to environmental law and examine how laws and regulations impact on farm operations which can ultimately influence compliance. Three attitude statements sought participants' views on environmental laws (Figures 6.3a, b and c).

Figure 6.3a: Environmental laws and regulations are written to keep city people happy. (N=1248)



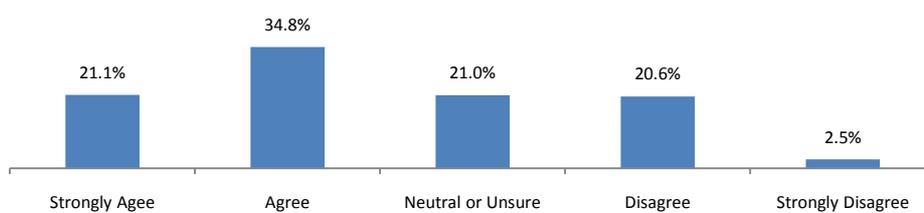
Strong agreement with this statement highlights the social distance between urban and rural communities on environmental issues. The social distance is geographic and cultural: those in the city are literally far away and also far removed from rural knowledge and experience. The distance is also political and unevenly weighted toward the cities: urban areas are heavily populated and the interior sparsely. Again, those in urbanised, mainly coastal, areas may have little awareness of rural issues however they have the political weight to drive the policy agenda and to decide on the direction of land management in areas distal from them and from their daily experience.

Figure 6.3b: Environmental laws and regulations are increasingly important as environmental degradation gets worse. (N=1248)



Responses are divided on these issues. Some farmers commented that they did not believe conditions were deteriorating. Most farmers in their written comments and in subsequent interviews however do acknowledge the need for formal laws to maintain order over the ‘few’ landholders who do not do the right thing. As noted previously there is also a strong social norm to comply with environmental law.

Figure 6.3c: Environmental problems are best managed by farmers without government interference. (N=1248)



A sizable proportion of farmers disapprove of the current degree of government involvement in natural resource management. The legitimacy of government action in the arena of environmental management is low for many landholders. Some accept environmental policy, goals and laws, some do not. Therefore governments face a challenge. For example, one wrote:

Regulation is a necessary evil but was never meant to be the core business of Government.

Another farmer responded, when asked in interview how regulations might be improved:

Yes, they can't get much worse can they?

Comments such as these suggest that the social license of government to govern is shaky and therefore the formal order of law is fundamentally undermined. The remaining sections of this chapter explore farmer attitudes to regulations further in order to obtain a greater understanding of this separation between regulators and the regulated, and what avenues may be most effective in addressing it.

7.7 Access to information on environmental regulations

To assess the level of access to information which might influence attitudes to environmental laws and regulations, farmers within the main sample (N=1248) were asked if they received any information about environmental regulations that were relevant to their particular industry or property. Only 460 (36.9%) reported they had received information. Within this group, the sources of information included CMAs 38 (8.3%); Environmental Protection Authorities (5%); Local Government (15%); State Government Departments (35.4%); Federal Government (2.4%); Water

authorities (6.7%): Industry bodies (6.95%); Accreditation courses (e.g. chemical) (1.5%); Farmer associations (2.4%); Landcare (1.73%) and the media (4.8%).

However, there were 666 respondents (53.4%) who received no information, while 65 (5.5%) stated that such information did not apply to them. One commented that there was*lack of information on what you can do. It is all a big stick approach.*

Another respondent reported that agency reforms had been detrimental to access to good quality information:

The shift from DPI extension officers and Soil Conservation officers to more emphasis on catchment management has been detrimental to farmers in many ways including the environment. We now do not have that expertise on ongoing best management practices that evolved in the era over 15 years ago. I find that assistance or facilitation is not there now.

Several mentioned the relative dearth of agency officers altogether:

...to be honest I've never seen a ranger out. I don't think that happens anymore.

...we've got cultural areas here, and trying to get someone to come out and have a look at them. But no one wants to come out. And that's disappointing, even the local guys won't come out. And that worries me...

The lack of communication was identified as having another downside: the lack of opportunity for farmers to have their views heard by government. The information stream was recommended as requiring a two-way flow, from landholder to government as well as from government to landholder. While it was observed by some that much consultation had been undertaken in some areas there was also criticism of what was seen as window-dressing and a waste of time:

..they [agency staff] came out initially and I still have some of the books where we filled out what we thought should be done. And they've got all that down – and then did what they wanted. It's not consultation. I understand that's how bloody things work, but it doesn't mean you've got to like them.

One respondent added: 'the consultation phase needs to be well publicised and easily accessible so people can get there'. Poor and meaningless consultation led to poor outcomes:

....if the government is trying to rush something through they'll give you a week to respond... That saves them the trouble of making a fair dinkum submission because they didn't really want anyone to comment on it anyway. That's the way bad laws are made, if they don't consult with people on the ground.

Another identified that one of the benefits of proper consultation, including consulting widely, was that it could bring to the fore ideas with merit from outside the mainstream:

It might turn out that the farmers have better ideas than the legislators. I'd like to see a way of them [government] taking on ideas.

Instead communication pathways and media debate were perceived as having been hijacked by lobby groups who had promoted a certain perception of farmers. This in turn had undermined farmers' regard for government:

I resent the fact that Government employees consider all farmers environmental rapists. I feel that Government employees should set down with farmers and work out a sensible and sustainable solution to land clearing - not GREEN GROUPS telling us what to do. (emphasis in original)

Such negative positioning appears to have made farmers distrustful of agency staff and less likely to seek out information or assistance. The focus on enforcement rather than extension by agency staff has also alienated farmers (discussed further below).

7.8 The impact of environmental regulations on farm operations

An open question to the farmers asked if there were any problems for their farm business caused by environmental regulations. Over a third (35%) of the sample reported difficulties. The problems included the cost of compliance both in terms of time as well as financial costs, increased paperwork and inequities.

- **Cost**

The cost of complying with regulations was cited by 88 (7%) of respondents as an issue exacerbated by the current state of drought and economic decline. As this farmer explained:

The cost factor has to be absorbed by farmer. It cannot be "passed on".

Complete regulatory compliance was seen as economically impossible, for example in the case of weeds a farmer in a phone interview said:

Some people do minimum amount, but in the end everything is driven by economics. If you were going to eradicate weeds to what the law might say – you'd go broke. You've got to strike a balance.

Another agreed:

We just don't have the manpower to handle it. I'm just a small bloke I've got 12,000 acres to run on my own. How the hell could I possibly control the weeds?

Time and money were also barriers to undertaking beyond compliant on-farm conservation projects:

With the extended dry period and cost of production, it is nearly impossible to do what we would like to do!

Land clearing legislation was the most common complaint made in the survey, mentioned by 123 respondents (10%). Many reported that the restrictions were a cost to business:

Being unable clear any land constricts the expansion of the business. 70% of the land is bush and cannot be cleared.

We have spent large amounts of money in the past to develop this property to make it both viable and sustainable. But current laws re native vegetation mean these funds were wasted and plans to establish long-term viability and sustainability are now unobtainable dreams. To continue to farm successfully in this area under current veg laws, there needs to be vast amounts of support in dollar terms by Government agencies as increasingly we farm to feed feral and native herbivores. Land development begun in 1991 must remain uncleared for grazing only and has already become subject to erosion (water) as the ground becomes devoid of grass and herbage species.

Inequity in the costs imposed by regulations was a common complaint:

If I am unable to use some land due to veg laws, threatened species etc., I am still liable for Council rates etc. If the wider community believes they are gaining benefits, they should also pay part of the costs.

The inability to clear for land management purposes was also lamented. Woody weeds were a particular concern:

Applying for clearing permits for river clearing is too time-consuming and costly; e.g., should not need to apply for permits to clear black pine (woody weed).

One farmer in an interview cited the need to manage woody weeds for environmental as well as production objectives:

I live in a woody weed area you see, and we're not allowed to do anything with them. And that's the government directive. You can't sustain the country because you can't do anything with it. We could stop it getting worse if they'd let us.

This issue was also highlighted in the Walgett Shire case study (Part 2). Efforts made by the government to assist farmers manage the issue, such as including some feral and native species in the definition of routine agricultural management activities (which do not require permission to be obtained) and allowing their removal in permits (via the property vegetation management plan process) appears to have made little in-road into changing farmer's opinions on this issue.

- **Bureaucracy**

Even when such facilities are made available it appears that farmers resent the bureaucracy attached:

[I don't like] virtually everything that takes power from the farmer to fix things that the farmer sees as problems confronting him.

Associated with these concerns were issues pertaining to property rights and the ability of a landowner to manage the environment as he/she sees fit:

Environmental regulations removes landholders' rights to manage land in the way they see appropriate - guidance from authorities is always welcome, but at arm's-length.

In a phone interview another farmer agreed:

With respect to fixing environmental problems we should be given a chance to have a go and we're not going to get it right first time every time. Nobody does. But we think we are the owners of the land – with freehold title. And within reason we should be given a go to fix it. But we're not and that annoys me.

One farmer found fault with permission processes which not only impeded landholder freedom but also led to undesirable outcomes:

The pressure is that if we try to tackle problems like soil erosion we aren't able to do it ourselves. The authorities make it difficult to get it done by them or commissioned by them. You can get government grants for things, and sometimes we think we'll get better outcomes by putting in a couple of contours, putting in a couple of wash-outs and then fence them off. They don't want to do those things. They would prefer to just fence it off and plant some trees. We would just like to get on with it. We're being hindered, but we've been able to demonstrate the outcome we can achieve but it's not appreciated.

A farmer in a phone interview agreed:

If we want to do anything we need to apply for a grant. And grants are fine - we don't mind anyone giving us money. But when there are strings attached and we can only do things the way they want us to do it.

- **Paper work**

There were 61 (5%) of respondents who reported that paper work or red tape (bureaucracy) associated with compliance was time consuming and created difficulties. The length of time taken to process submissions was a particular issue:

Timeframes are too long for commercial decision-making. Information given can be incorrect. Government bodies do not respond to applications without being chased, even when appropriate fees and applications have been paid.

Another farmer wrote:

It took my friend eight weeks to get an "emergency" permit to have mulga to feed starving sheep; many other similar stories in our district.

In a phone interview one farmer reported that he was still waiting on an application put in 20 years ago:

Back years ago when Bob Hawke said we've got to build our own drought strategies, there'd be no more relief. I wanted to put in a dam to grow fodder. The application was put in '88 or '89, and they made me reapply again, pay the fee again, and some bloke came out from Water Resources and he said if I wanted to grow cotton it would have gone ahead. And it still hasn't been denied or put through in 20 years.

In another phone interview a participant lamented that the cost of poor decisions was borne by the farmer:

...with the block I'm on now, they [government agency] reckon it's 100% pine country... I know I've got virtually no pine at all. And I wrote to them to say if I cut all the pine on this place I'd be lucky to build a couple of chook houses. You can't do anything, you can't complain. You've got to pay your \$300 or \$400 and have it assessed. It's going to cost a lot of money, and I haven't got a lot of money - so you're sort of handicapped like that.

Another criticised the time taken in waiting for decisions that when they came were impractical. Again highlighted was the need to return to the days where there was more interaction with extension:

Too slow in decisions. Idealist and inexperienced people telling you what to do. Not practical. Best days were the ones where Soil Conservation etc. worked with farmers and industry developed change with field days etc.

Undesirable outcomes caused by perceived inappropriate decisions were frequently identified. Issues requiring reform were conflicting legislative requirements and a lack of flexibility in application. These barriers need to be reduced to encourage compliance with environmental law, discussed further in the next section. Farmers themselves identified as critical the need to address the lack of consultation and interest by policy makers in working with landholders toward the same goal of improving land management. Farmers recommended that governments need to utilise expert and applied knowledge in ways which were supportive of farmers, production and the environment.

7.9 Encouraging compliance with environmental law

Many respondents acknowledged there was a need for laws and regulations to ensure order with a minority of landholders who were not doing the right thing. In a phone interview a farmer said:

The rules are there to keep the honest ones honest, and for the dishonest ones. You've got to have rules somewhere along the line. Some of them are pretty hard. But a lot of people are seeing the light...

Many appreciated environmental objectives:

I live in an area myself that has a lot of mountain country and in hindsight it should never have been cleared.

Several identified that they were ahead of the game:

Because we have been so far ahead of the game environmentally new regulations do not pose any problem for us.

Some thought that more needed to be done, by both regulators and farmers. In a phone interview one farmer said:

I wish there was more [pressure placed on farmers] to be honest... I despair looking at some of the practices.

However many regulations were also despised. One farmer wrote that there were “plenty of good regulations, abiding by stupid regulations is the problem”.

Many farmers agreed with this assessment. “Stupid” generally translated as impractical to perform and/or inadequate in outcome. The reasons behind these and similar judgements are illuminating for the task of improving compliance.

7.9.1 Improving regulation and regulatory processes to raise compliance

- **More practicality**

Impractical regulations were oft-cited as a barrier to compliance:

I just think that some of the laws are too impractical for farmers to adhere to. And nobody does. I wonder what is the point?

Both the legitimacy of regulations and government were undermined, which was related to low compliance: “It is just ridiculous. Like anything else [that is ridiculous] you just ignore it”.

“Restrictive” was a word oft-used to describe environmental laws. Several referred to restrictions regarding pest management. This is a concern as pest animals are a major problem for Australian landholders and was a significant problem for respondents to the survey.

...I need set fox baits; not allowed - a huge loss to my stock.

...Pest animal control has become far too cumbersome and restrictive to the point where landholders barely bother.

...We're declared drought EC, have destocked, and now overrun with macropods and rabbits; we're not allowed to shoot the former! We're not allowed to deal with wild dogs; baiting is under the control of Parks and Wildlife, who are entrusted with the preservation of the dingo - the biggest threat to the dingo is cross-breeding from wild dogs!

Regulatory failure itself undermined respect for government. Panic clearance in advance of the introduction of native vegetation laws in Queensland was mentioned in two phone interviews:

...the tree clearing legislation has actually wiped out half the trees. It hasn't done much bloody good, except stir people up.

...everyone started their bulldozer to clear land before the start of the period. And the main thing was not needing more land, it was being aware that they couldn't do it afterwards. And no one was managing their land properly.

Greater use and reliance on evidence-based policy was recommended, and government criticised for being ignorant:

I'd like to see the politicians come up to speed with scientific research about how pastures work and how to use grasslands to capture carbon. They're in the dark ages compared with some of the information that's out there.

Respondents used inappropriate rules and regulatory processes as support for their contention that policy makers had insufficient understanding of farming:

...The people making regulations have no idea of the impact regulations have on individual properties as each property is different. A regulation on vegetation management on coastal areas has no correlation with the western division of NSW or the western slopes.

...Based mainly on "lowest common denominator" using punitive processes as back-up. Inflexible, often poorly designed, can be simply inappropriate, or even downright counterproductive. Rarely actually engage the land stewards themselves.

...Unreasonable, unrealistic damaging legislation evidently compiled by persons lacking knowledge and practical experience of best land management. The majority of landholders will not destroy or damage their properties, therefore [they] should be given full control!!

There were many anecdotes provided of poor performance. One farmer in a phone interview maintained that government decisions were counter-productive in being focused on revegetation when often soil works and water diversion were required beforehand in order to reinstate areas properly, particularly areas that had become degraded due to poor land management historically:

I think the theory behind their decisions is flawed. Maintaining something that's broken doesn't make sense to us. It's not satisfactory. Fix it and then maintain it.

Active management was seen as something which was necessary but impeded by regulation:

Some environmental "laws" are too prescriptive. Veg laws assume all native vegetation is inherently "good" - but thick tree regrowth restricts groundcover, reducing biodiversity and ag returns. Some native plants are agricultural weeds.

...Government agencies need (and some are) to move toward active management of environmentally important issues - lock up and leave does not work.

The management of public lands by government was repeatedly provided as evidence in support of the view that the government were poor land managers. There was also the observation made that increasing the area under National Park was a counterproductive policy aim. In a phone interview one farmer stated:

We live on the edge of the Pilliga Scrub. Forestry was actually managing the land and it was in good condition so when the Greenies came along and looked at it all they could see was that it was in good condition and needed saving. It's a bit like seeing a kid being well cared for in a family situation and someone coming along and deciding to put that kid in foster care because they were in such good condition. Rescuing when something doesn't need rescuing... No one worked out why it was a pristine landscape. It was being managed well so it was pristine... That was excruciating from my point of view to see what happened to the Pilliga Forest - it's called a National Park for Wildfires. They're trying hard but they don't have the cash, they don't have the royalties that Forestry may have had. In the long run I think we're going to have more wild fires because the land is not as well managed... on a hot windy day, living in the middle of it, you wish someone else was managing it.

Another agreed:

National Parks buying up farming land. I've seen it happen up around here. Buying old run down farms that about a national park. And it's run down country, full of weeds and I just find that an absolute nonsense. National parks doesn't have the money or the infrastructure to do anything with it ... Now they're looking at wanting more prime land, as in grasslands. They'll want more and more, and when do you say - you've got enough?

The balance between conservation and production was a common concern. Food security into the future was seen as an overlooked but vital policy aim:

I'd come back to the Sydney Basin and turn it upside down, and really evoke some coastline protection laws. And other laws like getting a decentralisation program for the population. Looking at the prime horticultural areas that are being lost, particularly in areas like Camden. Huge issues. The way Sydney is growing, they're actually putting estates on prime horticultural land, and that's crazy. You've got to feed your people. It will get to the stage where they've got to rely on imports. And not imports from overseas, but imports from Brisbane. And the cost of living will go up. And they've got to make provisions for that. you've got to get people to invest in those horticulture type industries, and get them up and running again, and make sure they are viable. Even if they are subsidised for a while until they are up and running - and in a very sustainable way. It's not a matter of going in and flogging the country.

The WA State Government through the Water Department has applied P1 zonings on farming land, with no compensation. No consultation with landowners was undertaken prior to virtually shutting down their agricultural activity and future land values. No business can withstand the "dead hand" of Government or the inequity of total loss of fair-minded property rights. If

Government wants cooperation in environmental control, they must lead by example. This zoning of farming land has destroyed credibility and any goodwill they had.

- **More flexibility**

There was concern that regulations needed to be implemented more flexibly in order to provide food into the future. The current lack of flexibility in the application of regulations across diverse regions was a major complaint. Regulations were desired which were more sympathetic to the biophysical characteristics and needs of individual properties, which may rate differently according to land suitability criteria and ability to respond to certain management interventions. The phrase “one size does not fit all” was frequently used. Environmental regulations were described as overly “rigid”:

Regulation is too rigid/inflexible and doesn't allow for problem-solving. Takes too long to get permits etc. Government pretends, but doesn't really listen to landholder input and ideas. One size doesn't fit all. Big need for flexibility. Every season is different. Every area/land type is different.

In phone interviews several farmers stipulated that universal rules were inappropriate:

... they say it's environmentally sustainable and we know it's not. Because each little patch is different, and one blanket rule doesn't work. What's sustainable in one place is not sustainable in another.

- **Relevant to all**

At the same time greater uniformity was also desired, as there was resistance to regulations which had uneven impact, like land clearance laws which only affect those with land left to clear. Many respondents expressed concern about the impact of mining on agricultural land, water supply and the environment generally. The perception is that current law turns a blind eye to mining and residential development while penalising agriculture:

It would seem that there are two sets of rules - one for mining companies and urban development and one for farmers. The land degradation caused by coal mining in Central Queensland, for example, is devastating and the very productive land that has been destroyed will never be restored to a useable and productive state. Trees can be pushed over by mines, mines constructed on floodplains. Land clearing by landholders is vastly different to that allowed by mines. Also, it would appear that guidelines have been altered by the Queensland Government to allow the pumping of Ensham mine water into the river system following the Emerald floods, and the people testing the water are Ensham mine. Where are the EPA, Sunwater and DNR? This could - we don't know for sure - be gross environmental vandalism as this water is to be pumped into the river system for many months and the water in the river is clear - not muddy as it always is in the Mackenzie river.

Forestry was similarly viewed:

Forestry appears to be immune from environmental laws in terms of land clearing and water harvesting.

- **Conflicting requirements**

Several farmers also reported disparities between requirements by different regulatory bodies:

We are told to drought-proof our farms. To do this we need more water storage; e.g., more dams to hold more drinking water for stock. Sydney Catchment tells us we can only have so many dams per hectare of land, so we can't put extra dams in for water in drought times. So this authority is stopping farmers from drought-proofing their farms.

Environmental regulations and fire prevention measures clash! E.g., you need to control the environment to safeguard the environment from bushfires!!

Effects economic and practicality of farming operations; e.g., water runoff restrictions eliminate potential for irrigation and potential inability to store enough water for livestock in drought; e.g., increasing numbers of kangaroos grazing on pastures cannot be controlled, resulting in reduced stocking rates; e.g., supplementary feeding of livestock can mean that Local Government stock density regulations are exceeded.

More localised agencies and agency staff were often seen as exceptions to the general rule that governments were disconnected from the realities of farming and the economic, social and biophysical environments that they were regulating. However they were not beyond criticism. Especially resented were agency 'blow-ins' with formal education but low practical experience:

...someone who's got a PhD in prawns coming out here and telling 'em that you can't chop a tree down is just ridiculous.

Authorities intermediate between state and local came in for mixed comment. In NSW there are 13 Catchment Management Areas across the state and both water and native vegetation are managed by 7 member boards in each region. Compliance and enforcement is undertaken at the State level by DECCW. Clearance is therefore co-regulated between the CMAs and DECCW; the latter enforce the regulations at state level while the CMAs administer them at the regional level. Similar bodies are in place in other states. In telephone interviews it was observed that pressure to conform exerted by these types of government agencies was not appreciated where these same agencies were viewed as uninformed and ineffective. However the observation was also made that the CMAs were rendered ineffective because they could not prosecute:

One problem is that even though their classed as an authority, they're not a policing authority.... They can go in and identify areas, but they can't prosecute or anything like that. They're left a little bit high and dry.

One farmer wrote that because there were only a few cowboys and because these people tarred others unfairly, CMA officers should have powers to prosecute. Another farmer agreed:

If you're cruel to animals, the RSPCA has powers to come on to your land and prosecute. But the tragedy is that if you're doing the absolute wrong thing to your property – your land, it doesn't seem like there is as much power to make those people become good custodians. The law seems to be more powerful protecting the animals than the land.

The reconciliation of these two apparently contradictory viewpoints, that government action is undesirable but enforcement needed, is that the participants viewed regulations and more stringent enforcement as necessary for the 'cowboys' and essential also to send a message that breaking the law was wrong. This is consistent also with the general social norms of compliance and support for environmental aims. However at the same time this was considered to be a role required only rarely, and that most environmental objectives would be better served if authorities were less adversarial and more flexible in imposing restrictions and offering assistance according to the needs of particular farms, land types, industries and farmers themselves:

Generally I feel that we have to have some environmental regulations to keep some ruthless farmers honest and on the straight and narrow - I would say that 95% of farmers are very good environmentalists and really do care for their land. The land will not support them if they don't support their land with fertilisers, erosion control etc. I really don't like Government telling us what to do in a mandatory sense - maybe suggest ideas and explain where the ideas have worked and are quite useable.

Education therefore was seen as a necessary adjunct, if not replacement in many cases, for enforcement.

7.9.2 Education and incentives to raise compliance

Regulation itself was identified as an inappropriate tool for achieving environmental ends, especially when used as the sole mechanism. Persuasion and education were generally preferred over command and control and punishment. In a phone interview one farmer said:

It's like with other things you're not allowed to do because someone might get hurt. I don't think we should be tied down because of one bad egg. I don't think people need to be regulated. People are smart, and if someone's onto a good idea news will travel pretty quick, quicker than any legislation.

Education was not seen as a failsafe mechanism however:

So people who started the Landcare group said "Let's see, we're going to put all this trial pasture in on your country and we're going to make sure it's going to work so you'll have it growing on your country, and that will prove that this is the way to go forward". Because the information is on your farm, not on someone else's. And even when that evidence was coming in, on the environmental advantages ... People wouldn't listen, wouldn't learn. Weren't willing to fork out money.

Education which demonstrated economic advantages was therefore seen as essential. Economic realities were highlighted as being especially harsh at present. Several farmers observed in phone interviews that in the end it would always come down to the dollar:

...there should be some education done through Departments. Not in a way where it's going to be critical of people – more using a guidance way. Not about how to look after your property – that gets up your nose a bit. More how to make money.

It's an awareness thing. A campaign where people are shown how it will affect their bottom dollar, their operation or their return. Once they see that they will do something about it. If it will cost them.

My attitude is they can bring in all the rules they'd like, but I've still got to make a dollar off my land, and I'll find ways and means of working with those laws – good or bad – and still try to effect an outcome off my property.

Economic rewards to assist in whole-of-landscape management and sharing of the burden of providing ecosystem benefits was mentioned also:

I would go with incentives and rewards... I think if every farm had 2 or 3 acres of forest that would increase connectivity. That would be a bit of a reward for farmers that are that way inclined and there are quite a few of them around.

Such a proposal would act as a solution to inequity as well as more effective in terms of achieving environmental objectives. Others observed that considering economic constraints nothing would happen without assistance:

I think it's more a money-thing than anything. I mean the cost of sprays – there's a lot of cost that doesn't go very far. I think people with infested country need a bit of help there – a bit of support.

In such circumstances the same farmer advised that assistance needed to be provided early and before, rather than after, land degradation had occurred:

I think they need to get in early and help the people before they get in trouble. Why let a person get into real trouble before giving them a help?

Again the focus here is on practical and achievable outcomes which regulation was seen to in many cases impede rather than promote.

7.9.3 Improving regulation to support beyond compliance activities

Some farmers who were going beyond compliance stated that there were advantages in doing so in avoiding regulatory costs:

I think if you're proactive in that you can actually call the shots, rather than them coming and saying – you have to do this. If you're proactive you can move things forward at your own pace, doing what you want to do to your land.

Others observed that formal processes white-anted and undermined the strength of informal networks which had better social and environmental outcomes:

... where we did have our own networks running, the CMAs have destroyed those. We had our own pressure to perform, with production, but the CMAs have tried to stand on that, and it hasn't worked. It's seen as standover tactics from a government agency. There has been more pressure when it was producer driven – there was more uptake. Not when it's being forced.

Here, regulations and regulators are viewed again as an impediment rather than a facilitator of better land management practice. Another agreed:

I think environmental incentives are good. I'd like to be rewarded for doing the right thing. But regulations are killing farmers.

Another farmer said:

Those people who are doing the right thing would like to think that those people who are not doing the right thing are looking over the fence – emulating them, I suppose. But some people - you can jump up and down but you just can't make them [change]...

Therefore regulations are not the only barrier which such farmers have to work against. A regulatory apparatus which assisted model farmers could therefore have benefits in encouraging innovation and adoption.

7.9.4 Improving regulation for the future of agriculture

Some were keen to blame corporate landholders as the exception to the rule of generally good land husbandry in Australian agriculture. A trend which some felt had been given insufficient policy consideration was the movement towards bigger holdings, fewer farmers and corporate ownership. Agricultural restructuring in this manner was seen to be unfortunate for land management:

We have a number of absentee Sydney based landholders that do not understand that you have to put something in to a system to get something out of it. They overstock, no pasture improvements, no maintenance. Those people have also got multiple farms. One fellow has just sold out. He had 3 medium-size farms in the district – a bit of a sore point really, there would have been a few farmers waiting to see if he'd sell out and they'd have an opportunity to buy, but instead he sold out to another Sydney interest without telling anyone. One individual bought a property that had been well run, pasture improved and they ripped it all up – planted oats in it rather than managing the pasture properly. We despair because that particular bloke owns 13 properties now, they don't have managers on, and they don't participate in the community like the fire brigade, the Farmers Association. They have mobile work forces that go from one property to the other. That's more of a corporate structure. They visit the farm every 3 weeks for a day or so. They're not there to fix a broken fence. If you talk to a lot of people in a lot of districts they'll say the same thing.

Weeds management was identified as a particular concern in this context:

Too few workers on farms is a major contribution to causing damage to the environment. The increase of noxious undesirable weeds in my area is of concern to me. The idea of "get big or get out" that was about in the early eighties was bad for the environment. People borrowed large amounts of money to increase the size of their holdings and in some cases are still battling with debt. Farmers in these circumstances and all farmers to some degree are compelled to do

what makes money first so as to satisfy their creditors and stay on their farms. Cutting burrs and other work that is good for the environment doesn't make money in the short-term so these jobs seem to miss out. Then, when it becomes a major problem, chemicals have to be used which is another problem. This is a National problem and needs a National approach.

Reform itself however can be a two-edged sword. Regulatory reform may be related to continual improvement but at the cost of certainty for the regulated. Past reforms have caused confusion amongst some:

You can't work, and try and correct things, because they change things. You find something that suits you and the next time you go along they've changed it. No one has got any confidence in anything. I think that is the biggest problem.

The lack of public confidence in government is a problem for government as well as for farmers. One of the key areas therefore to address is the legitimacy of government to regulate in this area. Forecast social and economic changes to the agricultural sector present significant challenges for regulators, with the ageing demographic of the rural population and workforce and the continuing movement towards amalgamated holdings to offset the cost-price squeeze and maintain viable income. In future the average landholder may not be a family farmer nor even a small-medium enterprise, but a multi-national company with interests beyond the farm-gate and indeed offshore. Regulators therefore must meet the challenge of overcoming increasing alienation by current landholders as well as attracting compliance from newcomers, including corporate as well as hobby farmers, who may have less place attachment and fewer local ties, factors which have been shown by this study to be associated with place management.

7.10 Discussion

The study reveals that farmers are doing much for the farm environment. They are also thinking a lot about it. The comparison of farmer attitudes over time reveals that while there have not been large changes in opinions since 1991, there have been many statistically significant changes. The findings provide support for Reeve's (2001) conclusion that rural environmental issues are better understood than they were in 1991 — a period when environmental concern reached historical highs in most Western countries, and in which environmental issues began to impact on political agendas and elections. However their understanding of environmental issues, as apparent in these survey and interview responses, suggests there are some gaps between farmers' appreciation of the problems and policy responses and how scientists and policy makers may perceive them.

Understanding farmers' attitudes to land degradation is an important step in designing programs that aim to raise awareness and motivate behavioural change (Reeve and Black 1993). The degree of variation in attitudes about environmental issues and government suggests that there are significant challenges for agencies to engender support for environmental laws which attempt to change practices. Farmers may like things the way they are (or were), are disappointed and unpersuaded by past government action, and may be therefore resistant to change. However, the future, if we wish it to remain unaffected by climate change and ecological collapse, depends on us changing our behaviours now. To persuade regulatees to change their opinions and actions it may be that the nature of government and government actions may need to change.

Farmers themselves recommended that government revisit the regulatory approach in several key areas:

- Reassessment of aims and what type of outcomes are trying to be achieved
 - for example recognition of importance of agriculture in terms of food security; alignment of land use with land suitability; active management of both production and conservation areas; conservation and production as tied rather than competing aims.
- Increasing consistency across sectors (mining etc.) and jurisdictions

- Increasing flexibility to match local conditions and needs
 - Scale issues (to make laws locally applicable)
- Implementation to use collaboration and incentives as well as enforcement
 - Supporting model farmers and best practice
 - Educating and disseminating best practice
 - Use of local and applied knowledge as well as increasing use of expert knowledge
 - Prioritization of enforcement and transparency of enforcement activity
- Rationalisation of regulatory processes to be less time consuming, costly, labour intensive.

In many cases laws were identified as barriers to doing more. With other significant barriers facing agriculture it is perhaps unsurprising that farmers resisted adversarial positioning and looked for more consultative and assistance-based programmes, including financial incentives but also education. Farmers need to be supported in the actions which they are performing and programmes extended to the wider community so that farmers do not feel that they are being unfairly attacked.

Braithwaite (1995) has shown that if regulatees see themselves as opponents of a regulatory system, law evasion is more attractive. Conversely, if regulatees and regulators share common beliefs and values, law evasion is less likely and there will be more motivation to comply (Braithwaite, 1995). Personal ethics and norms in competition with the law may act as alternative codes of behaviour and a perspective shared is all the more powerful, as has been discussed in Chapter 5. Social suasion in farming communities has been hypothesized to act as a brake on reform (Richards et al, 2003). Less strident agreement with the frequency of land degradation by farmers over time may be due to resistance at being blamed as the sole cause. With resistant farmers however it must be observed that government can still engage (Braithwaite, 2003b) (discussed further in Chapter 8). Many farmers are still willing to interact with government in dialogue and believe that the latter may be helpful. The worst-case scenario for government is to have regulatees who have become so disengaged that they are dissociated from government and do not even consider them worth talking to (Braithwaite, 2003) as they will not be receptive to any messages.

One area in particular which may be fruitful for policy makers to examine further is the competition between the philosophies of land management held by farmers and those promoted in legislation. 'Good farm management' may mean quite different things to different farmers, and indeed policy makers, especially where 'farm' is replaced with 'environment.' Vanclay (2004) observes that while there may be normative agreement generally that our environment needs to be improved there may be disagreement over the substantive content of what needs to be done, where, why and how. As one farmer observed:

I'm all for sustainability, but I'm not all for what the general consensus for sustainability is.

Some common ground may be achievable through acknowledging and appreciating the multi-functional nature of the landscape, which goes beyond the productivist paradigm of traditional primary production. This paradigm may be contrasted with the 'post-productivist' paradigm which acknowledges the multi-functionality of the landscape. This includes the production of public goods and ecosystem services but also goods such as food (Mather et al, 2006). Farmers could be accused of being self-serving in arguing that food security should take equal priority with conservation. Nevertheless productivity may have to be increased on a declining resource base to meet future demand. Prime agricultural land may have to be preserved, both existing and additional, to act as a buffer against future environmental change. Equally, farmers may be accused of being disingenuous in arguing for an alternative model of land management which sees that production need not be impeded in order for conservation to be achieved. The landscape however does have many functions, and therefore this may be a useful characterization to ensure that conservation occurs alongside production. Farmers in this study viewed their alternative model as superior for being more practical and more effective in achieving environmental aims as well as supportive of

agriculture. There was some competition in priorities in achieving economic viability but on the whole the ideal was that conservation should be coincidental with economic survival. It is in the mutual interests of conservation and production, by government and by farmers, where perhaps the greatest benefits could be obtained, in terms of aligning informal with formal orders.

7.10.1 Conclusion

People are the key to achieving environmental sustainability because it is the behaviours of people which need to change if humanity is to alter the trajectory of present forecasts of irreversible climate change and ecological collapse. In Australia farmers are the key to effecting change on 60% of the continent and so their perspectives are critical in determining future policy responses desired to achieve environmental goals. Australian farmers are performing many environmental practices both with and without support from government and this should be further encouraged.

Australian farmers are ambivalent however about government regulation and government action and governments must therefore work to alter these attitudes so that future policy actions may be better received. The farmers who were part of this study varied in their views on the appropriateness of government intervention in environmental matters, however many indicated disapproval of government intervention in individual farm management generally as well as expressing disagreement with specific laws and implementation styles in particular. This was despite widespread agreement that environmental aims and practices were worthwhile and should be pursued by both government and landholder. In this area government appears to lack legitimacy and trust and several comments provided in interview indicate the degree to which this lack of credibility is undermining respect for the law also.

Governments must therefore work with farmers to better understand their concerns in managing Australian landscapes both for environmental sustainability and for economic productivity: our environmental security depends on it. The challenge for land resource management policy is to have the institutions in place to reduce the social costs of this period of change, and to halt the growth of environmental degradation while at the same time maintaining the productivity of the nation's agricultural and pastoral lands (Reeve 2001). The latter aspect was viewed by participants as something which should have as much political and social support as environmental aims. They did not see production and conservation as necessarily competing objectives however. What was a point of disagreement was to see production sidelined by environmental regulations which were perceived to be unsuited to, or ignorant of, biophysical conditions and therefore ineffective and counterproductive.

8 Motivational postures and compliance with environmental law

8.1 Introduction

Australian scientists and policy makers share with their counterparts in the rest of the world deep concerns for environmental sustainability. In Australia the impacts of climate change will be severe as it is already the driest inhabited continent on Earth and its unique biodiversity is especially susceptible to even minor perturbations in conditions. Impacts on food security will also be severe as Australia exports two-thirds of what it produces. Australia's agricultural industries are already threatened by land degradation, drought, bushfire and flood risks and biodiversity losses. The scientific evidence for environmental harm is overwhelming, yet it is sometimes difficult to translate this evidence into government and policy action and even more problematic to use it to generate behavioural change. Regulatory failure in improving environmental sustainability outcomes is also well-documented (see for e.g. Bartel, 2003; Martin et al, 2007; Yeagher, 1991). There is frequently a troubling mismatch between policy effort and on-ground outcome – and with public spending under increasing pressure to meet a number of equally meritorious and competing priorities there are important opportunity costs to be considered when it comes to allocating resources – if there are no guaranteed outcomes then could not public money be better spent elsewhere? How might public spending and effort be better targeted to ensure public goods are achieved?

Regulation in Australia, as in many other countries, has focused on 'command and control.' Although historically enforcement has been limited and at the lower end of the spectrum, and requirements and penalties remain predominantly administrative, there are also increasing moves for criminalization. At the same time there have been shifts toward privatization of natural resources and industry self-regulation. Evidence of how public policy ends might be best achieved is needed so that authorities may be better placed to decide between different approaches. This study addresses the particular need to understand the attitudes and compliance motivations of farmers with respect to formal environmental laws, to test and apply motivational posture theory in a hitherto under-examined field of regulation, and to inform policy makers of how compliance behaviour, and beneficial environmental outcomes, may be most effectively attained. The findings are summarised in this chapter.

8.2 Background

8.2.1 Environmental regulation and regulatory theory

Regulation is designed to affect outcomes through the manipulation of conditions: it may be used to change human behaviour, as a means of social control, to influence "the flow of events" (Parker and

Braithwaite, 2003). Significant achievements have been made due to formal law and regulation in improving human health and safety and reducing air and water pollution (see for e.g. discussion in Gunningham and Sinclair, 2002). However there is also evidence that regulatory failures have occurred. Knowing how best to enhance the efficacy of regulation and/or when alternative interventions could be applied, is critical for achieving environmental outcomes (Harrison, 1999; Lyon and Maxwell, 1999; Martin et al, 2007). Historically, the rational choice model or deterrence model has been thought to be favourable in affecting obedience, and therefore traditional law and order, so-called 'command and control' techniques have been adopted to enhance compliance. However empirical tests have found these wanting in a number of key respects and several of the models' underlying behavioural assumptions (see discussion in Black, 1997) have been undermined by research from the biological and social sciences. It is apparent that compliance behaviour is not only affected by the formal external constraints of the law but also by personal morals and social norms and other informal external and internal factors (Gardner and Stern, 2002). It is influenced by how regulatees perceive and react to the actions of the authorities, which is itself affected by the history of treatment by the government that regulatees have experienced, as well as what regulatees think about the substantive content of regulation. Rarely is regulatory activity isolated, rather it is an ongoing relationship, so history, memory and context are very important. The traditional deterrence model, as will be demonstrated in the short review below, underplays the contextual and relational aspects of implementation and enforcement as well as failing to recognise the limited rationality of human behaviour. Authorities who have followed its edicts may fail to elicit compliance and instead incite resistance, which is politically expensive as well as causative of regulatory failure. The Boston Tea Party is an example of what may happen when disagreement spirals not only into disobedience but outright rebellion.

Environmental laws cover a broad range of agricultural activities including pollution, hazardous chemicals, pest and weeds management, water use, stream management, native vegetation, biodiversity and heritage (Martin et al, 2007). Environmental law in Australia has a long history. The first National Park was gazetted in 1879 and there were early restrictions on the use of public waterways. Modern environmental law in Australia however dates from nearly a century later (Bates, 2006). Pollution laws were introduced in the 1970s, alongside protection of native species and management of introduced species. The 1980s saw a mainstreaming of environmental consciousness and the beginning of the Landcare movement. From the 1990s onwards regulation of water and native vegetation impacted further than ever before on private land management. The expansion of environmental regulation occurred at the same time as increasing doubt was being expressed in the legal and economic literature as to the efficacy and efficiency of the law. Some deemed the law entirely unsuitable "generally derided on efficiency grounds" (Barnes et al, 2009) while others sought to ameliorate its negative impacts. Important work in the improvement vein, which this study seeks to extend, is that which has shown that regulatees may adopt particular styles of engagement with authorities, termed "motivational postures", which may influence compliance behaviours and responses to regulation and enforcement activities. Motivational posture theory is based on empirical evidence from studies including nursing home regulation (Braithwaite, 1995; Braithwaite et al, 1994) and tax compliance (Braithwaite, 2001; Braithwaite et al, 2001; 2007). This body of research suggests that mapping the motivational postures of regulatees may be useful in designing and implementing successful regulatory mechanisms for behavioural change (Braithwaite, 1995; Braithwaite et al, 2007; McBarnet and Whelan, 1999).

The purpose of the review which follows is to outline current thought regarding compliance motivations and the contribution of motivational posture theory for the development of more effective regulatory intervention. It is timely to do this as environmental law enforcement agencies and professional bodies representing them, both in Australia and overseas, such as the International Network for Environmental Compliance and Enforcement (INECE) and the Australasian

Environmental Law Enforcement and Regulators network (AELERT), are currently committed to developing and using evidence-based regulatory implementation strategies. The drivers for this include a political environment which is placing increasing demands on agencies to deliver outcomes, and a policy environment which is extending the reach of formal regulation ever further into environmental management, through legal instrumentation alone, and also in concert with market-based initiatives.

8.2.2 Compliance motivations

The research is theoretically grounded in several disciplines and draws particularly on pivotal research in criminology, social psychology, socio-legal studies and regulatory theory. This literature suggests that compliance behaviour may be affected by a number of factors other than those previously thought to be dominant. Characterizations of regulatees as rational actors have been found particularly wanting, and therefore regulatory responses based on simplistic frameworks of threats unlikely to be successful (see for example discussion in Braithwaite et al, 2007: 138). These are important lessons for Australian regulators as the majority of formal regulatory interventions are based on the traditional deterrence approach. Famously proposed by Bentham (1789), the deterrence approach has found strong theoretical support in rational explanations of human behaviour according to which a regulated individual is primarily motivated by the costs and benefits of an action. Compliance is thought to be achievable through manipulating the cost-benefit transaction of transgression. One way of doing this to make the threat or disincentive, created by the probability of detection, apprehension, prosecution and penalty outweigh the benefits of contravention. Such narrow rationalist conceptualizations have been criticized however for their Gradgrindian worldview and their failure in practice to explain or predict human behaviour for the four reasons discussed below.

Firstly, they deny the value of voluntary compliance, and as Walker (2004) argues, there would be rule of the gun if voluntary compliance were not usual. It has also long been recognised that observance may be due to the symbolic status of law alone (see for example Kirgis, 1993: 522). Secondly, research in the cognitive sciences is increasingly demonstrating that human brains are not purely 'rational' but are both emotional and rational; and indeed so-called rational thinking may be impossible without the emotions (see for e.g. Haidt, 2001). The philosophies of David Hume are being supported by the most recent scientific evidence, and economic rationalist theories challenged. It is frequently argued however that economic motivations are primary for environmental and corporate crime (see discussion in Grabosky, 2003; Paternoster and Simpson, 1996; Scholz, 1997). Environmentally beneficial and compliant behaviour such as forgoing land clearance are costly in terms of lost production for agriculture (AGO, 2000; Davidson et al, 2006; NSW Audit Office, 2006; Productivity Commission, 2004; Mallawaarachchi and Szakiel, 2007). Compliance costs may also be important (Banks, 2005; O'Ryan et al, 2006) and changing practices may also be viewed as costly in terms of risk (Cary et al, 2002; Stanley et al, 2005). Such costs may be viewed as not only disincentives to compliance but as unfair imposts and therefore may also undermine the legitimacy of the regulator. It may be that these latter two factors are as important in affecting compliance behaviour as the strictly monetary equations of compliance because, and this is the third reason, perceptions of morality, including assessments of fairness, and the nature of the ongoing relationship between the governed and the authority have been shown to be very influential in compliance (Kahan, 2002; Paternoster and Simpson, 1996). In tax compliance, an area where economic motivations may have also been assumed to be central, Braithwaite et al (2007: 139) have demonstrated that appreciation of the legitimacy of the authority and approval for the authority and its goals, including the substantive law, are important determinants of compliance behaviour. Formal legal sanctions may affect compliance positively if there is some acceptance of the laws and processes pursued by an authority and of the authority itself. Herein perhaps lies the difficulty for regulators however as this may be the *only* situation in which formal legal sanctions work. The efficacy of formal sanctions in securing compliance may be limited if the legitimacy of the

law, legal system or government is challenged, for example by perceptions of unfairness, poor accountability, unequal treatment or there is disagreement with legislative aims and content. Such a situation inevitably also erodes trust and trust has also been shown to be pivotal in compliance (Murphy, 2004). In such situations deterrence strategies may have perverse effects in generating greater resistance to both the rules and the regulators, and alternatives such as persuasion may be stymied by the lack of trust (Hall and Pretty, 2008). What has previously been labelled as voluntary compliance and obedience due to the symbolic status of law may indeed have respect for law as its proximate cause, but trust as its ultimate cause.

Fourth and finally, compliance is socially influenced, and compliance motivations are influenced by what individuals perceive about what other people do and believe, and whether they identify or not with these people as a group. Work in the field of tax compliance in Australia has illuminated the importance of the norms that are held by individuals and those they perceive are held by society at large, for e.g. if people believe that most people evade paying tax then they also are likely to evade tax (Tyran and Feld, 2006). Perverse effects can result from enforcement strategies that are ignorant of social factors (for example media messages that include evidence of evasion, even alongside a message of increased enforcement, may only serve to reinforce the message that the law is not being observed and therefore alright to evade (see Sheffrin and Triest, 1992 in Shapiro and Rabinowitz, 1999). Norms of compliance, or non-compliance, may develop and be enforced through informal sanctions such as disapproval, shaming and ostracism (Ahmed and Braithwaite, 2005; Posner and Rasmusen, 1999). Work in the area of social delinquency and criminal behaviour has drawn particular attention to the importance of contextual factors and to the norms of behaviour within deviant groups (Sykes and Matza, 1957). The techniques which Sykes and Matza describe as “neutralizing” the effect of law can create and maintain a sub-culture of criminality. Personal ethics and norms in competition with the law act as alternative codes of behaviour, in delinquent groups, but also in other groups. Studies of the factors influencing corporate compliance, thought initially to be more likely to be restricted to cost-benefit calculations, have also demonstrated that social influences are important in driving or subverting compliance. These factors may include corporate culture but also social license and the influence of location in terms of the geographical contingency of social license in particular communities (Gunningham and Sinclair, 2002). Social suasion can also act as a brake on reforms the productivist paradigm holds and asserts its dominance in agriculture (Richards et al, 2005). “Although there may be interest in “implementing innovative systems of sustainable production, the social sanctions against doing so may prove to be too powerful” (Richards et al, 2005).

Models of compliance based on purely rationalist theories of human behaviour have conceived of regulatees as uniform and colourless actors, their behaviour determined, and thus able to be moulded, by the adjustment of a limited set of factors, with a type of ‘one-shot-rule’ perspective dominating. These models have traditionally tended to focus on what the regulators are doing, and how the legal system and apparatus of implementation and enforcement may interact with an *a priori* community with a very limited pre-existing architecture of motivations and norms of behaviour which are assumed to be known and which vary little. What these models may fail to recognise is that the legal system itself is part of this pre-existing architecture and that regulatees and the regulators are engaged in long-term relationships in a context which includes many other influences and factors. As with all relationships however, what one thinks and feels about the other party will affect how one behaves towards them. Notable contributions to this broadening of the scope of compliance inquiry, and important empirical and theoretical developments in this respect, are John Braithwaite’s regulatory pyramid, responsive regulation and work in restorative justice (Ayres and Braithwaite, 1982; Braithwaite, J. 2002), and the work by Valerie Braithwaite on trust, tax compliance and motivational postures (Braithwaite, 1995; 2002; 2003a; 2003b; Braithwaite and Braithwaite, 2001; Braithwaite et al 1994; 2007). From this work it is clear that compliance is multi-faceted and relational. Compliance may be related to a history of interaction between regulatees and regulators over a wide range of activities, as well as social norms of behaviour and desired

standards of law and order, and psychological and personal factors, including that of trust developed between people and government institutions.

8.2.3 Motivational Posture Theory

The work by Valerie Braithwaite and others has identified that regulatees may hold a number of motivations related to compliance and exhibit a range of compliance positions known as motivational postures (Braithwaite et al., 1994). Braithwaite et al (2007: 138) define motivational postures as “conglomerates of beliefs, attitudes, preferences, interests, and feelings that together communicate the degree to which an individual accepts the agenda of the regulator, in principle, and endorses the way in which the regulator functions and carries out duties on a daily basis.” These postures represent the social distance individuals place between themselves and authorities and may be related to particular coping sensibilities adopted as protective mechanisms in response to the threat of authority (Braithwaite et al, 2007). The greater the social distance, the less effective regulatory agencies will be in persuading regulatees to comply with regulations.

In previous analyses of nursing home and tax compliance five motivational postures have been identified: commitment, capitulation, resistance, disengagement, and game playing (Braithwaite et al 2004; 2007). Table 1 interprets these postures as they might apply to environmental law. Braithwaite (2003b) developed a 29 item scale to measure the five postures (see also Braithwaite, 2001 and Braithwaite et al, 2001). Factor analysis identified two separate factors; one being cooperation-resistance, the degree to which the individual is prepared to support the government and submit to its authority, and the second being dissociation, the degree to which the government is seen as having the right to direct the behaviour of individuals (Reinhart et al, 2003). Dissociation has been relabelled in subsequent work as dismissiveness, in some ways similar to resistance and has been identified as a “supra-posture” defining game players and the disengaged (Braithwaite et al, 2007). These two postures, alongside resistance, are associated with defiance to law, the remaining two associated with deference (Braithwaite, 2003b).

Motivational posture theory uncovers the contingency of regulation and focuses on the context of personal beliefs and social norms and previous experience with regulators. It is a way of achieving a deeper understanding about what particular people within a certain regulatory arena think about a specific regulation, and how they will respond to it. Motivational posture theory supports the view that the nature of social relationships are just as important for compliance as are opportunities to increase profits and evade legal restrictions. If regulatees and regulators share common beliefs and values, law evasion is less likely and there will be more motivation to comply. Conversely, if regulatees see themselves as opponents to a regulatory system, law evasion is more attractive (Braithwaite, 1995). This work makes clear that, as people may become compliant through government action, they can also become non- or creatively compliant in response to government action. Creative compliance, like game playing, is compliance to the letter of the law but not its spirit (Braithwaite, 2003b; McBarnet, 2003). Gunningham et al (1998) have also identified a beyond compliance position where regulatees pursue the spirit of the law irrespective of its content.

The challenge for regulators in increasing compliance is to reduce social distance and to heal the social rift. According to Braithwaite (1995) there are two main aspects to this: the rapport, social connectedness and degree of trust and respect between the regulator and the regulatee (after Meidinger, 1987) and the degree of agreement between regulators and the regulatee as to the ends and means of regulation (after Merton, 1968). The regulatory and enforcement strategies most suited to engendering compliance within each posture have been identified in an extension of Ayres and Braithwaite’s (2002) regulatory pyramid (Braithwaite, 2003a).

Table 7.1: The five motivational postures

Orientation	Posture	Description	Example
Deference	Commitment	Belief in environmental regulations as a means of securing the common good	<i>I accept responsibility for complying with environmental regulations</i>
	Capitulation	An acceptance of the regulator as a legitimate authority	<i>No matter how cooperative or uncooperative the regulators are, the best policy is to always be cooperative with them</i>
Defiance	Resistance	Attributing negative and harmful intentions to the regulator – they are out ‘to get’ farmers	<i>It’s important not to let the government push you around</i>
	Disengagement	A widespread disenchantment with the system whereby individuals have ‘given up’ on the governments and regulatory system	<i>I don’t care if I am not doing the right thing by the regulations</i>
	Game playing	Perception of the regulator as a partner in playing and finding ways to use the law to one’s own advantage	<i>The government respects people who can give them a run for their money</i>

(Source: After Braithwaite, 2003b; Reinhart et al, 2003)

In more recent work in tax compliance the five postures have been further unpacked to expose several underpinning coping sensibilities (Braithwaite et al, 2007). Regulatees who value their autonomy and may wish to challenge the law and its legitimacy (referred to as the “taking control” sensibility) may be more likely to display a dismissive posture such as game playing or disengagement. Those who feel victimized by the authority (“feel oppressed”) are more likely to be resistant. By contrast those who agree with the law and the authority (“think morally”) are more likely to be co-operative. These findings strengthen the argument for a view that compliance may be most influenced by factors which have hitherto gone under-acknowledged. Such factors give regulatory authorities scope however to be more effective and influential, by using deeper understanding of the regulatees to close the distance between them. Authorities are advised to undertake responsive strategies which are most likely to be complementary to the particular coping sensibilities and postures, rather than blanket deterrence-based strategies, especially if the aim is to achieve and build compliance which is sustainable over time (Braithwaite et al, 2007).

8.2.4 Closing the distance: relationships, trust and agreement

Examinations of compliance behaviour are aimed at prediction as well as understanding, and these predictions may be thought especially useful by authorities aiming at raising compliance. However profiling of the compliant and the non-compliant and tailoring appropriate regulatory interventions to suit is difficult due to the numerous factors and contextual aspects at play. Motivational postures are not fixed nor are they mutually exclusive (Reinhart et al, 2003; Braithwaite, 2003b). In other work aimed at targeting intervention to type, such as Gunningham and Sinclair’s (2002) work on corporations, scale of operation and location have also been identified as important factors (see also Shapiro and Rabinowitz, 1999; Sparrow, 2000). The public policy implications of this work is that there may be no one-size fits all model for engendering compliance, whether this be within a group of regulatees or even within a group which exhibit the same motivational posture or compliance

position. Rather the strategic targeting and adoption of a mix of implementation tools, including punishment but also persuasion, is vital in building compliance, as is building trust between those being regulated and the regulators and identifying and bridging gaps in values (Ayres and Braithwaite, 1992; Braithwaite, 1995; Braithwaite et al 2007). The absence of consensus can prove problematic for achieving conformity (Anleu, 2000). Laws will operate most effectively where they are also norms: where there is little moral ambiguity, where harm is demonstrably caused by punishable activities, and in culturally homogenous societies (Thompson, 1992 in Low and Gleeson, 1998: 190). This aspect may be especially pertinent in the environmental policy arena as public interest is often aroused (Braithwaite, 2009) because of conflicts in opinion. For example in Australia native vegetation clearance and land clearance laws have been especially contentious (Lockie and Higgins, 2007; Ratnapala, 2005). Legislated restrictions on clearance of native vegetation have been based on the scientific evidence of the environmental risks associated but regulatees may hold contrasting opinions. The Centre for Independent Studies (Saunders, 2002) has questioned the Australian Bureau of Statistics' (ABS, 2002) evaluation of high rates of land clearance as bad. Saunders (2002) says that it is not correct to say that land clearance is bad when those clearing think it's a good. Indeed, implied in the strict liability status of the regulation is that it does not carry the full moral approbation of the criminal law. Furthermore under land clearance regulations harm is inchoate. While the norm within the law is that harm is assumed, this is undermined by proportional sentencing policies which require the degree of harm to be established, and to be significant before penalties may be meted. The laws also may be perceived as derived from the interests of city people, and unfairly impacting on those living on the land. Here is a situation, as Haines et al (2008: 8) have identified as requiring attention, where law is "seen as legitimate by one audience, such as the voting public...and yet fails to gain traction on the ground with the regulated entity." Teubner (1998) says that the operation of the law is compromised not only where there is (and because of) a value conflict between the regulation and the regulatees but because there is a conflict between the norms underpinning the legal system and other social systems. Teubner (1998: 457) claims that authorities should attempt to work with rather than against internal motivators, that they should seek "structural coupling": the coincidence of law with cultural norms, of formal with informal sanctions, and of external with internal motivators. Authorities therefore need to discover, paraphrasing Scott (2003); "what normative structures are operating...which might provide the key to control in respect of particular sets of values." Only then can the gaps be bridged, the social rifts healed.

8.3 The present study

The present study sought to identify farmers' motivations towards compliance to environmental laws, their attitudes towards environmental governance and management, their regard for environmental problems and the management practices employed by farmers on their properties; to determine whether motivational postures existed; and to uncover any relationships between postures and behaviours. Most opinions sought were with regard to environmental laws generally but opinions were also sought on particular areas of environmental law (for e.g. land clearance) as well as approaches (for e.g. criminalization, third party regulation).

Specific objectives were to:

- identify farmer attitudes and behaviours around environmental issues and on farm environmental management;
- identify farmer opinions of government and government action regarding on farm environmental issues and management;
- identify farmer opinions of particular environmental laws and their aims;
- identify farmer motivations towards compliance and factors contributing to these;
- identify farmer attitudes towards environmental transgressions; and

- use a)-d) to identify possible ways forward for government and farmers to improve on farm environmental management.

A further objective was to identify any spatial differences in attitudes and motivations due to different regulatory interventions in the separate jurisdictions. In Reinhart et al's (2003) analysis of taxpayers few differences were found between states but differences were identified between urban and rural based taxpayers within New South Wales, Victoria, Queensland and Western Australia. Rural participants in New South Wales, Victoria and Queensland exhibited lower commitment and greater disengagement than their urban counterparts. In Queensland they also exhibited greater resistance. In Western Australia the only difference was greater capitulation (Reinhart et al, 2003). Differences between states could be greater in the environmental arena than in tax, because taxation is administered nationally while states have different environmental laws and administer each separately.

Motivations were elucidated in order to test and apply Motivational Posture theory and develop group profiles of groups to aid the development of possible implementation strategies. Environmental attitudes and behaviours were documented in order to illuminate any discrepancies between public policy goals and the values of farmers. The opinions of farmers regarding government and the appropriateness or otherwise of government regulation was sought in order to determine perceptions of legitimacy and the relationships aspect of social distance. The opinions of farmers towards various environmental transgressions was sought in order to ascertain prevailing social norms pertaining to different types of environmental laws, for example to compare and contrast attitudes towards land clearance with perceptions of water theft. While some community attitudes may be misinformed, they are important for understanding why environmental transgressions persist and formal legal sanctions are disregarded. Current research, policy and programs tend to overlook the importance of understanding the nuances of the social environment of rural communities and as a consequence, many regulations and programs for environmental protection remain ineffective.

8.3.1 The survey

Braithwaite's multi-item Motivational Posture scale, which was designed to measure compliance positions to Australian taxation law (and previously nursing home regulation), was adapted to assess motivational postures towards environmental law among Australian farmers (Braithwaite, 2003b; Braithwaite et al, 2007; Reinhart et al, 2003). To limit the size of the questionnaire, only ten statements from this scale were chosen and two items per posture were used to test the five postures previously defined in the literature (Table 7.2).

Table 7.2. The five motivational postures and statements for compliance with environmental laws.

Orientation	Posture	Description	Example statement
Deference	Commitment	Belief in environmental regulations as a means of securing the common good	<i>Abiding by environmental laws and regulations is the right thing to do.</i> <i>Abiding by environmental laws and regulations is helping the government do worthwhile things.</i>
	Capitulation	An acceptance of the regulator as a legitimate authority	<i>Environmental laws and regulations may not be perfect, but they work well enough for most of us.</i> <i>No matter how cooperative or uncooperative the government environment agencies are, the best policy is to always be cooperative with them.</i>
Defiance	Resistance	Attributing negative and harmful intentions to the regulator – they are out ‘to get’ farmers	<i>We need more people willing to take a stand against environmental laws and regulations.</i> <i>Government environment agencies are more interested in catching you for doing the wrong thing, than helping you do the right thing.</i> <i>If abiding by environmental regulations is going to cost me money then it is not worth it.</i>
	Disengagement	A widespread disenchantment with the system whereby individuals have ‘given up’ on the governments and regulatory system	<i>If I find out that I am not doing the right thing by environmental law and regulations, I’m not going to lose any sleep over it.</i> <i>I don’t really know what environmental laws and regulations expect of me and I don’t really care.</i>
	Game playing	Perception of the regulator as a partner in playing and finding ways to use the law to one’s own advantage	<i>I like the challenge of finding ways to get around environmental laws and regulations.</i> <i>It’s good to talk to other farmers about loopholes in environmental laws and regulations.</i>

(Source: After Braithwaite, 2003b; Reinhart et al, 2003)

An additional question pertaining to the cost of compliance with environmental law was added in order to evaluate the importance of financial incentives. Economic imperatives have often been put forward as critical motivators for farmers attempting to operate business enterprises through climatic extremes and economic pressures including declining terms of trade and debt. It was hypothesized that cost may be particularly important and this was borne out in the results.

In the questionnaire, respondents were asked to rate their level of agreement or disagreement for each of the eleven statements. A reliability analysis using Cronback’s Alpha was performed on the responses to this question recommended the deletion of the two Commitment statements. Subsequent analysis secured an alpha score of 0.62, which is adequate. This suggests that future use of this scale for measuring compliance with environmental law will be sufficient without the

inclusion of the Commitment statements. However, further testing of the instrument to trial other items from the Braithwaite model is recommended.

8.4 Results

To explore the types of postures towards environmental laws within the main sample (N=1248), a two-step clustering technique was performed to group respondents according to their similarity in their scores around the mean. The use of standardised scores permitted comparisons of diverse distributions within the analysis. The analysis identified the existence of four groups or clusters. Quick Cluster was then used to refine the solution using interactive reallocation (k means). Figure 7.1 below displays the standardised means of the various motivational postures within the four clusters. The two Commitment statements deleted from the analysis are included in Figure 7.1 to display how groups who were otherwise similar in their responses rated these statements.

8.4.1 Cluster profile: Four motivational postures

Cluster one (The Disengaged; N=313) were nonchalant about abiding by regulations and were happy to find ways to not comply but they also demonstrate capitulation tendencies. Cluster Two (The Game players; N=177) strongly disagreed that compliance was necessary and were keen to seek ways around regulations. They also believed more people should take a stand against environmental laws and sought out ways to get around regulations. However they also expressed disengagement with environmental regulations. Cluster Three (The Resisters N=245) have little faith in environmental regulations and strongly believe that they do not work well for all landholders and that people should actively take a stand against them. Conversely, cluster Four (The Aligned N=382) were strongly committed to abiding by laws and regulations and believed that the laws were well intentioned and very worthwhile. This fourth group appears to be more committed to legislative goals than capitulating to government. The low relative numbers of the Aligned group and the high numbers in the defiance groups suggests that environmental laws have extremely poor acceptance amongst regulatees, and this compares unfavourably with tax compliance where far fewer identified as opposing the system (Braithwaite, 2003b).

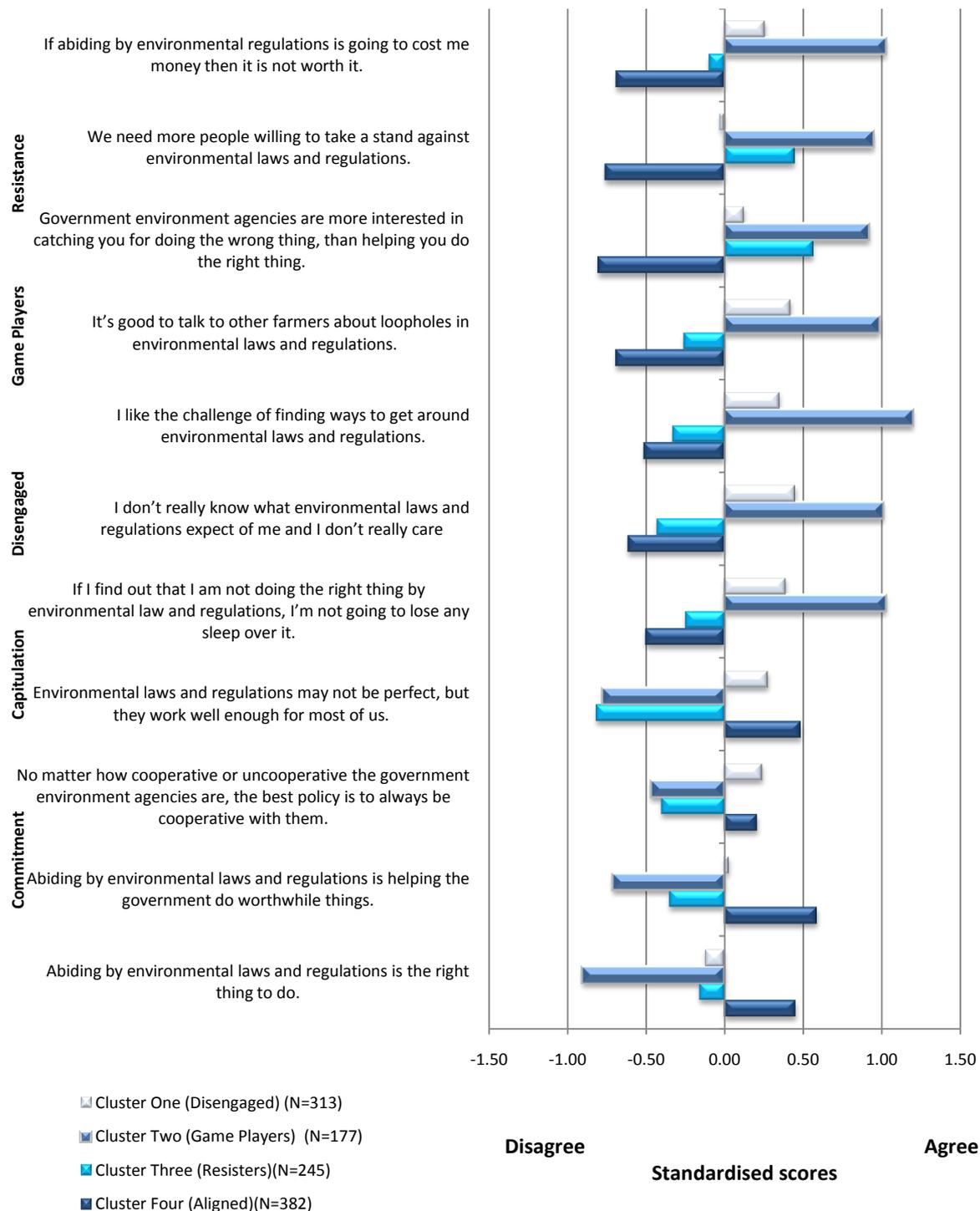


Figure 7.1. Motivational Posture cluster profiles.

There were differences in the proportion of net income from farming ($\chi^2=27.29, p<0.01$) with the Aligned group being less reliant upon farm income. There were no differences in farm business structure or equity levels or if their property was previous owned by family members.

There were no significant differences between the groups in gender, but the Resisters had significantly greater proportions of younger people (under 50) while the Game players were older ($\chi^2=9.44, p<0.05$). There were significant differences in levels of formal education: those with degrees ($\chi^2=12.51, p<0.01$), High school ($\chi^2=12.51, p<0.01$), and life experience ($\chi^2=12.51, p<0.01$). Game players indicated less sources of experience overall.

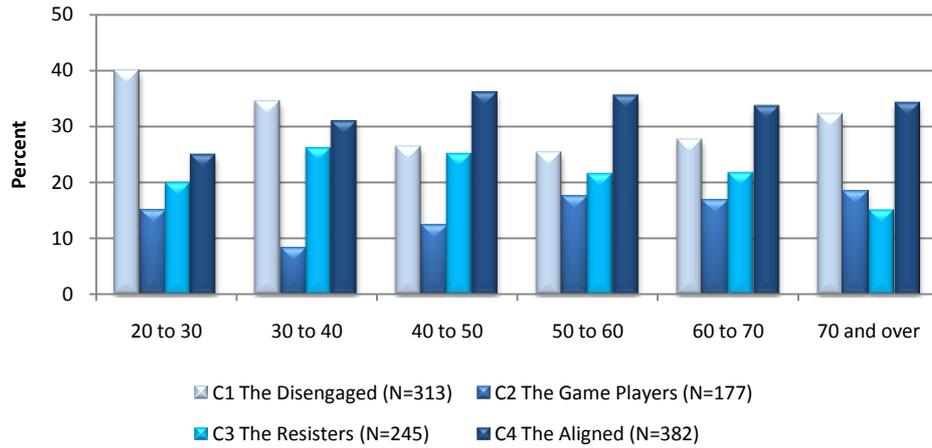


Figure 7.2. Clusters by age

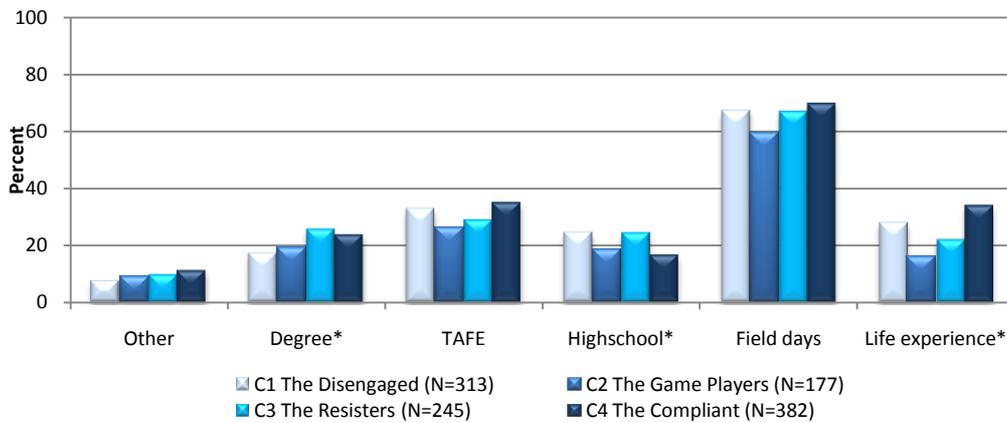


Figure 7.3. Clusters by education

8.4.2 Motivational postures, location, place attachment and social cohesion

The main differences between the postures were in location characteristics. There were significant differences between the postures in state distribution ($\chi^2=44.32, p<0.0001$). There were greater proportions of Victorians and South Australians among the Aligned group. There were more Queenslanders amongst the Resisters while more farmers from New South Wales were amongst the Game players (see Figure 7.4).

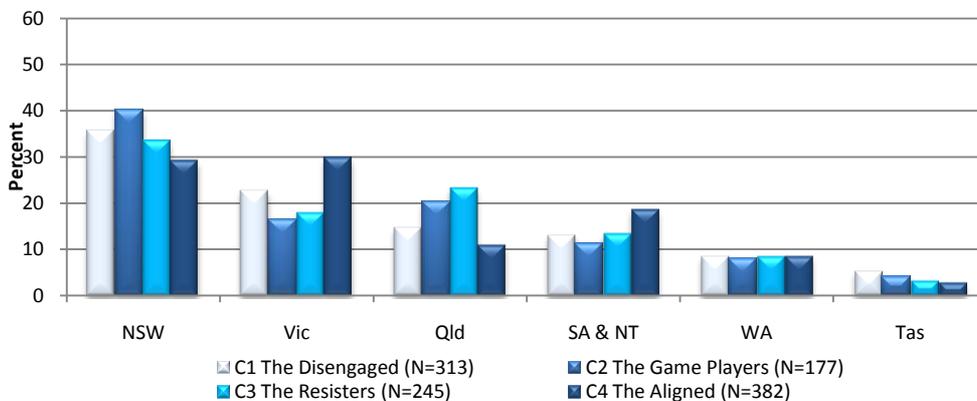


Figure 7.4: Postures by state.

Postures also varied across industries. Industry types are also affected by geography (especially for favourable climate and soil type but also for access to transport and market infrastructure). There were significant differences between the postures in those farmers involved in Beef production ($\chi^2=10.46$, $p<0.05$); Wool ($\chi^2=11.77$, $p<0.01$); Cereals ($\chi^2=13.39$, $p<0.01$), Fruit ($\chi^2=7.89$, $p<0.05$), and Grapes ($\chi^2=14.51$, $p<0.01$). Figure 7.5 displays the proportions for each of the industry types across the postures. The Aligned group tended to be more involved in grapes and olives and new and emerging industries such as turf, seed, flowers and herbs. The Resisters and the Disengaged were more likely to be growing crops. The Game players were rice growers, beef and wool producers. The Aligned group were more likely to be irrigators ($\chi^2=14.55$, $p<0.01$).

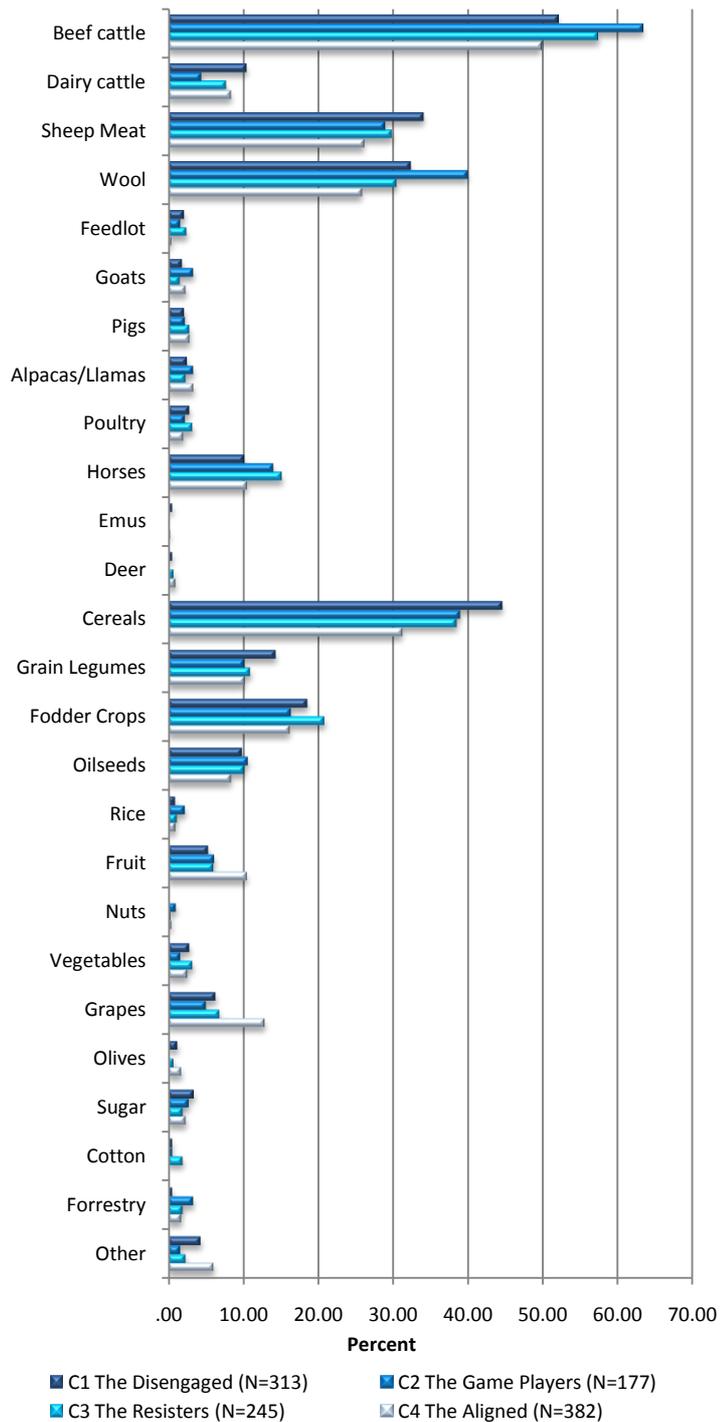


Figure 7.5: Postures by industry type

Property sizes varied between postures. Properties owned by the Aligned were significantly smaller than those owned by Game players and Resisters ($\chi^2=51.26$, $p<0.0001$). There were differences in the length of time the respondents had lived in their district ($\chi^2=33.27$, $p<0.001$) and on their current property ($\chi^2=30.72$, $p<0.01$). More Game players had lived in their district for more than 50 years and had been on their current property for more years than the Aligned group (see Figure 7.6).

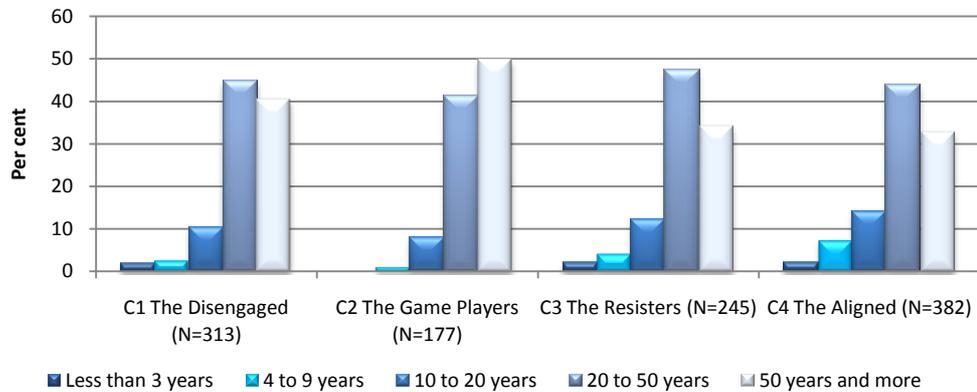


Figure 7.6a. Postures by length of time living on their property

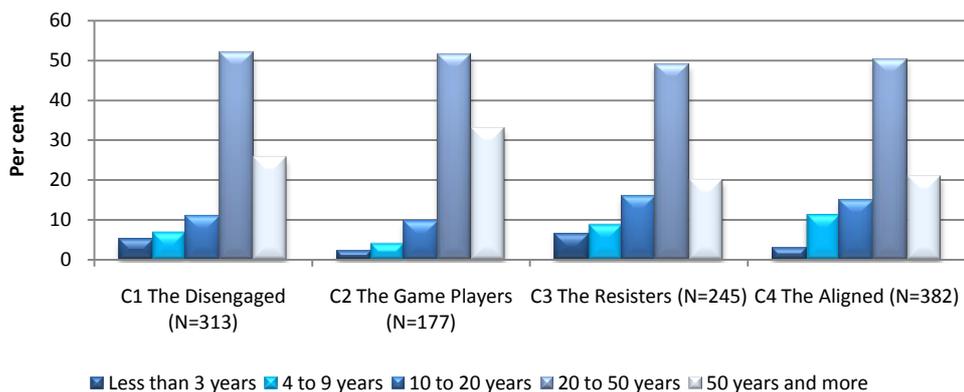


Figure 7.6b. Postures by length of time living in district

All of the farmers within the groups reported social change within their communities. However there were differences in the way the groups accepted these changes ($\chi^2=19.02$, $p<0.01$). The Resisters and the Game players were more likely to view these changes as negative. The Aligned group were more likely to be complacent about change. These findings suggest that place characteristics and place attachment may influence attitudes towards environmental regulations.

8.4.3 Motivational Postures and regard for the aims of regulation

There were significant differences between the groups however for Drought ($\chi^2=8.39$, $p<0.05$); pest animals ($\chi^2=16.49$, $p<0.001$); degradation of creeks and waterways ($\chi^2=7.68$, $p=0.052$); loss of habitat ($\chi^2=8.06$, $p<0.05$); and loss of vegetation ($\chi^2=16.7$, $p<0.001$). Drought and pest animals affected Resisters and the Disengaged more and the Aligned identified more creek degradation, loss of habitat and loss of vegetation than the other postures (Figure 7.7).

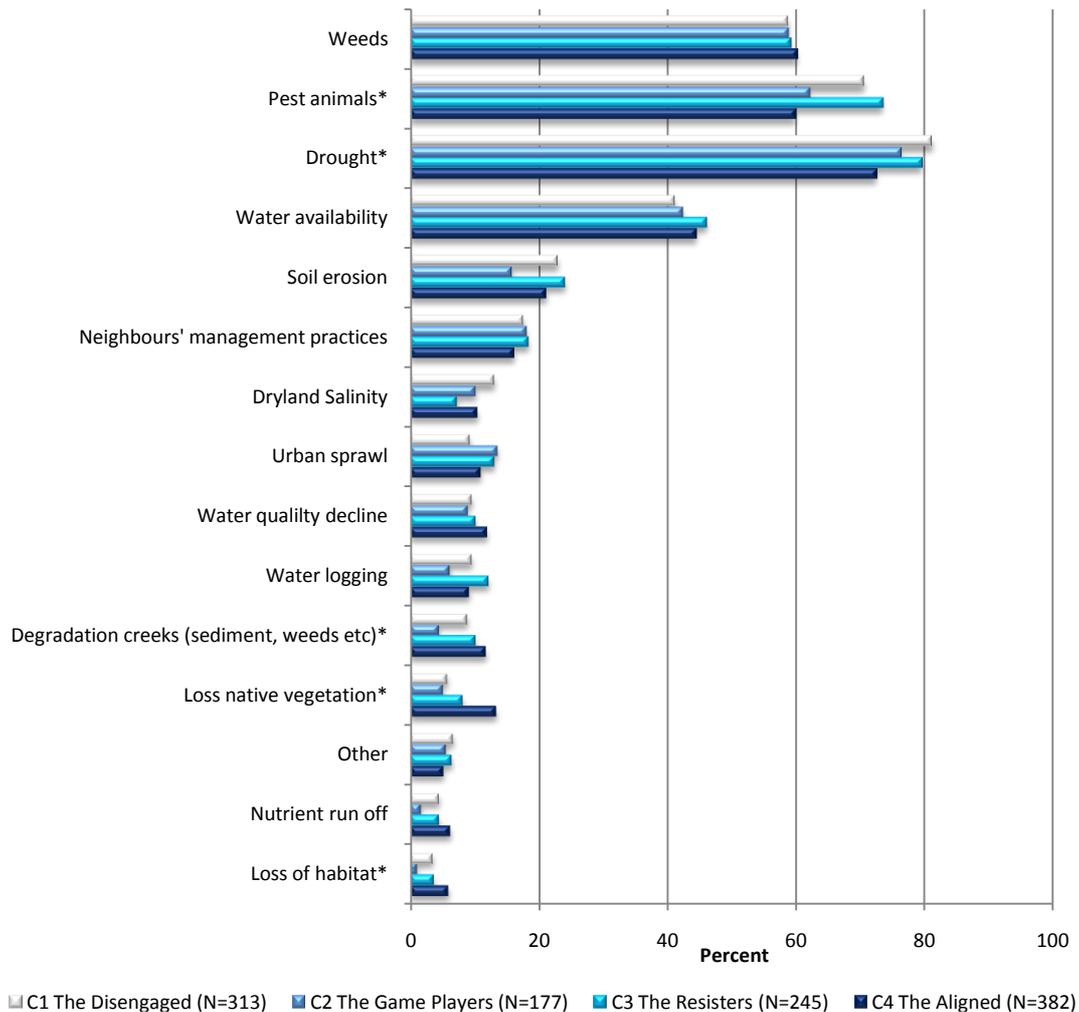


Figure 7.7: Environmental Problems by posture *(p>.05).

T

here was broad appreciation of the harms which regulations were attempting to address which could mean that most of the other disagreements farmers had were based on the process and outcomes of implementation, as well as the who of governance, rather than the desired end-goals of improving the environment (Figure 7.8).

Appreciation of harm:

Most rural properties have some sort of land degradation whether it is soil erosion, damage to soil structure, die back, and weed infestation, pollution of streams or salinity.

($\chi^2=14.79, p<0.05$)

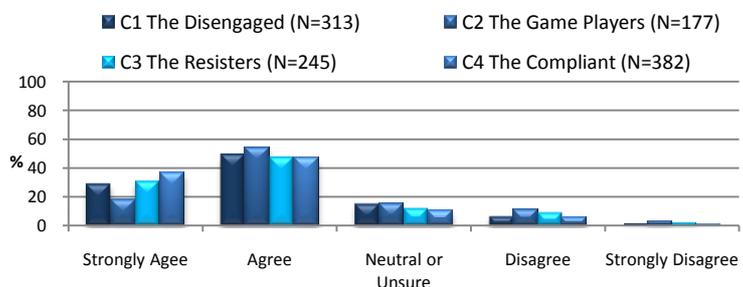


Figure 7.8. Appreciation of harm by posture.

There were significant differences in whether or not farmers had undertaken best practice in management of their farm operations. The Aligned were most active in nearly all areas, the Game players least active by comparison in all areas bar pest control and no till farming (see Figure 7.9).

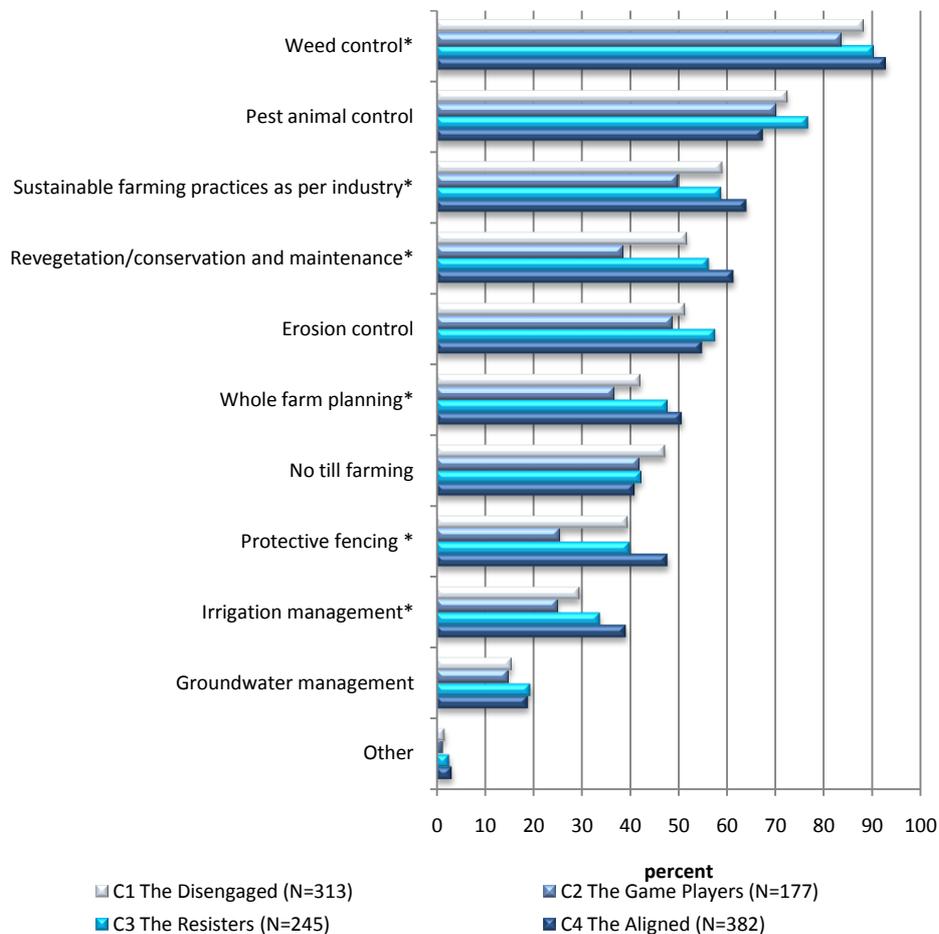


Figure 7.9. Best management practices across the postures *(p>.05) (Note: more than one category could be selected)

There was a significant difference in whether or not farmers had gone beyond compliance and had preserved an area on their property purely for environmental benefits ($\chi^2=25.91$, $p<0.0001$). The Aligned were far more likely to have preserved such a place and Game players least likely. Figure 7.10 displays the comparisons between the groups in the reasons for preserving such an area.

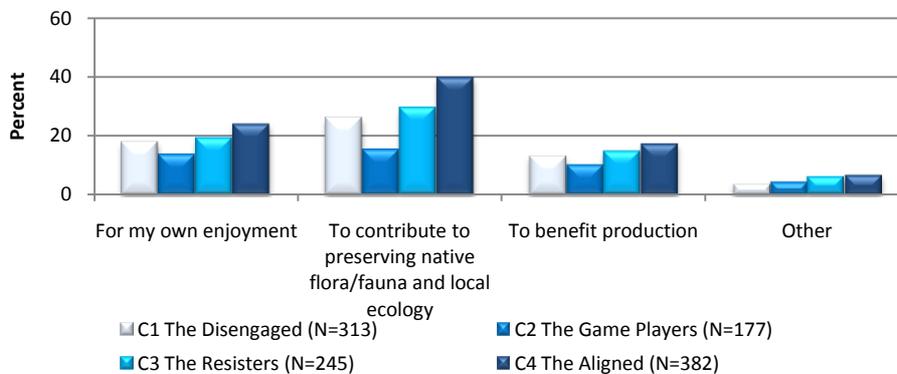


Figure 7.10: Comparison between postures in reasons for environmental conservation

These results were reflected in comparisons between the groups in whether or not farmers were involved in local groups concerned with sustainable farming or environmental issues. The Aligned group was far more likely to be involved in such a group and the Game players the least likely ($\chi^2=12.82$, $p<0.01$). The proportion of farmers for each posture were: Game players 55.5%, Disengaged 59.3%, Resisters 65.8% and Aligned 69.1%. There were also differences in the types of group involvement whether it be informally on properties ($\chi^2=24.47$, $p<0.0001$); in Government programs ($\chi^2=11.5$, $p<0.01$); Landcare ($\chi^2=9.98$, $p<0.05$) and Rivercare ($\chi^2=11.28$, $p<0.01$). The Aligned were more involved generally but the Resisters were more likely to be involved in other types of community groups (See Figure 7.11).

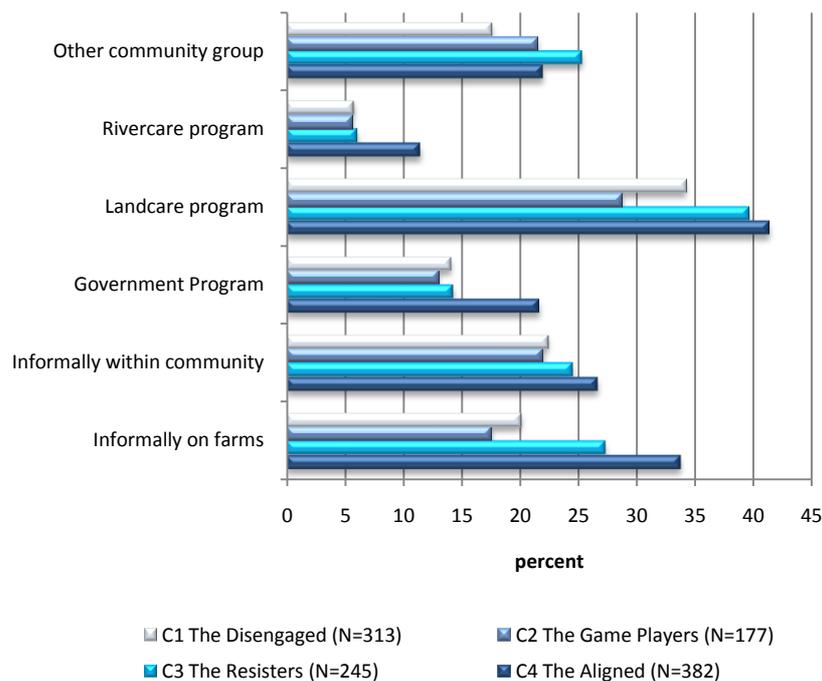


Figure 7.11: Involvement in environmental groups by posture

Respondents were also asked whether there was anything preventing them from implementing environmental improvements. Drought was more of a hindrance for the Disengaged and the Resisters. Game players were more concerned with the effect on environmental improvements on the bottom line, future prospects (removal of opportunity to later develop land) and the perceived associated threat of pests and weeds infestation (See Figure 7.12).

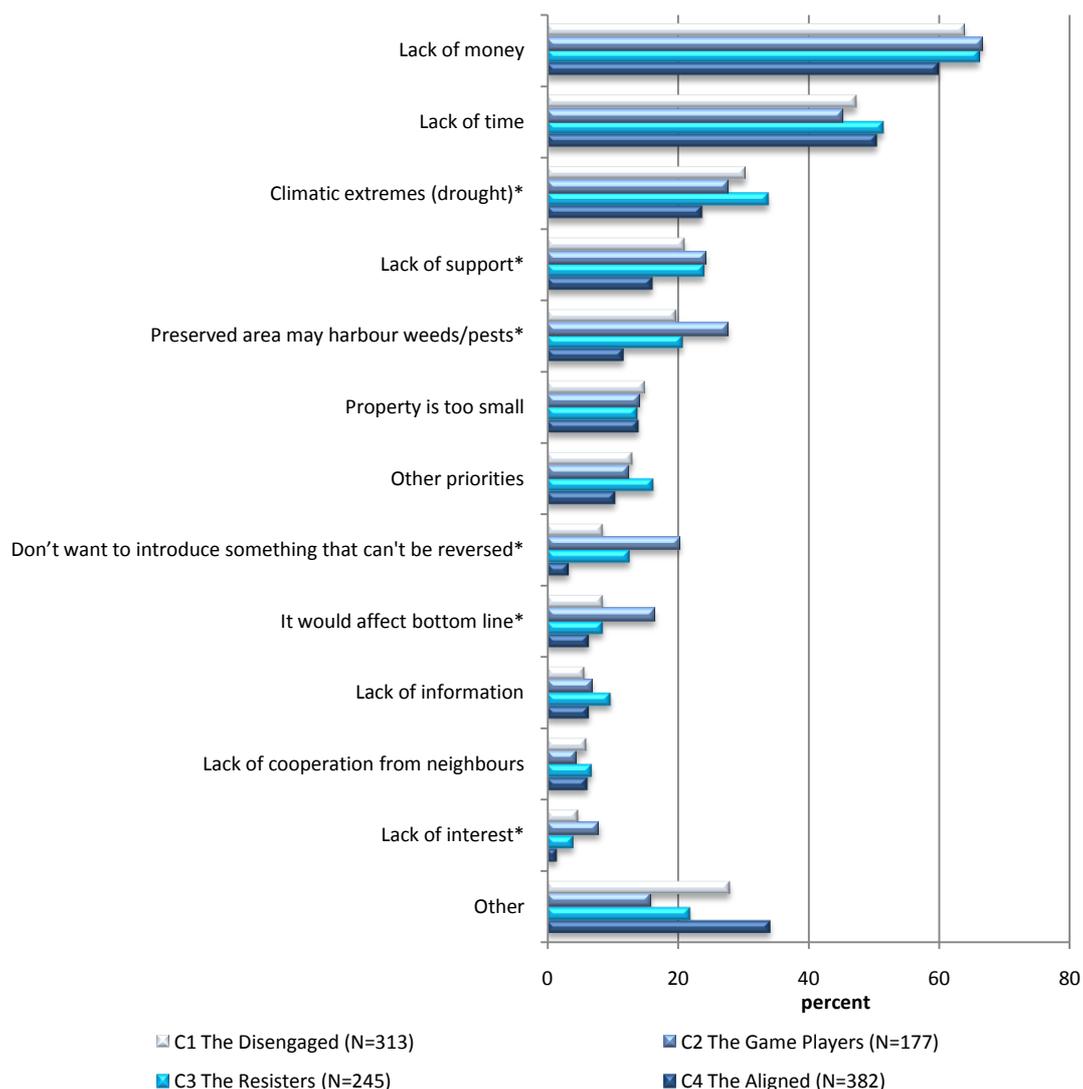


Figure 7.12. Factors preventing implementation of environmental improvements by Posture
 *(p>.05) (Note: more than one category could be selected)

8.4.4 Motivational postures as predictors of compliance behaviour

There are obvious limitations in a study such as this to assess the relationship between motivational postures and illegal activity. The survey did not ask whether people had been non-compliant with environmental regulations. The postures are not to be confused with actual compliance or offending behaviour. However because it was possible to ask about beyond compliant activity it is possible to determine the relationship between postures and activities which went beyond, rather than beneath, compliance. The predictive value of the motivational postures for encouraging beyond compliant behaviour was tested against a range of other possible predictors by conducting a binomial logistic regression. The dichotomized dependent variable was whether or not residents had preserved an area on their property for environmental conservation. Predictors for the analysis were motivational postures, age, gender, level of education, size of property, production type, and the length of time on property, whether it was previously owned by relatives and the number of environmental problems experienced on farm (drought, pest animals etc.). The reported reasons for not preserving an area were also included. Table 7.2 displays those variables that were significant

predictors. The regression was significant and the typology was predictive of environmental conservation reflecting the association with the Aligned group. However it was not the strongest predictor. Factors such as drought and property size had a stronger relationship. These are physical constraints rather than psychological factors.

Table 7.3: Logistic regression coefficients predicting environmental conservation

Variable	Beta Scores	Standard Error
Age	.263**	.083
Length of time on property	-.162	.093
Belief in climate change	.186**	.073
Number of environmental problems on farm	.330***	.080
Reported obstacles: -Uncooperative neighbours	.135	.073
- Lack of interest	-.199**	.076
- Property is too small	-.433***	.078
Climatic extremes (drought)	-.242***	.070
Motivational Postures	.162*	.071
Commercial production	.144*	.072
Constant	-.136	.172
-2 Log-Likelihood	1265.44***	Pseudo R2= .17

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$ (two tailed tests)

Previous studies have also identified farm size and economic factors as influential in the adoption of environmental practices by farmers (Nelson et al, 2004).

8.4.5 Motivational Postures and regard for environmental governance

Several items in the survey were included in order to assess social distance in terms of relationship and regard between the regulatees and the regulators. There were significant differences between the groups in their ratings of responsibility for environmental management on farms for all but two categories (Table 7.4). There were fairly equal distributions that industry bodies should have partial or least responsibility for environmental management on farms and there was consensus that property owners should have primary responsibility. The Game players prefer not to share responsibility with anyone. Their highest rating is for local natural resource management (NRM) groups. Catchment management authorities (CMAs) and local NRM groups were given comparable ratings to government by all of the groups. Amongst the different levels of government, local and State featured more highly. While Australia's Constitution confers the responsibility for environmental management on the States many also considered the Federal government at least partially responsible, perhaps reflecting the increasing dilution of Federalism in Australia. A role for government was recognized least of all by the Game players. These findings reflect a recurring

theme throughout the data of an adherence to absolute property rights; the owner's right to use the property in certain ways and impose on the remainder of society a duty to respect these rights (Reeve, 2001).

Table 7.4. Attitudes to responsibility for environmental management across the postures

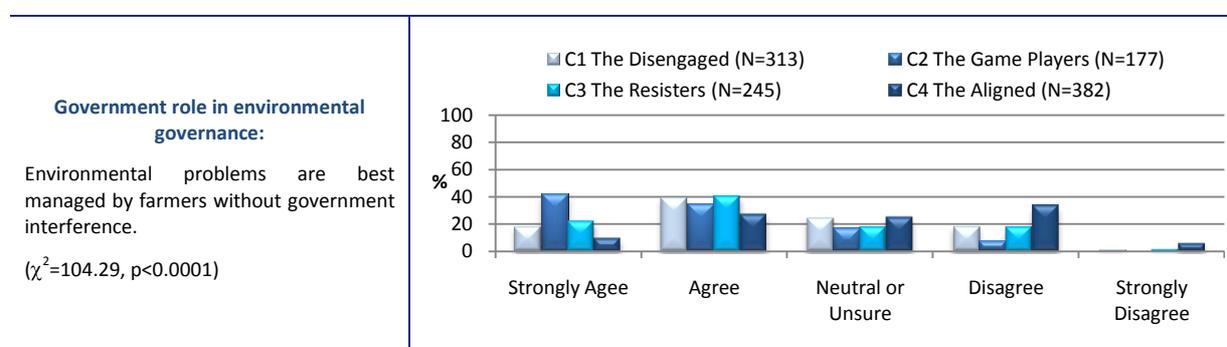
	C1 The Disengaged %	C2 The Game Players %	C3 The Resisters %	C4 The Aligned%
Property owners themselves				
Mainly responsible	85	85.6	86.7	90.2
Partially Responsible	14.3	13.8	12.9	9.5
Least Responsible	0.7	0.6	0.4	0.3
Federal Government***				
Mainly responsible	13.5	14.2	10.3	11.5
Partially Responsible	44	29.7	41.2	52.6
Least Responsible	42.5	56.1	48.5	35.9
State Government agencies***				
Mainly responsible	13.9	12.8	10.9	11.8
Partially Responsible	52.7	35.1	52.6	63.1
Least Responsible	33.3	52	36.5	25.1
Local Government**				
Mainly responsible	11.4	12.7	6.8	9.3
Partially Responsible	49.8	39.3	52.4	60.6
Least Responsible	38.8	48	40.8	30.1
CMAs***				
Mainly responsible	12.9	9.8	7.2	13.9
Partially Responsible	60.6	41.3	58.7	67.8
Least Responsible	26.5	49	34.1	18.4
Local NRM groups***				
Mainly responsible	8.3	13.1	5.3	8.1
Partially Responsible	64.9	47.7	67.1	73.1
Least Responsible	26.8	39.2	27.5	18.8

Regional NRM groups***				
Mainly responsible	7.8	6.3	2	7.4
Partially Responsible	56	39.6	60.6	62.2
Least Responsible	36.2	54.2	37.4	30.3
Industry Bodies				
Mainly responsible	9.5	7.9	4.5	6.6
Partially Responsible	36.4	41	42.9	45.1
Least Responsible	54.2	51.1	52.5	48.4

*p<0.01 **p<0.001 ***p<0.001 (two tailed tests)

A series of attitude statements were included to further investigate the regard towards government activities in specified areas (see Figure 7.13). Again the Game players were strongly in favour of farmers having a self-governing capacity and to consider that government should have less of a role. Game players were also disapproving of environmental monitoring of properties by remote means. Satellite imaging may be used by some farmers for climate and crop forecasting but governments have been using remote sensing to detect areas of unauthorised land clearance, which has caused some backlash in rural communities. The Aligned however accepted an increased role for satellite monitoring, and the role of government in management, including in land clearing. Game players expressed a desire for compensation, but they were also fearful that this could endanger community harmony. It may also be that there is a conflict between the idea of compensation as of 'right', to offset government interference, and resistance to government interference of any kind, including that of compensation.

All groups accepted a role for third party governance although some Game players disagreed with a role for third parties, perhaps again reflecting their wish to be entirely free of external control. However this statement may have been interpreted to mean that consumers can demand a certain quality of product, which is a more traditional convention of customer service, rather than demanding that the process of production be environmentally sensitive. Further and more extensive testing of this aspect is required.



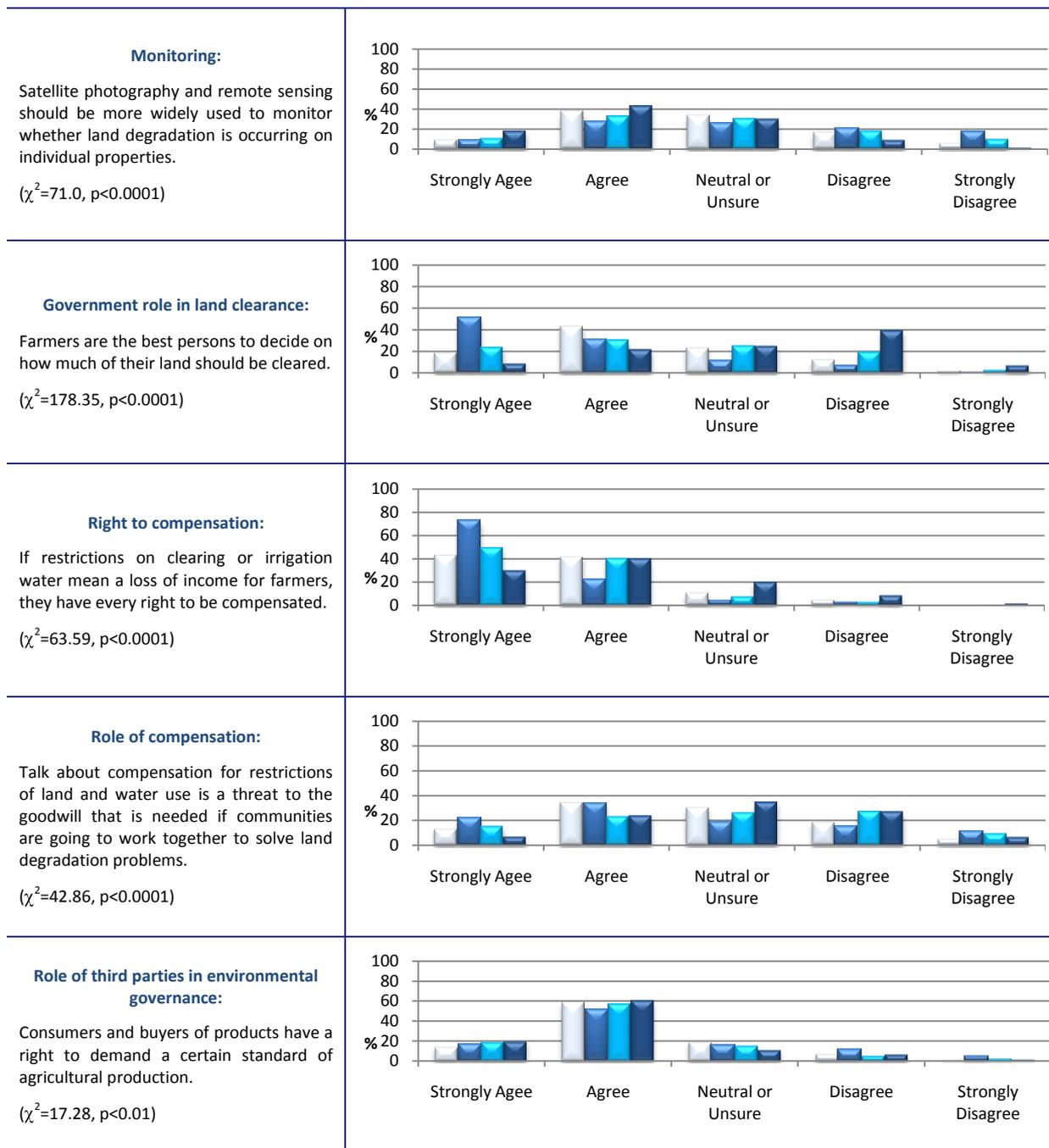


Figure 7.13. Attitudes to governance by posture.

8.4.6 Motivational postures and appreciation for regulatory solutions and moral regard for environmental transgressions

Several further items in the survey were included in order to assess the social distance in terms of the degree of agreement between the regulatees and the regulators over the means to attain policy goals, and more specifically to investigate what they thought of criminalization. The sample was split in its agreements as to the appropriateness of regulatory solutions. Game players were more likely to disagree with the necessity for environmental regulation (see Figure 7.14).

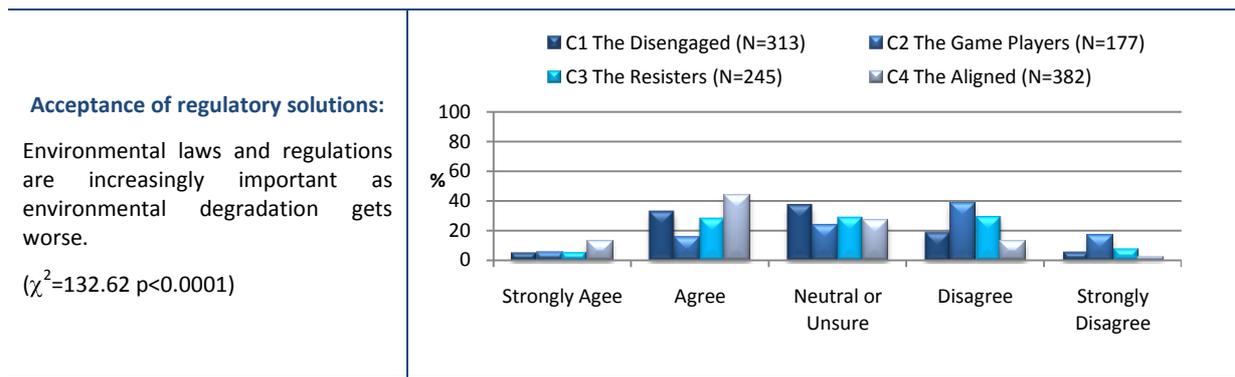


Figure 7.14. Acceptance of regulation by posture.

Moral approbation or agreement and support for criminal sanctions varied according to the nature of the circumscribed activity. There was widespread agreement that pollution was worthy of criminal status. There has been some debate of the appropriateness of extending criminal law to environmental actions (Farrier and Mooney, 2004) however here the ‘brown’ end of the environmental law spectrum appears to have allied with the core of ‘crime’ traditionally considered (identifiable harm to person or property caused by another person). Water theft, like pollution, appears to be accepted as inexcusable. There was less agreement overall however that land clearance was wrong (see Figure 7.15).

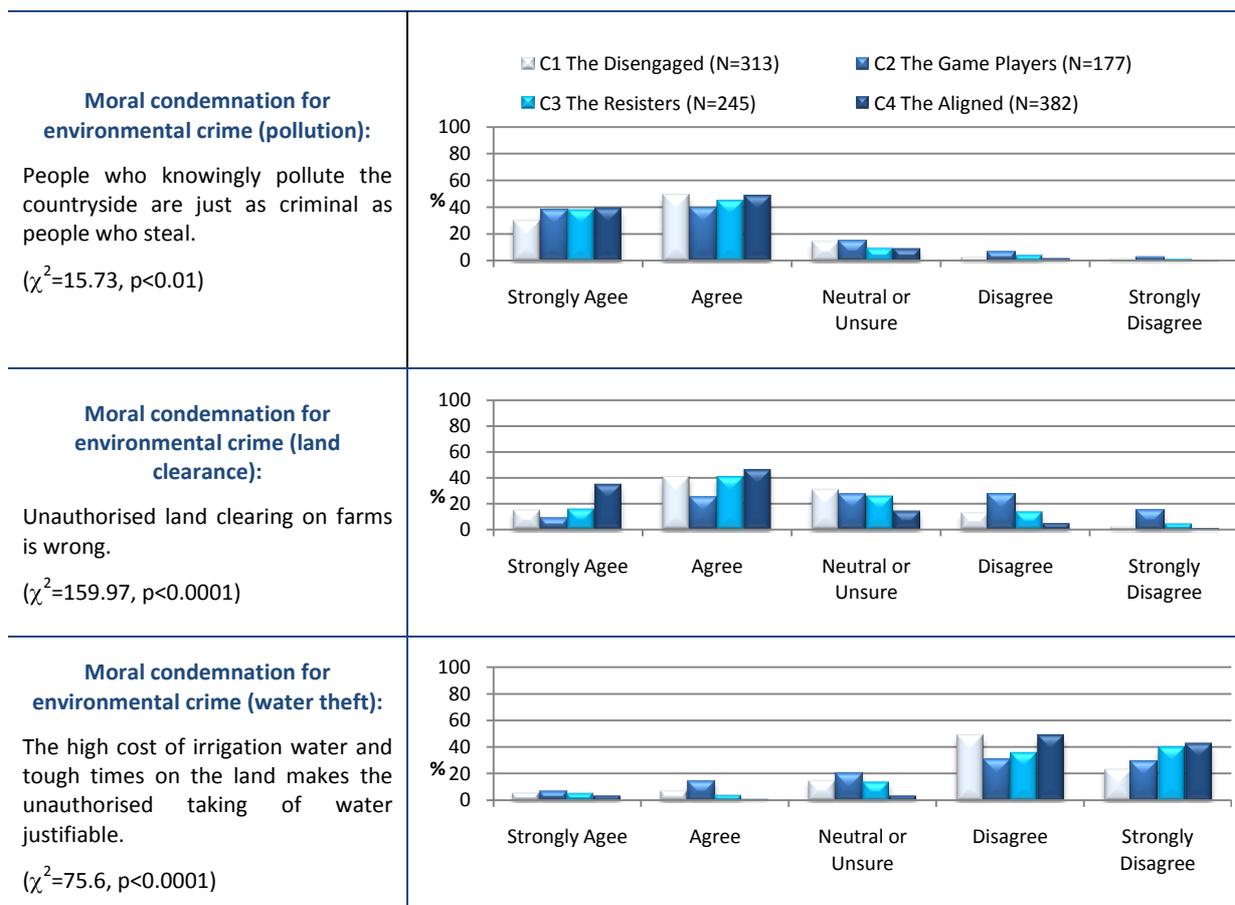


Figure 7.15. Regard for environmental regulation and criminalization by posture

8.4.7 Motivational Postures and the rural-urban divide

Farmer lobby groups often express dissatisfaction with rules made in state and national capitals which are divorced from the needs and sentiments of the bush. The rural-urban divide in opinion is being pressured in practice as development at the urban fringe escalates and traditional farmers find themselves in competition with hobby farmers and mining interests. The Aligned were more likely to disagree with statements which shifted the burden of responsibility for environmental problems onto mining and hobby farmers. Game players tended to agree that environmental regulations expressed the desires of city dwellers and that hobby farmers and mining should be targeted. The idea that environmental regulations are city-centric found especially strong approval with the Game players but also with the Resisters and the Disengaged (see Figure 7.16).

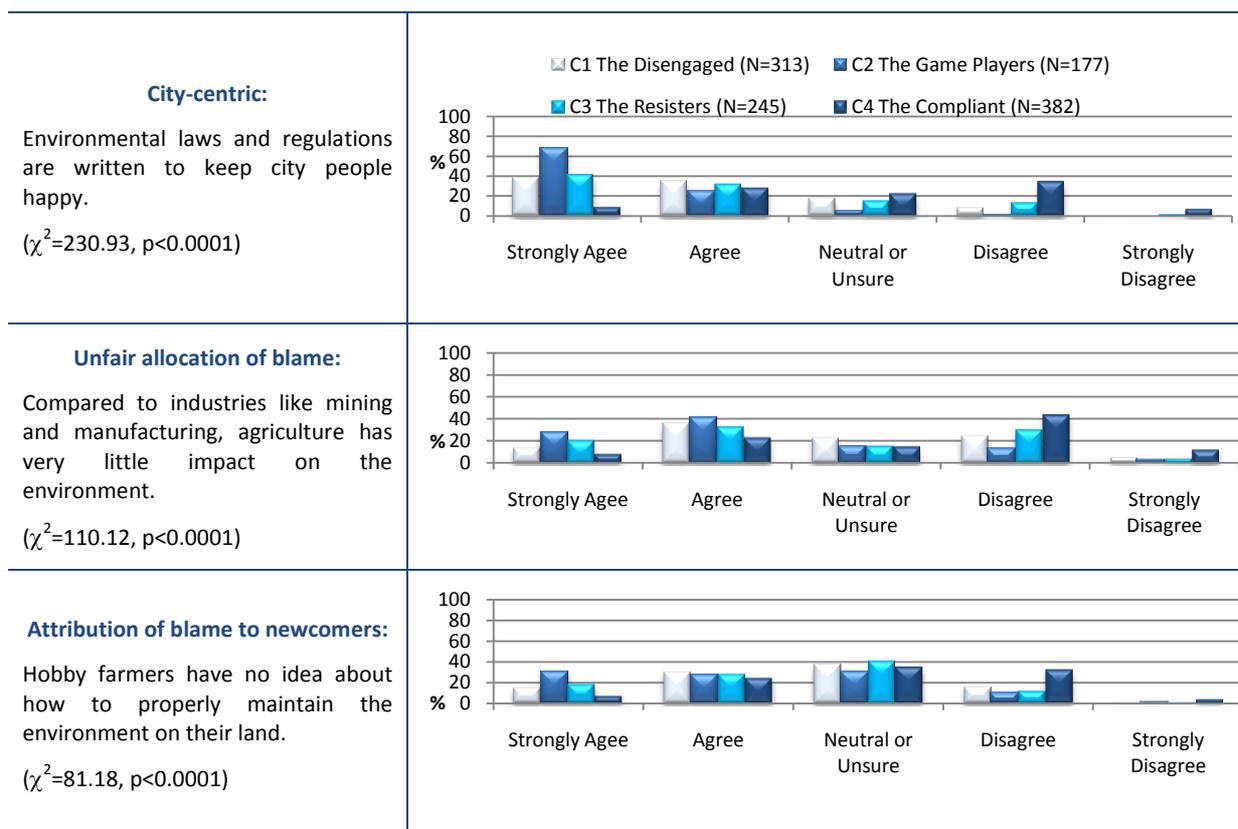


Figure 7.16. Attitudes to rural-urban issues by posture

8.5 Discussion

“Nothing will work if the people who are the subjects of reform efforts are not willing to make the reform.”

– Pearson, 2009.

Environmental laws in Australia are frequently attacked by farmer lobbyists and activists on the grounds that they infringe property rights and place the burden of responsibility for environmental sustainability on farmers unfairly. There have been numerous calls for a wider policy debate on the question of how best the farm environment might be managed and who should do the managing. Farmer lobby groups have argued strongly for an overall reduction in regulation, both in terms of number of instruments, levels of government and administrative complexity. Farming in Australia, although an industry, also occupies a unique cultural position as a strand of national identity and this is felt within the sector looking out as well as from outside looking in. However there is also great

variation between farmers and across different agricultural industries. In this study we suspected at the outset that motivations towards compliance might reflect fundamental disagreements with the role of government, the aims of the legislation or impact in terms of equity, or with the institutional apparatus more systematically as well as personal ethics and the perceptions of beliefs and behaviour in the community more generally. We also suspected that there would be variation amongst the views held on these issues reflecting personal characteristics, demographic, education as well as industry and economic position and which environmental law was the focus. As environmental laws have varied across Australia and implementation as well as regulation has been different between the various state jurisdictions it was also hypothesized that farmers in different states would have different attitudes associated with the history of regulation in their respective states. This proved to be the case. We hoped that motivational posture theory would be a useful tool to group those with different views and this has proven worthwhile. Four clear motivational posture groups emerged from the study, each similar to the motivational postures identified by Braithwaite (2003b) and Braithwaite et al (2007), saving distinct capitulative and committed groups: Aligned, resistant, game players and disengaged. The findings further suggest that positioning in terms of social distance but also jurisdiction and place attachment may also be important.

- **Regulatory Alignment**

Motivational postures are related to what is termed here “regulatory alignment”. This label refers to alignment in terms of social distance and the regulatee’s degree of agreement with the authority’s role and legitimacy and degree of agreement on policy goals and means. The Aligned posture group identified here demonstrated greater alignment, and the Resistant, Disengaged and Game playing postures lesser. The postures of Game playing and the Aligned were found in this study to operate at either ends of the environmental values spectrum: the Aligned hold views similar to those of the regulators and the Game players hold views at odds. Most farmers agreed that environmental problems exist but Game players least of all. Game players disapprove most for a role for government in addressing these problems and disagree most with the regulatory means with which governments have chosen to combat these problems. These disagreements are disconnects in the regulatory alignment between these regulatees and government. There is a degree of ambivalence rather than outright rejection amongst the Disengaged and Resisters to regulation. The Disengaged have previously been identified as the hardest task for agencies, almost impervious to punishment or persuasion (Braithwaite, 2003b: 23). Braithwaite (2003b: 23) discovered only a small proportion of disengaged in tax compliance (7%), and interpreted this figure, alongside the much higher proportions of commitment, capitulation and resistance in the sample, as a reflection of a well-functioning democracy. In this study the Disengaged were the second most populous group (n = 313) and this indicates a serious problem for authorities: “where the defiant postures of resistance, disengagement and game-playing are high...a truce will need to be negotiated in all likelihood before any meaningful attempt at the co-design of the...system can proceed.” (Braithwaite, 2003b: 24).

- **Beyond compliance behaviours.**

Game players are least likely to undertake beyond complaint behaviour (such as preserving an environmental area for environmental reasons, being involved in environmental groups such as Landcare and instituting on-farm best practice management), which (again) indicates that they are less interested in the public policy goals of environmental legislation. They gave lack of interest as a reason for not implementing environmental improvements. They also have fears that to perform such actions would affect their bottom line that conserved areas would harbour pests and weeds and that such actions would be irreversible; again all reasons which indicate a degree of distance in values held. The Resisters in this study were more likely than the Game players to adopt environmental practices, and this suggests that they may be less resistant to the spirit of the regulations. Game players and Resisters both eschew a role for government but are supportive of

government aid, including compensation. This appeared to be the only role for government that Game players would countenance.

- **Jurisdictional differences.**

Social distance to government also appears to be affected by which government regulatees have been relating to, and in terms of environmental regulation in Australia this is the state jurisdiction. There were more New South Wales residents amongst the Game players, more Queenslanders amongst the Resisters and more Victorians and South Australians in the Aligned group. Environmental regulations have met with far greater political conflict in New South Wales and in Queensland than in Victoria and South Australia. It has been reported elsewhere (Bartel, 2003) that land clearance regulations in South Australia may have been more successful than in the other states because acceptance of the public policy aims may have been easier to obtain: so much land had already been cleared that the impacts were easier to see. Here, the Aligned identified greater loss of habitat and loss of vegetation than the other postures. Land clearance laws have been particularly contentious in New South Wales and Queensland where there is more land left to clear and agriculture has expanded in recent decades – with intensification occurring through conversion of vegetated land for grazing and the latter for cropping. The Aligned were in newer irrigated industries on smaller farms which are more profitable, with this group also less likely to be reliant on off-farm income. Because of the nature of their properties they may also be less likely to be directly affected by land clearance regulation (the land already having been cleared) however despite their small property sizes they were more likely to preserve an area. Economic motivations were felt most strongly by Game players and least of all by the Aligned. It may be that the Aligned can better afford to meet the demands of regulation and undertake beyond compliant environmental behaviours. All groups however, including the Game players and Resisters, identified lack of money and lack of support as preventative factors for undertaking best management practices.

- **Place attachment.**

The Game players, who by virtue of the fact that they have lived the longest in their districts and on their properties of all the posture groups, have also had the longest relationships with the regulators. This has not however built esteem, instead the reverse. Their negative attitudes were not reserved just for the regulators but for newcomers. Both Game players and Resisters were negative about social change occurring in their districts. If one is attached to a place and the community which resides in it one may be less supportive of any change to it (Cantrill and Senecah, 2001). Place attachment has previously been associated with preservationist tendencies (Mesch and Manor, 1998; Vorkinn and Riese, 2001) so place attachment may also mean resistance to change. That nearly half of the Aligned were irrigators suggests perhaps that closer regulatory alignment has developed between the regulators and the regulatees through interactions around water licensing. These may have been to some degree positive and these positive interactions could be built on as well as being used as models to extend into other industries. Lessons may also be taken from experiences which have proved less successful. When Reinhart et al (2003) discovered differences in postures towards tax compliance within some states they concluded that these taxpayers may have been targeted for some type of regulatory intervention outside the tax system. The observed responses may have reflected dissatisfaction with other aspects of government and/or policy (Reinhart et al 2003). In this situation any deterrence effort may be counterproductive because resistance could become socially galvanised, and galvanising (as groups identify as anti-regulation or anti-government this informally reinforces defiance behaviour) (Bardach and Kagan, 1982; Sheffrin and Triest, 1992). Because environmental laws cover such a range of activities and are administered by a number of state agencies further work would be required to ascertain which interventions may have been most influential in generating the opinions observed here. It can be suggested however that the responses made with regard to land clearance legislation in particular identify this area as being of particular concern.

- **Lessons for government: Encouraging compliance**

Generating compliance is the chief aim of state agencies charged with the implementation of environmental regulations and this study offers some useful insights to inform this objective. This study has identified a possible link between farmer attitudes and behaviours and motivational postures to their location in terms of jurisdiction and regulatory alignment with the laws and authorities of that jurisdiction, biophysical characteristics of location (for e.g. drought) and personal and social ties to locations. A one-size fits all state-wide policy of implementation, even one targeted to specific postures, cannot be guaranteed to be successful. Policy makers also need to be concerned not only with illegal activities but with creative compliance: behaviour which is legal but subverts public policy aims. Beyond compliance behaviour is the ideal, for as McBarnet (2003) has observed creative compliance also undermines government legitimacy. Beyond compliance behaviours are motivated by the goals which public policy desires but which law and the legal system can only imperfectly implement. This is a major reason why reducing the social distance of values held is so important, and greater alignment may be achieved either through establishing a closer relationship between government and the regulatees, and/or greater agreement on shared aims, or using one of these strategies to lever the other (Braithwaite, 1995).

It is evident from this study that people who exhibit motivational postures which may be compromising of compliance are located at the greatest social distance from government and the values advanced by legislation. Social distance is the regulatee's choice (Braithwaite et al, 2007: 138). This choice however is exercised in response to a context and field of (inter-)action in which the authority also has a choice. The authority may choose to implement legislation in ways which are more likely to lead to regulatee's choosing to place themselves at a greater or lesser distance from the authority. Resistant, Disengaged and Game playing postures do not need to be incited. Coping sensibilities possibly underpinning postures in this regulatory environment are unknown and remain to be tested in further work but it could be hypothesised that if, following the work of Braithwaite et al (2007), the Resisters are feeling oppressed then authorities may be advised to focus on limiting and treating injustice. Also if the Game players are more concerned with their autonomy ("taking control") then authorities may do well to assist in supporting and developing responsibility and through this also building trust for their role (after Braithwaite et al 2007). Such an approach advises authorities to work with each postures' particular characteristics to improve regulatory outcomes, rather than ratcheting up the threat of deterrence. Traditional deterrence is ill-advised as it may have the perverse effect of reinforcing social distance (Braithwaite et al, 2007). It may be concluded from the high degree of ambivalence amongst the sample that many still have some respect for law and government but equally this finding suggests that this perspective is somewhat fragile and that agencies must therefore tread carefully. Where motivations result in non-compliance they may be considered as barriers to compliance which regulatory agencies must overcome, but it is important that in so framing the problem that agencies do not further alienate regulatees.

- **Shared fates, Common purpose.**

Farmers vary in their views on the appropriateness of government intervention in environmental matters, but many would prefer fewer incursions into on-farm management. This indicates that in this area governments may lack legitimacy and trust. For governments perhaps the first challenge is to raise the support for their role in regulating the farm environment. This element of social distance may be attempted to be treated by adopting a shared fates approach (Cummins and Barclay, 2007) and working with farmers to develop a common purpose. Martin (2008) argues for an explicit consideration of social justice in the design of environmental laws. This could also help address the second major challenge: that of disagreement with the aims of laws. Voluntary compliance may be in the main achieved where laws mirror pre-existing norms, and the law then obtains the benefits of informal sanctions and/or internalized motivators which work to enforce the desired behaviour even if formal sanctions are infrequent (Shapiro and Rabinowitz, 1999). The difficulty for regulators is

obvious: for there to be a pre-existing norm most people must already comply with it (Shapiro and Rabinowitz, 1999). Where changes in behaviour are required, as in the environmental arena, a norm may have to be created before law will become effective. Perhaps activation of the existing norm of land stewardship could assist. This has previously been identified as a recommended pathway, alongside recognition of constraining factors (Stanley et al, 2005) and provision of incentives (Barr, 2003). The human-nature typologies identified by Bauer et al (2009) could be utilised for further work as could their recommendations for overcoming differences in opinion. In their study of attitudes towards re-wilding initiatives in Switzerland a range of attitudes towards nature were categorized and responses to regulation identified. The authors concluded that some groups could be targeted for special interventions but that above all participatory and consensus building processes would be required. Decisions needed to be “negotiated between equally empowered stakeholders” because the success of the policies depended upon “the strong cooperation, and the consent of several communities.” (Bauer et al, 2009: 2919). As Cantrill and Senecah (2001: 192) observe: “the marginalizing of any viable perspective is thought to result in conflict sure to delay progress toward sustainability.” Furthermore, it is possible that acceptance to policy initially disapproved of may be achieved through undertaking meaningful public participation (Lind and Tyler, 1998). Increasing the level of consultation and ownership of problems may also raise the level of land manager engagement (Robertson and Pratley, 1998; Stanley et al, 2005) but such a process must be understood deeply and performed well for these benefits to be secured (Moore and Rockloff, 2006).

- **Third-party regulation.**

Industry associations were favoured least of all for shared responsibility by all groups. Linkages with local NRM groups however may assist, as these were the group most supported by Game players as having some shared responsibility (with farmers) for environmental management. Local NRM groups could also be used to identify the place-based aspects of resistance, as agencies may be strangers both to the district and to the community. Agencies may find that the biophysically relational aspects of regulation may be very important and that reforms may be required to take account of local factors, for e.g. water shortages, woody weeds or preservation of agricultural land. Governments need to be responsive to needs for regulatory reform as regulatory unreasonableness has negative consequences for compliance (Bardach and Kagan, 1982).

- **Economic incentives.**

Economic incentives and market tools have been recommended as an alternative to formal law for improving the farm environment (Davidson et al, 2006; Nelson et al, 2004). There may however be moral hazards in such an approach. Money, whether in the form of compensation or public goods payments following a user pays model, as outlined by the Productivity Commission (2004), may also leave more fundamental disagreements unaffected. Incentives (rewards for desirable behaviour) also belong to the rationalist behaviour model, like deterrence (punishment for undesirable behaviours), and suffer the same deficiencies. The idea that behaviour can be controlled by simple systems of reward and punishment, along the lines of Skinnerian behaviourism, has found little success in education (Entwhistle, 1997) and regulation alike. It is internal motivators, such as values and attitudes, rather than external ones, such as threats and inducements, which should be the chief focus for regulators. However, there remain opportunities for well-designed innovations such as biodiversity trading and carbon trading to be utilised to support regulation, although more work is needed to ascertain the effectiveness of these schemes (Carswell et al, 2003).

8.6 Conclusion

Environmental law is a relatively new area of regulatory intervention but it has not been allowed the luxury of developing at its own pace. Successful interventions are expected with some urgency in order to offset ecological crises such as climate change and declining biodiversity. It is therefore increasingly critical that the efficacy of regulation is better understood. This work has contributed to this endeavour by extending Braithwaite's (1995; 2003b) motivational posture theory to environmental regulation of agriculture. Four motivational postures broadly consistent with Braithwaite's model were uncovered: an Aligned group associated with deference and three groups associated with defiance: the Disengaged, the Game players and the Resistant. There are strong indications that these postures are related to what is termed here regulatory alignment as well as jurisdiction and are furthermore linked with beyond compliance behaviours. This study has been exploratory in nature. While support has been found for motivational posture theory additional work is required to test both the theory and its application in this context and to investigate further the significance of place to farm management and compliance behaviours. This study has identified place as a potentially fruitful site for further work in four areas in particular. Firstly, the placement in terms of social distance and degree of agreement between regulatees and regulators on values and the latter's role and on the content, process and aims of regulatory interventions (i.e. regulatory alignment). Secondly, placement in terms of jurisdiction as the nature of the regulator and regulation is defined by political boundaries. A nationwide survey such as this has been able to expose the significance of jurisdiction and provide policy makers from the different states a useful opportunity to identify and compare differences. Thirdly, place in terms of place attachment which may act as a brake on achieving change. Environmental regulations seek change but this may be resisted if preservation of the *status quo* is desired. Fourthly, biophysical factors of place such as drought also have an influence. This study has provided strong indications that both social and geographical contingencies may be central to farmer attitudes and behaviours and therefore compliance but further work is required to elucidate the nature and extent of these aspects before more definitive conclusions can be made.

9 Summary and Discussion

9.1 Introduction

Australian farmers are not the environmental vandals they are often reported to be. The majority are deeply concerned about environmental degradation and most have adopted sustainable farming practices. A significant proportion are actively involved in conservation projects on their land and in their local communities. However they are the first to admit that weeds and pest animal management can be overwhelming and accept that environmental laws and regulations have a place because some landholders do not always do the right thing. At the same time, they urge significant reform in the design and implementation of environmental laws. Informal social norms have a strong influence over the management of natural resources within farming communities and in maintaining social order. Improvements could be made in farmers' participation in conservation activities and compliance with laws and regulations if governments understood and appreciated the way these norms operate and worked alongside landholders to form a 'common-ground combined-effort' to fight environmental degradation. With less blame and more of a shared 'fates' approach, landholders may be more willing to comply with government objectives.

These conclusions were drawn from the findings of the nationwide survey of farmers which examined the social dynamics surrounding natural resource management within farming communities. In this concluding chapter, the main findings are summarised and the implications discussed, and some possible solutions for improving adoption of sustainable practices and compliance with environmental law are proposed.

9.2 Summary of the main findings

The analyses commenced in *Chapter three*, with an investigation of the level of adoption of sustainable practices on farms. The study found that weed and pest animal management is a continual fight for Australian farmers. Drought and reduced water availability were other problems that exacerbate environmental concerns and at the same time, limit the ability of landowners to respond and manage problems. Yet almost all of the respondents had implemented at least one type of best management practice on farm and more than half had preserved a conservation area on their property, an activity that is beyond compliance with regulatory requirements. Controlling weeds and pest animals was an issue for maintaining conservation areas but farmers were motivated by the aesthetic value and the need to preserve native fauna and flora. A lack of time and money and drought prevented them from doing more. The analysis found that subjective factors influenced conservation activities more than objective factors. A commitment to a social norm of doing the right thing for the environment, a desire to retain the property within the family, and a strong attachment to place were associated with conservation activities. The objective factors

associated with conservation were environmental problems experienced on farms and involvement in local conservation groups.

Landcare remains important but membership is declining while informal community environmental groups are growing across rural Australia. The findings suggest that informal community groups should be encouraged to increase adoption of sustainable practices on farms. Industry recommended best practice management practices also influence farmers' adoption of sustainable practices.

In *Chapter Four*, the findings of the exploration of environmental crime revealed that just under half of Australian farmers experience some type of environmental crime. Few victimisation experiences were reported to police. The reasons for this reflect the perceived seriousness of these offences as well as the nature of farming. The social norm denoting a need to work out disputes between neighbours rather than appealing to the law to keep the peace within a small community were strong reasons for not reporting offences. Victims of water related offences were more likely to consider them as serious, than were victims of the more common offences of trespass or illegal hunting. The labelling of the infestation of weeds and pest animals due to mismanagement in neighbouring areas as 'crime' by some participants demonstrates the depth of feeling about deliberate, careless acts or negligence that harm the environment which increases costly and time consuming pest management for landholders.

Opportunity theory proved to be a sound approach to identify the vulnerability of farms for environmental crime. The risk factors of exposure (easy access to the property), proximity (to roads, waterways, national parks) and guardianship (neighbourhood watch) were effective predictors of victimisation. Different patterns in the relationships between the various risk factors were associated with different types of environmental crimes.

In *Chapter Five*, the social norms surrounding natural resource management within farming communities were investigated. Many farmers were motivated by altruism, to lead by example in conservation projects to benefit the wider community, and were proud when they received positive feedback from their neighbours. Leading by example is also considered the best way to change behaviour in landholders who are not managing sustainably. Weeds and pest animals, and access to water were environmental problems that frequently cause conflict between neighbouring farmers. Farmers prefer not to approach neighbours directly, adhering to a norm that requires residents to maintain peace within a community and another that prescribes landholders as ultimately responsible for managing their land. However, when neighbouring activities that negatively impact on a farm operation become a serious problem, it must be addressed. Where neighbouring land is owned by national parks or state forests or mining companies, landholders must manage environmental problems alone. This leads to considerable frustration and anger that legislation governing farming activities to ensure sound environmental husbandry is perceived to not apply to these land users.

Social change, caused by farmers leaving farming, increasing numbers of hobby/lifestyle farmers, and urban encroachment into agricultural areas, can exacerbate conflict within communities. Farmers are willing to be inclusive and share their knowledge and advice with newcomers but may feel their efforts are in vain. Conflicts can result in farmers withdrawing offers of friendship, alienating newcomers from a community. Newcomers with different ideas are taking a leading role in Landcare and many traditional farmers are feeling alienated. There is a need for government at all levels to target educational programs for farmers new to the industry and hobby or lifestyle farmers to ensure they are aware of local environmental problems and the necessary practices for sustainable farming as well as the pertinent environmental laws and regulations.

In *Chapter Six*, landholders' attitudes to the risks of climate change were explored. Not all farmers are convinced about the reality of climate change because climate variability is a constant for farming in Australia. While a four-fold typology of risk perception identified a relationship between

acceptance of climate change and participation in pro-environmental practices, it was more strongly associated with the extent of environmental problems experienced (positive association); drought and property size (both negative associations). Australia's harsh and changeable climate acts as a physical barrier for adaptive practices but may also contribute to the sceptical attitudes of farmers towards climate change.

In *Chapter Seven*, farmers' attitudes to a range of environmental issues including environmental laws and regulations were examined. Rural environmental issues are better understood than they were in 1991 although farmers complained that they lacked access to information on environmental laws and regulations. There are gaps between farmers and scientists and policy makers in their appreciation of environmental problems. Comparisons with Reeve's (2001) findings found 78% of landholders agreed that all properties have land degradation, although this was a lower proportion than previous years. There was greater acceptance of satellite technology for monitoring land degradation. There was also stronger agreement in 2008 that agriculture has less impact on the environment than industries like mining and manufacturing. Dislike of land clearance regulation remains very high. There was more agreement that farmers should be compensated for financial losses incurred through restrictions placed on clearing or access to irrigation water. Yet a greater proportion agreed in 2008 that compensation threatens a community's ability to work together to manage land degradation.

New questions posed for this study found general acknowledgement of the rights of consumers and the duty of care farmers must demonstrate to ensure food security. There was moral condemnation of water theft even in the face of persistent drought and water restrictions. There was less condemnation of unauthorised land clearance. Attitudes to environmental laws highlighted strong agreement that laws are designed to appease urban communities and equally strong agreement that farmers should be allowed to manage environmental problems without government interference. There were divided opinions on the relevance of laws to address worsening land degradation because some do not believe it is increasing. Compliance with laws and regulations are costly for landholders. Issues which were identified as requiring reform were more and better consultation, conflicting legislative requirements and a lack of flexibility in application.

Farmers felt that governments were right to introduce laws to ensure environmental sustainability but that these laws needed to be tailored to the biophysical needs of different localities as well as the economic realities of farming. Current laws were felt to be insufficiently flexible to enable such targeting and therefore impractical for farmers to implement. Impractical laws meant that farmer's respect for government was undermined, as government was seen to be incapable of legislating appropriately to solve problems effectively. Perceived poor management of public lands further undermined respect for government. Farmers therefore felt that there needed to be more collaboration with farmers to ensure effective land management outcomes rather than singling out farmers as the cause of all problems. Farmers felt that there needed to be more research into effective land management fed into regulation and disseminated amongst themselves, and use of model farmers, as well as appreciation of the multi-functional nature of the farming environment.

In *Chapter eight*, a typology of farmers' approaches to compliance with environmental laws and regulations was developed and then employed to examine the relationship with conservation practices on farms. Braithwaite's (1995; 2003b) motivational posture theory was extended to environmental regulation of agriculture. Four motivational postures broadly consistent with Braithwaite's model were empirically derived: one associated with compliance, labelled *Aligned*, and three associated with non- or creative compliance: one *Disengaged*, one *Game playing* and one *Resistant*. Analyses of the characteristics of each group demonstrated that motivational postures are related to place, jurisdiction and degree of regulatory alignment: the degree of agreement between regulatees and regulators on the latter's role and on the content, process and aims of regulatory interventions. Game players eschew a role for government. The Aligned support both government and regulations. Disengaged and Resistor displayed more ambivalence. The Aligned were more

likely to undertake beyond compliance behaviours and Game players least likely. Fiscal limitations were identified as restricting beyond compliance behaviours by many farmers.

9.3 Implications of the findings

This study has shown that farmers generally are most concerned about environmental degradation and have implemented sustainable farming practices and the greater proportion have established conservation areas on their land. Less than half had received financial support for these endeavours. Many farmers are motivated by altruism to lead by example by implementing new practices that other farmers may emulate and were pleased when their local community recognised their efforts. Farmers generally conform to a norm of good farm management. However, the downside of these endeavours is the constant and costly management of weed and pest animals, which is confounded by drought and the economic downturn. Many farmers despaired that effective weed control was beyond them and were frustrated by the lack of management on land owned by government or industry. Some farmers noted the success of programs conducted through CMAs where landholders were provided with chemical to manage weeds. If more grants were available for such programs, it is likely that weed management would be more effective. Greater recognition is needed of farmers' contribution to environmental conservation. While rural media frequently celebrate individual farmer or community initiatives in conservation, recognition by government and more widely in the media and consequently the general public would affirm farmers that they are appreciated for their efforts rather than being unfairly blamed as the cause of all of Australia's environmental problems. Such recognition, particularly by government, would be in line with informal norms for farmers to lead by example which may encourage more sustainable practices.

Social change has seen increasing numbers of hobby/lifestyle farmers, and urban encroachment into agricultural areas which creates diversity in land uses and approaches to natural resource management which can lead to conflict within communities. Farmers' are willing to be inclusive and share their knowledge and advice with newcomers but often their efforts are in vain. There is a need for educational programs for farmers new to the industry and hobby or lifestyle farmers to ensure they are aware of local environmental problems and the necessary practices for sustainable farming as well as the pertinent environmental laws and regulations.

Greater acceptance of government environmental policy could be achieved if governments also lead by example and addressed weed and pest animal problems within national parks and state forests. This would be in line with social norms that land management is the owner's responsibility. With acknowledgement of the extent of the problem, the size of the area to be managed and scarce resources, it is suggested, as Barclay (2003b) found, that governments working alongside communities may be a solution. This does not mean leaving pest management to landholders - as is the current status quo, as this builds resentment. Rather establishing memorandums of understanding with sporting shooting clubs to deal with feral animal problems that arise within national parks and state forests will allow volunteers to provide a professional service while enjoying their chosen recreational pursuit. National Parks and Wildlife in Queensland have such arrangements with Sporting Shooters Association to assist with pest animal control within park areas. For example, hunters may be asked to count the number of pygmy possums in a national park, or under ranger supervision, be requested to eradicate feral cats. In order to participate in conservation and pest management as part of the Sporting Shooters Association, members must achieve a certain level of skill in shot accuracy, map reading, navigation, firearm safety, wildlife appreciation and 'living in the field' courses. To the members of these associations, their role as conservationists was equally as important as their role as hunters. In New South Wales, similar memorandums of understanding have been established between four-wheel-drive groups and National Parks and Wildlife to allow club members to pursue their recreation while providing voluntary support services for National Parks, such as monitoring and maintaining park trails and fire

breaks (Barclay 2003b). This concept could be rolled out nationally to provide pest management as well as access to recreational pursuits which are becoming increasingly difficult to conduct as access to private and public land is limited.

- **Environmental crime**

The infestation of weeds and pest animals due to mismanagement on neighbouring properties was defined by several respondents as a 'crime' which demonstrates the intensity of farmers' feelings about this problem. The time and financial cost of pest management is significant. With increasing public concern about environmental degradation, certain actions that negatively impact the environment are increasingly likely to be labelled deviant.

The Australian Bureau of Statistics (ABS) provides no specific data on 'environmental crime'. Such crimes are hard to quantify because in most instances, there are no human witnesses to an event or victims (Williams 1996). Court statistics are available for cases prosecuted in the land and environmental court. However, it is difficult to achieve recognition of the pervasiveness of environmental crime without the availability of specialised data. One of the greatest obstacles to future data collections is the significant variation between the States in regulations as well as the many and varied types of regulations and agencies involved in managing these.

- **Climate change**

The finding that not all farmers agree with the concept of climate change suggests a focus on climate change education but so would providing support for farmers on smaller holdings and to those experiencing drought so that they may also implement adaptive practices to address the impacts of climate change. Education about climate change should first recognise farmers' existing understandings, with a focus perhaps on the differences between the past and the future, including the causative factors, to differentiate natural climatic cycles from anthropogenic climate change. Farmers are very familiar with extreme climatic events, so forecasts need to be compared to the climate histories which farmers' already know with a focus on preparing for unprecedented extremes. Involving farmers more in the development of policy responses may also assist in reducing the suspicions farmers carry towards government action. Farmers resent being singled out as the cause of environmental degradation. Adopting a shared fates approach in working with farmers but also the wider community would also assist in reducing the social distance between farmers and government so that farmers will be more open to participating in the global discussion on global warming. While current Government policies and programs such as "Farm Ready" do recognise farmers' resistance to climate change and seek to address these issues, these findings suggest that many farmers remain very sceptical of current policy which will inhibit the successful adoption of adaptation programs. A more collaborative approach is needed whereby government is seen as listening to and working alongside farmers to address the same goal; to safeguard the environment.

9.3.1 Natural resource management in rural communities

Landcare was introduced in 1990 in response to nationwide concern about land degradation and has been very successful in motivating volunteers to work together to address environmental problems within their local catchment. Yet problems with land degradation persist and current management structures, including Landcare, will need to adapt to meet these challenges. The study found Landcare membership is falling and the organisation itself acknowledges they need to re-engage with traditional farmers. The discord between approaches to natural resource management between traditional farmers and the growing numbers of newcomers to farming and lifestyle or hobby farmers is an issue for policy. While social capital is characteristic of many small communities, future policy and programs could focus upon building collective efficacy particularly within growing 'tree change' communities as there is a need for community-centred approaches to natural resource management and to maintain social order. As rural communities are not

homogeneous, more appreciation is needed for the increasing number of informal community groups that have evolved to manage localised environmental issues. These groups attract local support and are more effective. If current management structures can incorporate these localised institutions while retaining their individuality, greater accord would be achieved within communities, and between communities and regional management levels and government.

9.3.2 Social Norms

A number of social norms operating in rural communities which are relevant to natural resource management have been identified in this research. They include:

- A strong belief in landholder's absolute property rights requiring others to respect those rights.
- A commitment to good farm management and land stewardship.
- A belief that landholders are responsible for management of their land and farm operation and therefore, how landholders manage is their own business.
- A focus on leading by example, quietly, unobtrusively, to introduce new farming innovations or conservation practices.
- An expectation that farmers work together to support each other and their community and be involved in community activities – and that includes newcomers.
- Any disputes between neighbours to be resolved without involving formal law to maintain peace and harmony within the community. This may mean turning a blind eye to some types of deviance within the community.
- A belief that compliance with environmental law is the right and proper thing to do.

Understanding how these norms strongly influence landholders' behaviours is essential for developing future policy and programs.

9.3.3 Formal environmental laws and regulations and improving compliance

The study found landholders accept that environmental laws and regulations are necessary but noted that the design and implementation of many of these laws are impractical, inflexible and restrictive and often irrelevant for local environmental conditions which alienates landholders and impedes productivity. 'One size does not fit all' was a frequent comment. Participants offered several recommendations to improve the regulatory approach:

- Reassessment of aims and what type of outcomes are trying to be achieved, for example recognition of importance of agriculture in terms of food security; alignment of land use with land suitability; active management of both production and conservation areas; conservation and production as combined rather than competing aims.
- Increasing consistency in application of laws across sectors (mining etc.) and jurisdictions.
- Increasing flexibility to match local conditions and needs.
- Implementation to use collaboration and incentives as well as enforcement, such as supporting model farmers and best practice; educating and disseminating best practice; utilising local and applied knowledge as well as increasing use of expert knowledge; and prioritisation of enforcement and transparency of enforcement activity
- Rationalisation of regulatory processes to be less time consuming, costly, labour intensive.

The 'big stick' approach is not working and landholders and policy makers need to work together towards the same desired outcome to improve and conserve the environment. Again rather than blame, a more 'shared fates' approach to dealing with environmental dilemmas is likely to be more effective in achieving compliance. Braithwaite (1995) has shown that if regulatees see themselves as opponents of a regulatory system, law evasion is more attractive. Personal ethics and norms in competition with the law may act as alternative codes of behaviour. Conversely, if regulatees and

regulators share common beliefs and values, law evasion is less likely and there will be more motivation to comply (Braithwaite, 1995). One area that may be fruitful for policy makers to examine is the competition between the philosophies of land management held by farmers and those promoted in legislation. As Vanclay (2004) observed, while there may be normative agreement generally that our environment needs to be improved there may be disagreement over the substantive content of what needs to be done, where, why and how.

Farmers in this study viewed their approach as superior for being more practical and more effective in achieving environmental aims as well as supportive of agriculture. Farmers do not see production and conservation as necessarily competing objectives however. They object to production being sidelined by environmental regulations that they perceive to be unsuited to, or ignorant of, biophysical conditions and are therefore ineffective and counterproductive. It is in the mutual interests of conservation and production, by government and by farmers, if formal orders can be in sync with informal laws. Governments must therefore work with farmers to better understand their concerns in managing Australian landscapes both for environmental sustainability and for economic productivity.

9.3.4 Encouraging compliance

It is of concern to observe an ever widening social distance between landholders and governments in their approaches to natural resource management particularly when both groups seek similar outcomes. Farmers vary in their views on the appropriateness of government intervention in environmental matters, but many would prefer fewer incursions into on-farm management. Farmers see regulation as appropriate but disapprove of current regulation and the role of government in land management. This indicates that in this area governments may lack legitimacy and trust. For governments perhaps the first challenge is to raise the support for their role in regulating the farm environment. This could be achieved by working with farmers to develop a common purpose. Voluntary compliance may be achieved where laws mirror pre-existing norms, and the law then obtains the benefits of informal sanctions and/or internalised motivators which work to enforce the desired behaviour. Where changes in behaviour are required, as in the environmental arena, a norm may have to be created before law will become effective. Perhaps activation of the existing norm of land stewardship could assist. This has previously been identified as a recommended pathway, alongside recognition of constraining factors (Stanley et al, 2005) and provision of incentives (Barr, 2003). As well, closing the social distance using collaborative pathways would assist in raising public confidence in government.

9.4 Limitations of the study

As in all social research, there are several limitations to this research. The response rate of 41% is adequate but could have been better. Farmers as a social group are over-surveyed. We elected to gather complex data from a large detailed survey to examine these issues rather than limit the study to encourage a greater response. The sample was well represented across states and industries. However, respondents were limited to those who were more educated, or who were older or semi-retired and had time to complete the survey. Two respondents chose to call to discuss the issues rather than complete the survey. To address these concerns, the researchers targeted a wide cross section of the residents within the case study communities.

9.5 Further research

Several ideas have emerged through the course of conducting this study for further research. First there is a need to assess the nature and of the impact of 20 years of Landcare on land degradation

across Australia (ABC 2010). A nationwide survey would establish national baseline data for assessing the degree of progress Australia has actually made toward alleviating land degradation and what role the Landcare movement has played, and will play in the future. Exploration of alternative management structures within rural communities would be useful to identify possible alternatives that may encourage participation by landholders.

Second, more research is needed to examine environmental crime victimisation at the individual level on farms as well as other businesses, and identify the vulnerability characteristics (attractiveness) of potential targets, and possible prevention strategies to improve guardianship on farms and within communities. More research is needed to explore further social and environmental determinants of environmental crime victimisation to clarify the opportunity framework risk factors for particular environmental crimes and verify the characteristics of farms that render them attractive to offenders. Understanding and theorising environmental crime would benefit from further research using social control theories, particularly collective efficacy. Rural communities are not homogeneous and comparisons of environmental crime victimisation and levels of social control between communities may reveal important insights into crime prevention and informal social norms pertaining to the commission and prevention of these types of offences.

Third, the analysis revealed divergent opinions on the reality of climate change due to the climate variability that is characteristic of farming in Australia. It would be useful to explore diversity in opinions on climate change within other types of agribusinesses, particularly large corporate businesses, and how this will affect adaption to climate change impacts in rural areas. Fourth, further examination of the philosophies of land management held by farmers and those promoted in legislation would provide useful information. 'Good farm management' may mean quite different things to different farmers, and policy makers.

Finally, while support has been found for motivational posture theory, additional work is required to test both the theory and its application in this context and to investigate further. This study has identified the significance of place to farm management and compliance behaviours as a potentially fruitful site for further work in four areas. Firstly, the placement in terms of social distance and degree of agreement between regulatees and regulators on values and the latter's role and on the content, process and aims of regulatory interventions (i.e. regulatory alignment). Secondly, placement in terms of jurisdiction as the nature of the regulator and regulation is defined by political boundaries. Thirdly, place in terms of place attachment which may act as a brake on achieving change. Environmental regulations seek change but this may be resisted if preservation of the status quo is desired. Fourthly, biophysical factors of place such as drought also have an influence. This study has provided strong indications that both social and geographical contingencies may be central to farmer attitudes and behaviours and therefore compliance but further work is required to elucidate the nature and extent of these aspects before more definitive conclusions can be made.

9.6 Conclusion

People are the key to achieving environmental sustainability because it is people who need to change if humanity is to alter the trajectory of present forecasts of irreversible climate change and ecological degradation. In Australia farmers are the key to effecting change on 60% of the continent and so their perspectives are critical in determining future policy responses desired to achieve environmental goals. Australian farmers are performing many environmental practices both with and without support from government and this should be further encouraged. Governments working alongside farmers in a 'common-ground, combined-effort' approach to environmental concerns will achieve better environmental outcomes. These issues were further examined in Part Two of this research.

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Appendix 1: Conservation activities on farms: Ch. 3

- A bush area containing Brookarena eucalyptus, paperbark, tee tree, Marraunah gum
- A chain of trees left around every paddock to provide habitats and free protection movement of wildlife
- A creek fenced out and sown with trees
- A creek on one block currently being fenced and planted with trees riparian repair
- A gully running through property and a creek boundary
- A natural wetland lake
- A small area of native hakia, which feed sulphur crested black cockatoo and young
- A small area of regrowth
- A small dam for wildlife
- A small section in one paddock
- A steep gully with remnant forest both sides
- A 500ha black box swamp with trees up 1500 years old
- All bush has been preserved
- All of our farm we see as a preserve for birds and Australian native wildlife
- All of the rainforest; also have left regrowth to grow along steep slopes and creeks; also have planted corridors for wildlife; have planted trees for birds etc.
- All river frontages fenced off from livestock access
- All tree lined creeks
- Almost all remnant vegetation fenced to exclude stock and maintained as private nature reserve
- Almost half of our farm is salt swampland. As we have had no livestock for 14 years, no sheep have been into this area
- Along creeks
- Along river and creeks
- An area fenced out of the farm onto road survey (40-50 years) which is very small with banksia, jarrah, and marri trees and flowers (wild)
- App 8.5ha
- Approx. 1/3 gazetted private native forest
- Approx. 2 ha, heavily timbered, natural bushland; scrub; creek running through from National Park
- Approx. 2000ac native forest veg
- Approx. 30ha natural woodland
- Approx. 50% of property is identified as an Environmental Protection Zone
- Approx. 75ha
- Area not cleared because originally a road reservation, now on our title but fenced off from stock. Very varied species
- Area of 20 acres natural bush and rock formations
- Area of remnant scrub
- Area of yaccas (grass trees) and also of native trees and shrubs
- Area set aside bordering farming country. Clearing license included this area. It is covered in ins and feral animals
- Areas along creeks
- Areas along Maryland river only grazed very lightly
- Areas of a major creek have been fenced from cattle as have one swamp area; approx. 40 acres rainforest and regrowth fenced
- Areas of creek frontage fenced off
- Areas of native cypress pine; areas of shelter trees
- Areas of native trees and shrubs as shelter belts for native birds, bees etc.
- Areas of native vegetation, fenced
- Areas of revegetation that have been fenced off preventing livestock grazing
- Areas of swamp land fenced in
- Areas that were heavily degraded, found endangered species and have regenerated into native veg areas!
- As near to natural pre-European condition, great biodiversity, 56 native plants, steep and never used for farming, has a creek
- Bamboo windbreak along river bank
- Barrier country with Manna gums and blackwoods
- Beach front dunes; mutton bird rockeries; vegetation fenced off remnant areas
- Bingalow Creek, a tributary of the Moore River and tributary creek - natural trees with additional trees planted; creek into Pyre creek
- Bird preservation - parrots, eagles; lots of natural bush
- Bird reserve and wildlife - hilly, spring, treed
- Blackwood and wattle trees and gum trees and full of tree ferns
- Border around farm of bushland
- Boundary creek embankment covered with trees and various grasses
- Boundary creek through volcanic barrier, riparian fenced to limit stock access, very secluded and isolated
- Breakaway country fenced off
- Brush - shade, shelter, firebreak
- Buckinbah creek have fenced it off and revegetated it
- Bush
- Bush block with mainly native eucalypts
- Bush old growth and new growth that has been left for environment
- Bush, hill, creeks
- Bushland
- Bushland - for flora and fauna
- Bushland - mountain area that the area was first viewed from when it was explored by Major Mitchell
- Bushland - native orchid habitat
- Bushland - regrowth
- Bushland - wildlife habitat
- Bushland (blue gum); eagles, swift, parrots and rare native orchid

- Bushland 120ha remnant, other small areas
- Bushland and creek
- Bushland and timberlines
- Bushland approx. 5ac. Tall gums with small bushes underneath
- Bushland creek
- Bushland for wildlife
- Bushland habitat
- Bushland habitats uncleared
- Bushland ironbark stands
- Bushland natural habitat
- Bushland natural state
- Bushland on hills within cane land
- Bushland preserved for wildflowers
- Bushland reserve
- Bushland, regrowth area
- Bushland, tree ferns, large trees, rushes etc.
- Bushland/wetland
- Cane for river bank revegetation for erosion control
- Century-old red gums along a creek; century-old olive plantation with curlews
- Channel country covered with timber and _____ for birds and animals
- Check cattle locked out, weeds controlled
- cleaning out creek to rid non-native vegetation
- Condamine River runs through property and is protected from stock
- Couple of small low areas with native trees
- Covenant placed on 40 ha reg with DSE two kms lake frontline
- Creek - maintain 50M vegetation buffer
- Creek - riparian vegetation, platypus. Bushland - maintain older vegetation
- Creek - swamp
- Creek (native companion); it usually has a waterhole depending on rain
- Creek and blue scrub. Rare pygmy gudgeon and platypus in creek
- Creek and bushland
- Creek and main dam (18KL)
- Creek and native forest for native flora and fauna. Removed all invasive species and restored to natural state
- Creek and scrub areas
- Creek and surrounding bushland with cliffs 200ha
- Creek and waterfall
- Creek avenues for regrowth on main property of trees and shrubs; nature reserve of native habitat on other block
- Creek bank, saltwater creek, part-owned adjoining property (100ha) waterfalls and streams
- Creek banks fenced off, river banks fenced off
- Creek boundaries are fenced and revegetated on home block
- Creek corridors
- Creek fenced and planted with native trees
- Creek fenced and planted with trees and understory/stopping erosion creek rock work
- Creek fenced and revegetated, some natural bush fenced off
- Creek fenced off and trees planted therein
- Creek fenced off and trees planted therein
- Creek frontage and 0.4ha remnant rainforest on top of hill
- Creek frontage; grassland remnant
- Creek is fenced off. Ours is second property from headwater of creek. Home to platypus
- Creek line and remnant blue gum bush
- Creek lines - minimise salt encroachment
- Creek running through the property
- Creek running through, trees along for shelter and erosion control, birds and kangaroos
- Creek runs through farm
- Creek through a gorge
- Creek traversing property - remnant banks
- Creek winds its way west to east across our property, ends up in the Hopkins River. The creek is lined each side with red gum trees. The creek only flows when heavy rains occur
- Creek with lagoons and remnant vegetation
- Creek with large eucalyptus trees
- Creek with old native trees (coolabah and gum trees)
- Creek with waterfalls, bush with tree ferns
- Creeks and dams
- Creeks fenced (small waterfall) and remnant vegetation (stands of trees)
- Creeks fenced off allowing natural regrowth for fauna etc.; another area for wildflowers (spider orchids, donkey orchids etc.)
- Creeks, dam and wetlands, bushland, _____ gullies
- Cypress pine scrubs
- Dam - waterfowl
- Dam and hills above dam
- Dam area fenced off to keep cattle out. Dam area protected for wombats
- Dam for water birds
- Dam overflow that I have revegetated
- Dam/bushland
- Dams are fenced to exclude stock, heavily planted with local provenance trees/shrubs
- Dams installed with plenty of wildlife, birds etc.
- Deep bushland gully at the source of a creek "protected" by steep terrain and cliffs
- Dense timber - feral!
- Desert plain country
- Dry creek running into heavy timbered area
- Dry creek through property lined with red gums
- Ephemeral creek
- Erosion control to promote revegetation on a fragile slope which is the beginning of a creek

- Escarpments/natural rock/sand. Banks left undisturbed except for pest clearing (blackberry, fireweed etc.)
- Fence line surrounded by pine/polar/gum trees; windbreak and bird habitat
- Fence off and improve remnant vegetation
- Fence off river and runoff areas
- Fenced creek area, gradually increased corridor
- Fenced creeks and reseeded - linking with neighbours efforts for corridors etc.
- Fenced grassy boxy area
- Fenced in about 60ac Golden Wattles some years ago; eventually destroyed by witchetty grubs
- Fenced native bush as Mallee fowl habitat and protection of native flora
- Fenced off 1.5km of riverbank and 2km of creek lines
- Fenced off a creek to control grazing
- Fenced off a few old trees
- Fenced off area where sheeps are growing to stop sheep entering
- Fenced off area with trees planted in it
- Fenced off areas for regrowth
- Fenced off creek and native regeneration areas
- Fenced off creek bank on southern boundary
- Fenced off creek to protect banks and stop erosion
- Fenced off dams, encourages wildlife
- Fenced off remnant trees
- Fenced off residual trees and some regrowth
- Fenced off revegetation areas
- Fenced off riparian strips
- Fenced off river bank
- Fenced off river frontage with areas 100m from banks of river. Mainly red gum, grassy woodland with wattle understory regrowth. Sandy beaches along permanent river
- Fenced off river frontage; fenced off area of remnant bush
- Fenced off shelter belts, fenced off environmental low storey bird habitat
- Fenced off watercourse, planted trees - fenced
- Fenced out 65ha
- Fenced out creek and revegetated surrounds with natives
- Fenced reveg area and an ongoing native windbreak program
- Fenced to eliminate stock
- Fenced watercourses and planted steep areas
- Fencing creek areas and bush
- Fencing off small dam and revegetate - natives
- Fencing to prevent river bank degradation
- Flats that were covered by combungi - no good for anything; no biodiversity at all - we drained the area, disced combungi out and encouraged grasslands
- Forest, habitat, seasonal creek
- Forest, therefore no use for farming - too rough, too rocky, too steep
- Forested hills
- Freshwater lake - covers 200ac when full; lots of native birdlife
- Frontage to Pejar dam fenced off and planted to native trees
- Gorge and spring; small amount of rainforest - large, old trees, area
- Granite hill paddock that has been allowed to regenerate naturally by removing stock
- Green for birds and other wildlife
- Gully area down through middle of property with 3 farm dams (small)
- Gully revegetated to bushland
- Gully, box trees - red box, apple box
- Gutters fenced and planted with various trees
- Half property timber full of kangaroos etc.
- Have 1 dam fenced out and 2 kms of creek fenced
- Have fenced off 100 x 100m around Quandong trees to help regrowth of new trees
- Have frontage to approx. 3kms river which has permanent water fairly brackish but the roos drink it
- Heritage scrub
- Higher part of range
- Highest privately owned natural bush area in the shire
- Hill with thick timber for bird habitat
- Hillside vegetation, creek and water protection, shelter belts etc.
- Hilly bushland
- I have approximately 1/2km creek frontage. The creek has been dry for many years, the vegetation has been undisturbed for at least 50 years
- I have multiple areas preserved to provide habitat for native species of birds and animals
- In a major sense, the entire property is preserved - it is best described as conservatory managed natural outback pastoralism
- Intermittent watercourse - drains through remnant tea tree grove into main dam and out via overflow channel through regrowth native scrub
- Irrigation dams fish
- It is an area of approx. 10ha that has not been cleared
- It's just 70ac of land not cleared for cultivations. It provides building and fencing material, firewood, shelter for shorn sheep
- Lagoon
- Lagoon and Ironbark ridge
- Lake
- Land unsuitable for farming due to terrain
- Landcare creek etc.
- Large areas of scrub and large dams, large areas of open forest grazing land
- Large dam with trees surrounding. Also used for pumping stock water

- Large swimming hole with flat granite rock
- Leasehold on 100ha river frontage; designated tree lines for conservation corridors
- Left natural to protect fauna in natural surroundings and protect waterway (fenced off from stock)
- Light sandy rises to stop erosion
- Lignum, swamp and rivers - I believe in managed conservation so all can benefit - most of property has these features
- Local lakes
- Lovely creeks and bushland access
- Low lying grey box and lignum area remnant vegetation
- Mackay Creek has had 3000 trees planted along bank to prevent erosion
- Maintaining nest areas, pelicans/spoonbill rockery, adding fish, water quality, populations of black duck and wood duck, carp eradication, regular flushing. Farming - eco-reservoirs, 40ha preserved wetland nesting area, swans, stands of trees retained
- Mallee scrub
- Mallee, front bank, gum woodland
- Mangroves
- Most creeks are fenced off from stock
- Most of the farm
- Mostly remnant vegetation
- Mountains and surrounding country
- Mt Misery Envirofund area <700ac managed area
- Native bush area with river on boundary
- Native bush; fenced off river
- Native bushland
- Native creek land - ungrazed by stock
- Native forest block
- Native grassland
- Native land habitat
- Native pines
- Native remnant scrub with at least 10 different species of vegetation
- Native scrub
- Native scrub kept as a heritage area - never been cleared or grazed
- Native scrub which has native orchids
- Native timber area - remnants with some sown
- Native timber corridor
- Native trees (planted)
- Native trees and some animals land-locked
- Native trees plantation fenced off
- Native vegetation along watercourse
- Native vegetation along watercourse
- Natural bush 40ha jarrah/redgum
- Natural bushland
- Natural creek - fenced to preserve creek banks
- Natural grassland and low bush, steep terrain
- Natural Hawkesbury heavily wooded sandstone country
- Natural salt lakes
- Natural springs in various places; large areas of native pine and eucalypt bushland
- Natural tree clusters
- Natural wetland swamp
- No because everything we do has been beneficial to wildlife - more water, more grass supports kangaroos (1000s) (pigs and dogs) birds - crops support thousands of birds
- Northern boundary is a river. Remnant river reeds and reveg program of river reeds and local species
- Numerous wildlife corridors, most are 10-15km in length
- Old Bendee Forest and Caves
- Old native trees as wind rows
- Old river red gums, SA blue gums, native pine and acacia indigenous to our area
- One 400m boundary
- One paddock - native vegetation that is not fertilised or grazed much
- original bush area
- Original bush with Mallee fowl, various rare parrots and echidnas and black-gloved wallabies
- Original scrub
- Patch of virgin scrub that represents the landscape pre-development
- Patches of original species/creek lines of timber for birds and wildlife
- Permanent creek, well-timbered - fenced off from stock
- Pine scrub
- Planted area of trees
- Planted wildlife corridors, fenced off remnant vegetation
- Planted with native species creeks and windbreaks
- Planting trees in belts approximately 15-20m wide
- Plenty of natural bushland
- Prescribed windbreaks and native animal and bird corridors; under Western Lands Commission - Western NSW
- Preserved brigalow scrub and softwood scrub
- Pristine waterway
- Protect salt pan
- Protecting riparian zone
- Put in riparian fencing on dry rivers
- Quartzite and sandstone ridges
- Rainforest, Dtharowal creek, closed forest
- Range of hills, remnant growth, fenced off from livestock; native habitat
- Range, steep hills with lancewood timber
- Rare species of box
- Red gum and box forest
- Red gum paddock and long tree gullies
- Red gum trees and suckers
- Remaining bush and creeks
- Remnant along river
- Remnant and regrowth vegetation on hills and slopes
- Remnant box and ironbark trees; 50ha
- Remnant bush along a creek
- Remnant bush, large blue gums and swamp gums
- Remnant bushland habitat of approx. 5 ac consisting of mature eucalyptus (13m-

- 18m in height), approx. 50-80 years old, and regrowth timber of varying age
- Remnant bushland, saline creek lines, carnaby cockatoo, nesting and food sites
- Remnant bushland/wildlife corridors
- Remnant forest
- Remnant native bush
- Remnant rubida woodland and tea tree swamp creek
- Remnant scrub land (last of bigger timber)
- Remnant softwood scrub
- Remnant softwood scrub and remnant Brigalow scrub and hardwood forest
- Remnant stringy bark, pine gum, yaccas and native grasses
- Remnant veg on a branch of river
- Remnant veg too steep for any form of ag use
- Remnant vegetation
- Remnant vegetation - trees, less than 1ac
- Remnant vegetation and tree lots fenced off
- Remnant vegetation, ODC Mallrys
- Remnant vine scrub
- Remnant woodland (schlerophyl - dry) - grazed only by sheep to reduce bushfire fuel (not cattle)
- Reveg with native pines
- Revegetated native bush area
- Riparian areas and wildlife protection areas
- Riparian areas fenced
- Riparian zone and remnant bush, 25ac, has been fenced for 12 years
- Riparian zone exclusion
- Riparian zones and eucalyptus woodland
- Riparian zones on all permanent creeks and rivers, native grasslands, native bush
- River - red gums and other native grasses
- River and creek
- River and creek frontage fenced off and native trees planted
- River and its banks vegetation; forest as natural zone for animals and plant species
- River and surrounds
- River borders our property
- River country left for beauty and wildlife; water holes filled during drought for wildlife
- River fenced off and native trees planted
- River frontage
- River frontage and creek environment
- River frontage that has lost much of the original grass species due to favoured grazing. It is now protected to encourage the native grasses and biodiversity to return
- River riparian revegetation together with preserving existing remnants
- River running through property that can be diverted to on property redgum swamps
- River shady creeks
- River system, creek line, low line ground, bushland
- River fenced and trees planted
- Rock salt area
- Rocky outcrops with scherophyl milo thickets
- Rocky outcrops with scherophyl milo thickets
- Rough timbered and rocky outcrop country
- Two creeks 2km long - permanent water
- Salt area fenced off, planted into trees, planted with salt couch, got good results on about 50ac right through
- Scrub on hilltop and down some valleys
- Scrub wood rainforest, creek through
- Second property - creek - fenced off
- Section of bushland with creek
- Sediment Catchment dams on creek
- Several patches of bushland
- Several swamps
- Shade and wind protection plantations
- Shade clumps for cattle
- Shade for cattle and to prevent erosion
- Shelter belts
- Sheltered gullies with full canopy
- Small area (2ha) of bushland with dam
- Small area of bush - red gums with understory species
- Small area of bushland
- Small area of floodplain
- Small area of grey box
- Small area of native forest
- Small areas of endangered species
- Small areas planted to trees (native) on hill, also along creeks and riverbanks
- Small bushland
- Small creek fenced off
- Small creek running through property 85% of it is fenced off and trees planted along banks
- Small creek with native fish
- Small hilly area fenced off and planted with trees
- Small lake
- Small waterfall in wet times, large boulders scrub native animal habitat
- Small wetland, wildlife corridors
- Small winter dam, small bush
- Softwood scrub
- Some bushland and gullies leading to the river
- Some swamps and areas of bush
- Special pastures to breed and fatten 180 roos and 30 wombats plus 60ha to house and shelter these plus 20 koalas and possums
- Spent \$36,000 over 5 years developing a 8ha wetlands behind coastal dunes. Fenced all creeks and dams off
- Spring-fed fern gully
- Springs-fed creek
- Steep and rocky areas
- Steep bushland and creeks fenced off
- Steep gully culminating in waterfall - left uncleared
- Steep hill covered in timber down to creek, bird and native animal habitat
- Steep hilly areas
- Steep, scrubby, virgin scrub
- Stock access, to the two permanent creeks is controlled by fencing off banks

- where erosion would occur or had occurred in the past
- stony soil types not suitable for farming plus some swamps and wetlands
- Stringy bark scrub
- Swamp and box trees
- Swamp area - large red gums and native grasses; fills up with water when river floods - last time was early 1990's
- Swamp fenced off to allow regeneration of red gum trees. Attempting to surround boundary with double fencing and plantations (native trees) internal plantations
- Swamp land for bird life and sediment trap for runoff from farm
- Swamp land native flora
- Swamp with natural vegetation and natural bush
- Swamps in wet weather creeks
- Swamps, native veg, many birds, bushland, great flora
- The creek has been fenced as a riparian zone
- The hills
- The property as a whole for flora and fauna diversity
- The river - banks and vegetation
- The whole farm
- The whole property is like this
- There is a large lake/dam on our property, previously built by a mining company. We have protected it from development, and allow the public access for fishing, boating etc.
- This is native bush
- Timber lump left in their natural state
- Timbered area used only for fencing timber
- Timbered areas along creeks, areas of remnant bushland, areas of natural softwood scrub (remnant)
- Timbered creek (non-permanent)
- Timbered hills, creek and water holes
- Timbered ridge for bushland
- Ti-tree swamp
- To keep water table down
- Top of high sand rises, yacca sheook and mallee fenced off from stock
- Tree ferns gully and creek
- Tree line
- Tree planting on a creek erosion area
- Treed areas along creeks; hill area on ____ country - window pane-type of clearing
- Treed gully lines
- Trees and bushland for wildlife
- Trees that came up without any care
- Try to apply environmental considerations to whole of property
- Two creeks - still remnant
- Two ephemeral waterholes. We are presently fencing part of the creek
- Two lakes; cask lake of about 20 ac; 1.5 kms shore line on Lake Flannigan - 500 acres when full
- Two main gully lines bisecting property fenced off to grazing
- Ungrazed bushland for 30 years
- Ungrazed 'reserve' areas
- Very steep hill going down to creek
- Very steep natural bush falling westwards into a river
- Virgin scrub
- Watercourse areas fenced
- Waterfall small natural native vegetation - mini-rainforest completely undisturbed habitat - inaccessible to livestock
- We are in the process to Heritage list some of our farm
- We conserve and nurture all our land but it is a farm and we make our living from it
- We contacted Bush Heritage as it is in pristine condition. They weren't interested
- We have 2 blocks approx. 20ha each fenced off creek and revegetation (stock excluded)
- We have 2 x 80 mile beach tidal creeks; these are in pristine condition
- We have 600ac of native grassland shut up for approx. 20 years
- We have a creek which we have fenced off and revegetated; great windbreak and flora and fauna area
- We have fenced almost all remnants, creeks and wetlands for their importance to the planet
- We have fenced off a number of remnant vegetation areas and connected them with plantations to make corridors. We have also fenced off a large percentage of our creeks
- We have just finalised creation of the "Yarra" Maltese refuge with the State Forestry. It is 1950 hectares of sand, hills, creeks
- We have planted approx. 400 trees for environmental benefits
- We have preserved an area along our creek cypress pine and river red gums wildlife corridors
- Welga trees 10ac and one dam fenced off
- Wet area, fenced and encourage wildlife
- Wetland - adjoining permanent creek
- Wetland 5 ha. Reed bed filter. Waterfowl breeding area. Source of reeds and sedges for further riparian areas
- Wetland and habitat
- Wetland area of some 50ha has been fenced from stock. Wetland is a mangrove swamp beside a river
- Wetlands fenced off from stock 450ha
- White gum bush and creek from cave
- Whole farm is balanced; river is fenced off; shelter belts with featured remain throughout property
- Whole property
- Wildflowers - caves
- Willen Close photo
- Wimmera River frontage
- Windbreak to help prevent salt appearing in lower valley, personal flora and fauna
- Windbreaks which serve as habitat for birds and animals; treed areas along gullies and creeks also

- Winter creek with some native veg along banks
- Winter waterfall over breakaway
- Wooded area kept for native habitat
- Wooded paddock
- "Creek" bed - last flowed for a few days in 1995
- 5600ha under our Ent based Cons scheme; Aboriginal relics, old tin mine, rare flora; (2) Under 1ha fenced and signed - AB Art site - large
- 0.5ha creeklines; 8ha remnant vegetation - endangered rating
- 0.5ha native trees
- 10,000ac reserved under a Conservation Agreement with CMA for 15 years
- 1000 acres native vegetation
- 10ac of uncleared black box timber and old creek lined with lignum
- 10ha bushland
- 10ha direct _____, mainly acacia
- 13ac black box
- 15ac of native timber and scrub
- 160 acres sandy country - not cleared
- 16ha scrub for native orchids and native bushes and trees; 2ha old gold route
- 16km of riparian frontage, endangered kangaroo grass species, in-stream water values
- 17% is remnant vegetation
- 170ha native vegetation - Heritage listed
- 17ha coastal veg
- 2 acres planted to native trees
- 2 dams for irrigation
- 2000ac remnant veg which is never used for any agricultural pursuit, in one lot we do dingo bait
- 200ac of bush
- 20ac sandalwoods etc.
- 20ha fenced reserve
- 20ha of native scrub on top of hill fenced off 1980 a lot of regeneration has happened; 4ha of native scrub near house fenced off
- 240ac next to Weddin Mountains National Park
- 25% of property has been returned to native vegetation, a creek running through the property has been fenced and revegetated
- 2500ha grassland managed on time-control principles to encourage 100% groundcover and allow the many rare grazing plants
- 250ac hill country, locked up for 14 years
- 2ac planted trees
- 2km of river frontage fenced to restrict stock
- 3 lake/swamp area - plenty of birdlife in winter; dry in summer
- 30 acres natural bushland
- 300 acres total reserve; 900 acres RFA
- 300ha of undeveloped bushland on poor hilly country
- 30ha of remnant native bushland, mainly manna, stringybark and peppermint gums
- 380ac of stringybark scrub
- 3ac of bushland
- 40ha bushland
- 40ha virgin vine scrub
- 460ha native scrub huge biodiversity
- 480ac natural bush left to nature
- 4ha site for natural revegetation; 5ha creek fenced as yet to be planted with trees
- 50 metres of bush on either side of creeks
- 5ha native bushland
- 6 dams; 1 with island for birds/ducks to breed; 2 dense tree clusters to encourage native birds
- 6 ha was low lying and frequently flooded by drainage. But drainage system constructed in community and area fenced off
- 750ha private forest reserve
- 80% property not grazed; trees provide bird habitat; kangaroo, wallaby, echidna and koala habitat
- 800 acres bushland, riparian zones, understones etc. etc.

Appendix 2: Who and what participants blame for environmental crime: Ch 4

- 5-acre lots and urban sprawl
- A lack of understanding by authorities whom implement the changes to our environment
- A minority, who are noisy, are against green people; lack of education, most big landholders haven't even finished high school!
- A person of undesirable character bought a local farm with money from a workers comp payout and then proceeded to grow cannabis, light fires, damage fences, let cattle out on main road and fell trees. He is now no longer in the area
- Absentee landowners and closeness to larger town
- Action and non-action by Government to apply law only to areas that suit them politically
- All sorts of people come up here regularly
- Animal activists campaigning against sow stalls
- Arrogant hunters
- Authorities; burning is frowned upon even though the Australian bush has been designed around fires. Our area has only part-time police present; hence, cannabis and trespassers
- Because small farms are purchased by large farms, lots of empty houses - cheap rent for people who want to leave town and out of view of police
- Blatant disrespect of property owners' rights. Our backyard just happens to be 7 acres not the 1/4-acre block in town
- Bloody minds who have no respect for private property
- Boredom in country towns - lack of recreational opportunity. Government funding to NPWS/Government policy on hazard reduction
- Boredom in local towns
- Bureaucrats
- Burning fire breaks - especially rank roadsides
- Bushfire - DSE Vic Government
- Bushfire spreading - none and inadequate prevention
- Bushfires = drought or lack of fire breaks
- CFA, Local Government, State Government, Local Water Authority, NRE, DPI etc. etc. - all Government-funded individual farmers and companies
- City shooters
- Close to city
- Closeness of highway and ignorance
- CMA, RTA, ATO et al
- Coal mines allowed to change water courses, resulting in horrendous consequences
- Commercial hot-air balloons
- Conflict between small landowners who do not realise the danger of bushfire and other land users
- Controlled burn-off in National Park got away overnight and caused burnt-off areas on neighbouring properties
- Corporations or large companies don't worry about fires, only the bottom line. A practise of topping up aquifers with drainage boxes stops the natural flow of watercourses, resulting in small swamps and creeks not flowing
- Cost of power to heat homes. It's a lot cheaper going out on a farm and getting firewood. Council dumping fees too costly
- Council apathy; lack of police resources and/or lack of interest if "crime" not severe enough to thoroughly investigate. Buck-passing (i.e., Council to police and vice versa). Lack of parental concern for others in relation to dirt bike riding
- Councils didn't always control weeds
- Dam construction for irrigation - Government
- Degraded irrigation channels allow people to get free water
- Department of Conservation - do not create firebreaks on reserves
- Developer activity
- Dog attacks: generally the direct result of the release of suburban dogs at weekend properties - no supervision and little understanding (by the owners) of the consequences
- Don't know - but suspect former employees
- Don't realise what they are doing. Fishing is stealing. A hell of an insurance risk
- Drought - water shortages
- Drought and overgrazing
- Drugs and pig hunters
- Drugs and poor policing
- Dumping of rubbish - if able to find person who did it then prosecute and fine heavily
- Dumping of rubbish because Council will not pick up and charge too much to use Council dump some 3kms away
- During past 1 year we have not had a proper water/environmental arrangement. To manage these matters arrangements are now in place to set up water, plans which should be in place by mid-09 to totally manage the region's water courses
- Environmentalists
- Farmer greed and dishonesty

- Farmers desperate to protect their livelihood
- Farmers in dire circumstances
- Farmers trying to spray when conditions are unsuitable
- Farmers, town people
- Feral deer: Believe hunters continue to release farmed deer into forest reserve areas
- Feral pig catching and roo shooting. Such people should have to prove where animal was caught
- Financial pressure to control weeds with the cheapest chemicals and equipment
- Financial pressures on farmers and lack of environmental awareness
- Firewood theft
- Flippant carelessness
- Forestry
- Forestry does not control the build-up of fuel in reserves next to us
- Fossicking areas declared by Council with environmental studies. No process control - no responsibility. No rehabilitation. No disease or weed quarantine
- Fuel prices
- General public (not rural) not respecting our ownership of the land. Tourists think that they can camp at any waterhole even if it is on private land
- General public attitude
- Generally the offenders for trespass and hunting are from the city (and timber). Chemical spray drift is purely the operator. Water theft is usually associated with vineyard irrigators that DO NOT live locally
- God (no rain)
- Going soft on crime and failing to implement the laws. Also all motorbikes on beaches should be registered as are all boats
- Government - pastoral lease has grazing rights - Aboriginals think they have hunters rights - firewood collection
- Government authorities close down recreation areas and create poachers. Ignorance or bad manners - it was settled in court (chemical spray drift)
- Government management practices of National Parks
- Government not doing enough for unemployment also leaves idle hands. Lack of money for summers to address the problem; i.e., better security. I think bank security has increased, thus making it too hard for thieves to steal cash so they prey on the stock
- Government policy
- Government State and Federal, local
- Government-funded organisations. Greenies
- Greed of a few at the expense of many
- Greenies can go a bit overboard. They should think sometimes before they open their mouth
- High cost of fuel and other inputs to run a farm, people just want to steal them
- High cost of tip fees and remote tip sites; easy to dump rubbish and cut firewood in one operation
- High gate charged at local rubbish dump
- Hobby farmers and small block lifestyle people
- Hobby farmers lack of weed control and understanding restricted burning procedures
- Hobby farmers unprofessional practices
- Human nature of unoccupied people
- Humans profiting from stealing
- Hunters and wood gatherers not respecting private property. Croppers shifting excess water onto next farm. Ideal spraying conditions rarely exist
- Hydroponic cannabis creates waste that is dumped in near rural areas
- I relate back to the biggest issue in our region and I believe feral goats are our issue and this could be controlled by those who have legislation behind them to do so
- I think chemicals are going to cause more harm to the land and water system in the future
- Ignorance and taking the "rights" of farmers to conduct normal farming practices for granted
- Ignorance to legislation - I can't be caught
- Ignorance, greed, arrogance, laziness, introduction of large GPs straight line and hands-free systems
- Ignorant townies
- In relation to water, the Governmental decision-making process and resultant administration gave rise to a most inequitable allocation system for our local groundwater
- Inadequate fire prevention measures
- Inadequate firebreaks by landowners or departments. Needs policing/needs enforcing if possible
- Inadequate planning, financial constraints
- Inconsiderate townies
- Inconsiderate/selfish people, not treating other people how you would like them to treat you
- Increase in roadside rubbish since local tip now only open two days a week, plus you now have to pay to use the facility. We often pick up and bag the rubbish and then we get charged
- Individuals from cities misinformed/feeling they have a right to the Australian bush
- Individuals way of thinking and acting

- Insufficient scrutiny by authorities
- Intensive agricultural practices (e.g., higher stocking rates, higher fertiliser rates) affect quality of water. Should be addressed by Department of Agriculture or Landcare bodies
- Irresponsible people
- Is a very large property involved and manager usually reports to police
- Isolation
- Lack of care by individuals
- Lack of consideration for neighbours
- Lack of controlled burning in National Parks
- Lack of Council action
- Lack of courtesy!
- Lack of education in primary production best practice and lack of economic rationalism; i.e., is the cost of clearing worth the returns predicted?
- Lack of education of property owners on their custodial responsibilities as landholders - especially in respect of water and weeds
- Lack of enforcement by authorities who HIDE BEHIND CODES OF PRACTICE etc.
- Lack of fire precautions and fire fighting equipment by local "hobby" farmers
- Lack of foresight in providing water for increasing population
- Lack of information and understanding of block owners in primary production and their impact they have on farmers and their income
- Lack of local policing - our local policeman is not given any hours in and around his village. Put on in the large town nearby. Chemical spray drift - bigger farmers who don't care about others
- Lack of opportunity for recreational hunters to use native forests, crown lands etc.
- Lack of people in the district due to blue gum plantations
- Lack of police numbers and power
- Lack of policing
- Lack of public awareness
- Lack of rain the only environmental problem
- Lack of regard for condition of watercourse with resultant erosion and serious degradation
- Lack of respect by tourists/campers/holiday-makers of someone else's property. When in an unpopulated area you can do what you like
- Lack of supervision of practices - no policing
- Lack of support for police - from Government and judicial system. Lack of respect for other people and their property brought about by bad upbringing. Insufficient penalties - when they are caught - especially from judges and magistrates
- Lack of tree planting; no attempt to control foxes or rabbits
- Lack of water, lack of community concern on cannabis
- Land is being cleared to produce more to try to increase returns. Due to external factors you can liken this practice to what is happening to Brazil. Farmers are at the bottom of the wealth chain. All risk low return
- Landholders with too much work to do; Government works
- Large business bringing in heaps of workers from all over country. Lots to strangers lurking about, with not much to do in small country area
- Large companies - plantation timber companies
- Large companies exploration/mineral rights and unmanned/poorly staffed National Parks/privately owned conservation parks
- Lazy people who don't take rubbish to tip. Urban development encroaching on farm land
- Legal loopholes. Desire for wind power energy. Unpractical tourism ventures with damaging side-effects
- Letting bogans think they can own guns
- Living close to larger city 5km Melbourne CBD
- Living too close to ferals, low-class losers!!
- Local Councils allowing investors to plant pine on good farming land
- Local farmers
- Local Government roadworks
- Local kangaroo shooters on their way to other properties
- Local kids
- Local Landcare for rivers - "older style" farming; River Authority - full of trade-offs compromises to deliver irrigation water to drought-affected areas
- Local people stealing wood and collecting grubs (___ moths) on private land. Local people hunting (spotlighting). State Government allowing deeper bores in hotspots, unsustainable. Shire arrogance
- Local Regional Council
- Local teenagers
- Local town people hunting
- Location to urban sprawl and cheaper rental accommodation, which brings in people whom have difficult standards
- Louts and weekend warriors
- Low rental properties nearby
- Maybe young people

- McDonald's standards for vegie growing
- Mining activities create dust fallout of heavy metals on surrounding agricultural land
- Mining in the near future over large areas will impact hugely and pits, voids, open cuts will be left to do so much damage
- Mining is a legal pursuit
- Mining; unprepared burning off
- Money or lack thereof
- More conservation, no-till farming so a lot more spraying going on
- Most drift is of a minor nature (crop damage along fence line); occasional other damage is accepted as next year it could be me that damaged neighbour's crop
- Most hunters think it is their right to go where they want!!
- Neighbour on second farm
- Neighbours not being careful enough
- No proof for most stealing, but culprits caught with stolen property once by police
- No public servants want to implement prosecution proceedings, after being informed of fraud, theft
- Not allowed to burn roadsides to make them safer in bushfire situations
- Not certain whether the sinking of bores can impact on neighbours or is it just the drought?
- Not enough care taken or knowledge of gumatic conditions; e.g., drift
- Not enough policing by DSE/police, water authorities
- Not serious enough to take action
- Nothing - it is just a fact of life we have to deal with
- Old-fashioned attitudes
- One farmer and aerial operator not observing correct conditions and procedures for chemical spraying. Coal mining companies being allowed to work under special rules that favour them, because they bring in lots of dollars to the Government
- One individual involved; no-one else to blame
- Operator and climatic conditions
- Organisation perceive concerns are low-keyed problems
- Organisations not wanting to own up to their responsibilities and try to "pass the buck"
- Other farmers, ignorant workers
- Our local Council, EPA, Department Natural Resources and Mines
- Our wonderful Government under Labour years ago; i.e., Whitlam, Hawke era
- Outback map books lack detail and are erroneous. 4WD clubs do not know that people live in such areas, or do not respect others' land
- Parents not looking after their children
- Particular people wanting to hunt/shoot animals for sport
- Part-time shooters, occasional drug growing
- People being ignorant to the law or not obeying it
- People generally have lesser moral and ethical values than in the past. A trend to only consider "self" and not my neighbour. (Big picture issue across the first world.)
- People in general
- People moving from the city and unaware of the results of their actions
- People not thinking or caring
- People nowadays want anything for free and not pay for
- People unknown to use from neighbouring towns who just arrive, jump the fence and use our dams for crayfishing
- People who are not farmers and may have come to the area in the last 2 years
- People who are out to earn a quick dollar and have no concern for the community as they do not intend to stay here
- People's attitude. In my 6 years I've seen rabbits at a density of 2 per acre and roos in excess of 1 per acre, yet rabbits, not roos, are considered the more serious
- Pig chasers, thieves generally
- Police are not taking trespassers seriously and fining them or confiscating motorbikes or vehicles
- Poor character
- Poor education at school to appreciate other property
- Poor farm management
- Poor judgment, lack of attention to detail. The Government - allowing VIC, NSW and Queensland to hoard water that should be flowing to the lower lakes and South Australia
- Poor return for many hours hard work - may be food is too cheap! Or middlemen mark-up too high
- Presence of a couple of "different" individuals who think they can get away with it
- Private developers
- Probably an "old community" versus "new community" attitude, with "old community" viewing tenure as a permission for their activities
- Probably lack of community standards in certain town people
- Public servants, people with no understanding on certain situations
- Rabbits and foxes, Rural Lands Protection Board and Roads and Traffic authority, Local Council

- Recalcitrance of authorities to even care
- Recreational fishing and camping people (from large town)
- Recreational shooters and other licensed harvesters
- Removal of waste station in the district (City of Greater Bendigo) Elmore
- Roo shooters leaving gates open; laws and penalty too low; not enough police to service this area
- Rubbish. I think the Council should have free dumping. They try to control illegal dumping by having two full-time officers and pick-up truck and abo beat - it is not cost-effective and I believe if the dump was free and perhaps have more than one, it may solve the problem. We are near the metropolitan area and other Councils could try as well
- Selfish or unthinking neighbours
- Selfishness and thoughtlessness
- Should control roo population in nature reserves instead of getting everyone else to do it
- Simply carelessness on the hunters' part
- Single property owner
- Smart-arsed people - no respect
- Social belief they weren't doing any harm
- Society
- Some people get a bit cheeky and take a risk but really don't meant to hurt anybody
- Specific neighbour
- Spray drift - different varieties of fruit close to each other require different sprays. Unfenced areas easy to dump
- Spray drift management by broadacre grain growers needs to be dragged into the 21st century
- Spraying - time restraints putting pressure on to get jobs done in conditions that aren't really satisfactory. Trespassers - common feral crooks in society today
- State Government lack of planning for the future; i.e., dams catchment. Nothing done for the past 5 years; water systems overdrawn
- Strawberry growers replace plastic ground mulch annually - the old is burned or thrown into landfill or a creek/dam - no recycling option and would cost too much anyway
- Stupid Government legislation
- Sudden change of wind direction
- Surrounded by State Forest, the DSE will not cool burn
- The above problems have not been experienced to any extent in our area
- THE BLOODY GOVERNMENT. They won't spend anything to solve problem. Not enough police in rural areas
- The current landowner
- The Environment Protection Act is unworkable; clearing controls unfair
- The farmer appears to be able to get away with illegal environmental activities which affect others without the authorities acting
- The Government and Local Council regulations
- The Government and the drainage department early last century
- The high cost of disposing of waste at local waste sites is causing illegal dumping of waste. The main cause of this is EPA charges
- The hunter/trespassers believe they can shoot over your land, when they want to
- The individual person
- The issue of trespassing and hunting is mainly from the perceptions that pig hunting is a right (Melbourne-based) and is taking some time to be re-educated
- The law is too weak in regard to people trespassing and starting fires through neglect
- The need to keep production increasing to keep pace with costs
- The neighbour involved has lost a number of sheep to theft and domestic dog attacks
- The odd contour bank in wrong places
- The owner of our adjoining properties
- The proposed wind turbine installation (69 turbines, 43 stories tall) will kill birds in huge numbers (this is a breed area for wedge-tail eagles), insects and bats. They are a crime against the environment
- The proximity of a large town; e.g., Broken Hill
- The red deer and pig hunters
- The Victorian Government north-south pipeline. Taken all the water out of Eildon dam so Melbourne can wash their paths
- The way people slowly and sneakily clear land of trees illegally. When these people are reported to the authorities there is never any action
- Theft of timber because of "wood-hookers" coming from the town to cut firewood; too hard to locate landowner to ask for permission that probably would not be given
- Timber companies and agriculture department
- Too many "ferals"
- Too many authorities not doing enough, passing the buck, not doing the hard work
- Too many vineyards riding roughshot over neighbours
- Too many water licenses
- Tourists and Indigenous community members
- Town people - don't want to pay dump fees; farmers spraying chemicals on wrong weather days

- Townies wanting to go hunting; e.g., pig chasers etc.
- Trespass, garbage dumping and mull growing - general lowlifes. Land clearing, bushfire, water issues - thoughtless greedy landholders
- Trespasser was urban dweller, unauthorised hunter was a kangaroo shooter and the altering of watercourse was a farmer
- Trespassers - close to town; Chemical drift - multi-national grape companies
- Trespassers and hunters
- Trespassers/theft - desperate people because of the lack of money and hard times with the drought
- Trespassing by pig hunters from town; altering watercourses - fellow farmers taking what they are not entitled to
- Undisciplined young people - drugs and alcohol affected; and with spraydrift, carelessness
- Unemployed dole-bludgers
- Unforeseen climatic conditions
- Unforeseen mistakes
- Unidentified people coming out of town - but as this is a mining area, with roads and tracks all over, it is difficult to follow up
- Uninformed arrogant city slickers
- Unlicensed water boring; price of firewood; lack of access for firewood
- Unnamed spotlight shooters
- Unthinking drivers throwing rubbish out windows
- Untreated weed infestations - ongoing
- Upstream landowners, urban residents
- Urban sprawl
- We don't have environmental problems - only trespass and theft of stock
- We live in a good community that is only small. Any problems are dealt locally
- Weekend trail bike riders noise for neighbours and friends
- Wild pig chasers
- With the frequent restricted irrigation from local creeks and the Ovens river in recent years, the sinking of new bores into the 2-ft or 4-ft aquifers causes the stock and domestic water from 2-ft aquifer wells to frequently dry up
- Wood-chip companies and Government-sponsored investment schemes
- Young town kids who think the rules don't apply to them.
- Young "hoons" in 4WD vehicles, some members of the Indigenous community
- Young people with too much time on their hands; mining

Appendix 3: Chapter 5:

Neighbours activities that affect farmers	Impact upon farmer's property
Urban sprawl	dogs wildlife live in my bush; had to put up extra high fences around pastures to keep them off so they live in bush area
National Park	Feral animals and noxious weeds breed
6ha next door turned in wildlife;	result is animal pests - roos, foxes
9ac of olives northern boundary on large deep sand ridge, cropping	Worrid about water table with so much irrigation on sand, fox numbers make small mobs of ewes a constant worry, drains put in cropping land direct natural watercourses
Absentee landowners - weeds, weeds and weeds	More weeds and foxes!!
Acreage areas of blackberry and scotch thistle	The spreading of seeds from the above considerably increases the work involved on this property to keep these weeds as close to elimination as possible. Landcare has been informed but no change observed regarding weed control by this neighbour
Additional dams constructed by neighbour	Less water flow
Adjoining properties do not stock sheep and hence feral animals have built up and so more ferals to prey on our property	With the build up of feral animals we are losing more stock to the feral animal
Adjoining property was neglected for years and overgrown with blackberries	Harbour for feral pigs, dingoes - have spilled over onto our land
Agroforestry blue gum plantation	Vermin live in plantation in day, feed on my pasture at night
An increase in number of native and feral animals but not enough to make us doubt our decision to revegetate	
As trees are planted and creeks and watercourses fenced off wallabies become a major pest competing for feed with stock and fouling pastures	Slight reduced carrying capacity
Basket willow plantation upstream to preserve river banks	Infestation with basket willow twigs, which then suckered, and became permanent plantings along the river
Being organic	Neighbours' sheep contain lice and other parasites which contaminate our sheep. Also weeds have spread due to their non-usage of weed control
Blue gum plantation timber	Zero runoff
Blue gum plantations	Pests fox haven. No neighbours any more
Blue gum plantations	Harbour foxes, kangaroos, wallabies, feral deer and lice-infected sheep, and reduced creek flows
Blue gum plantations	Increased feral animals; e.g., foxes
Blue Gum plantations harbouring pests	More feral animals
Blue gum plantations, labour, feral animals	Feral animals attacking sheep and lambs, weeds
Blue gum tree farms have provided a safe habitat for foxes to breed in	Losses of newborn lambs. Invasion of native reveg areas and impact on fauna
Blue gums	Foxes, cats, at worst
Bluegum plantations	Inundated with vermin
Building of dams above	Lack of surface water
Change from grazing livestock to no grazing or management of any kind	Influx of feral goats, pigs, kangaroos
Change from grazing to cropping	Pest plants
Changed from sheep for wool to sheep for meat and cattle	Roos and dogs have become more uncontrollable
Clay wash from excavations	Silts up main drainage in that area
Cleared land has introduced pest and weed issues	
Clearing	Increased feral/native animals looking for food and habitat
Close to National Park and roads	More kangaroos than cattle; weeds along roads
Coal mining	Increase competition for water as well as change to aquifers
Coal mining	Coal dust and noise and power lines traversing the land
Contour banking of neighbouring property caused channelling of water runoff	Erosion
Corridors for native animals - particularly possums, roos and wallabies	They eat grass, leaves on trees and shrubs; carry ticks
Crushing and rolling of volcanic rocks on pasture land,	Overpopulation of koalas in our trees, increased population of

trees dying out	kangaroos and foxes
Cutting of trees on adjoining property and overgrazing	Noise pollution from main road, increased native animals and fence damage
Damming of creek lines for irrigation	Less access to water
Damming of watercourse upstream, reducing flows downstream	Property entirely dependent on water sources from property dams. Major impact increased salinity in dam resulting from lack of flow which is necessary to dilute salts introduced by spring on the property creek line
Deer a problem; improved legumes are flogged	Labour to police deer
Dingoes breed on other properties	Huge cost to block them from killing stock
DNR stopped _____ in plague proportions and some dingoes	Less output
Double fencing for kangaroos	Increase in vermin
Drainage on upstream properties may have increased salt-affected area	Financial and visual
Due to clearing restrictions invasive scrub	Grasses choked out, lower productivity
Dust blowing from farming of unsuitable erosion from light _____	Difficult work conditions
Encroaching urbanisation	Restricts planning
Excessive planting of wildlife corridors	Increased fire hazard through inability to access and control bushfires. Increased invasion of pest animals, particularly kangaroos, which we are not legally allowed to control, reducing our stocking rates
Exotic sheep and mining	Contamination and dust and rubbish
Extractive industry - sand mining - in same creek which runs along border of my property	Lack of water in creek partly caused by extractive industry. Excessive noise and dust and road traffic. Visual pollution!
Failure to control feral pigs and dogs	Loss of time and incomes
Farms being cut up into small lots and either unkempt or trees planted on blocks	Wallabies, water hens, foxes - all eating sugar cane
Farms cut up for hobby farms	We cannot expand at economic prices. Eventually we will be rated off and pushed off due to lack of viability
Farms sold and now pine forest, other farms subdivided	Upstream creek and erosion and silt deposits on our property. Waterholes filled with silt, smaller holdings with hobby farmers - weed and pest control
Fauna/flora reserve	- increase in native animal impact on grazing land
Fencing off waterways okay, but weed control	Weed control
Feral and native animals	Animal damage
Feral animals	Damage to orchard trees, damage to market garden vegetables
Feral animals and roos very increased due to water - pasture increase	Time, trapping etc. Roos in plague numbers
Feral animals from blue gums, foxes, rabbits, roos	Lambing losses from foxes, pasture pressure
Feral animals not controlled by NPWS and neighbours. Roos etc. take refuge at National Parks and feed on my crops	Economic cost
Feral deer; possum explosion (permit controlling in excess of 1/year); Rufous Wallaby	Excess browsing; tree damage - particularly young and emerging trees
Feral goats are becoming more of a problem each year	Potential for overgrazing, cost of mustering goats to keep their numbers down
Ferals	Plenty damage, irrigation damage
Forestry plantations above property	Water quality during winter rains and water quantity during summer
Fossicking areas recently declared by TRC	Riparian vegetation stripped, banks undermined causing erosion. Nursey water holes smothered with mud and river dammed to enable sludging. "Fossicking is good for the community!!!"
Fox control measures are much less effective when not all landholders participate	Ongoing invasion from foxes
Fox habitats along creeks that have been fenced out	More lamb losses
Foxes in blue gums	Lambing percentage drop
From grazing/farming to mining	Because of the huge amount of water the mine uses/bore

	fields, using all water when drilling, damming creeks, purchasing large amounts of water from Lucerne holders along river at big prices, water is becoming a scare commodity for landholders below the mine
Grapes	
Grazing only on timbered land - leads to increase in kangaroo, fox, rabbits and snakes	Crop damage
Growing wine grapes	Spray
Hazard reduction disallowed in area by National Parks	Greater risk of out of control fires on my property
He doesn't control Foxes, scotch thistle, kangaroos	
Heavy stocking rates have driven more kangaroos to feed on our pasture, also causing more damage to trees and fences	Less feed for commercial production, cost of fence repairs, poor regeneration where roos camp
Helicopter pad	Noise, upsets livestock
Hobby farmers allowing weed and feral animals to go unchecked	Loss of income - more weeds and pests
Hobby farmers next door inhibit farming	Makes farming difficult
Hobby farmers; olive trees	Fire risk, weeds, vermin, increase in price of farming land and rates, spray drift risk, lice from infected sheep
Hobby farms	Increased kangaroos and rabbits
Hobby farms and increase in wildlife that consumes our pastures	The freedom to control weeds and vermin by Government Departments and Local Council
Hobby farms, horse farms, non-farming neighbours	Lack of control of blackberries, noxious weeds, feral animals; e.g., rabbits; complaints about noise and netting structures
Horticulture block	Horticulture on neighbouring property makes weed control difficult
Inability to clear to control invasive native scrub	Lower production and ultimately lessen sustainability
Increase in feral pigs	Degradation
Increase in kangaroo numbers; increase in wild dog numbers	Compete with cattle for grass
Increase in vermin, drought forced native animals to graze crops and consume water supplies. Drought dried up creeks	Loss of income, loss of native pastures, loss of habitat
Increase in wild pigs	Damage to crops
Increased difficulty in 18 use to control dingoes, foxes and cats	Foxes have killed out potaroos, cats are destructive on wildlife and there are increased numbers of dingoes and pigs
Increased feral and native animals from an adjoining property	Damage to fences
Increased feral animals	Loss of livestock
Increased feral animals	Calves killed or mauled
Increased feral animals, dogs and camels	Wrecked fences and death of livestock
Increased feral cats	
Increased feral dogs - domestic dogs mating with dingoes	1 run steers aged 18 months and over so impact is negligible to me but major impact on neighbours who breed cows
Increased ferals, reduced water	Need for trapping dogs, loss of calves
Increased native animals due to large plantations of blue gums	Increased grazing by kangaroos, more fence damage from kangaroos
Increased number of "blockies" who do not have good animal husbandry (e.g., lice) or weed control	Increased weeds, especially serrated tussock. Having to use chemicals on livestock; e.g., lice control, when we want to have eco-friendly wool
Increased numbers of feral animals (foxes) and also kangaroos from district blue gum plantations	Foxes are killing newborn lambs. Kangaroos are damaging fencing. Blue gum plantations have affected amount of runoff into dams and creeks
Increased plantations (tree)	Big increase in vertebrate pests; e.g., wallabies, possums
Increased roos from Bowen nature reserve - very eroded and badly managed by NSW NPWS	Fence damage; lack of feed
Increased water runoff onto our property due to banks, and clearing and cropping activities of neighbours	Fence damage, erosion, weeds
Increased wombat numbers in the last 2 years due to the mono-specie pine plantations	Really a nuisance in that holes and damaged fencing are more work and care
Increasing salinity - raising water table	Saline areas

Interference from non-contributing people. Concerned with encroachment of urban development and complaining nimbies	
Introduction of giant Parramatta grass (GPG); introduction of fireweed - windborne	Approx. \$4 per year in time, equipment and chemicals; opportunity lost
Introduction of weeds from soil con earthworks upstream	Weed infestations
Invasion of feral camels	Damage to 27 miles of fencing that we are reerecting
Invasion of kangaroos from public land	Grazing pastures/fence damage
Irrigation	Lack of water
Irrigation development	Greater depth of floodwaters, vastly reduced drainage
Irrigation properties who have sold water permanently	Weed infestation; pest infestation
Kangaroos eat all the grass, especially when it is shut up for hay	Less feed and hay, and broken wires
Kangaroos have built up into huge numbers. Bird especially lower storey birds have no habitat on neighbours land but do on our land	Weeds are not controlled by neighbours
Kangaroos invade my property to eat pastures from neighbouring National Park	Less pasture available for my cattle
Kangaroos living in neighbours revegetated area	Kangaroo visit - short out electric fences; not a serious problem - yet; no issue with neighbour
Lack of cooperation from other landholders on control of wild dogs and weed control	Extra cost of control
Lack of feral control in National Park two properties away	We have wild dogs and dingoes, roos, foxes, cats and pigs and rabbits
Lack of fox and rabbit control in surrounding crown land	More cost and time to control them on our land
Lack of fox control and noxious weeds = overclearing of trees and biodiversity	Predation from foxes, spreading of weeds and blind exposure from overclearing
Lack of income to support eradication of kangaroos, feral foxes, pigs and acacia tree pest	Too many kangaroos; therefore not enough grass
Lack of pest control; e.g., foxes and pigs not controlled	Loss of lambs in normal seasons when we have stock
Lack of weed control	Infestation
Lack of weed control along creeks, lack of pest control, spray drift	Increase costs to control weeds and pests, reduced crops from spray drift
Lack of weed control, overpopulation of kangaroos	Cockatoos spreading weeds, dogs allowed to roam and kill sheep; this is impacting our income
Land changes - wool grower - crops; market lost	
Land next door sold to blue gum company, now planted out in trees	Weeds (thistles) blown across like it's snowing onto our land. There's now bloody kangaroos, hares and rabbits coming onto our land, eating our pastures and damaging our fences.
Large farms being blocked into too small areas	Increase in feral animals
Large mine approx. 14km upstream is a major worry	Don't know yet
Leased land changed to National Park. Freehold block has been changed from farming to urban	Wild pigs and wild dogs and dingoes have increased. Urban development has increased rates, caused us to change from bananas and pumpkins and melons to only cattle because of complaints and threats because of spraying of these crops
Less crops grown in area has concentrated galahs onto our crops, also feedlotting of cattle is feeding galahs with a steady source of grain	Intensive control methods are in place to protect newly-sown crops
Level bank construction on adjoining properties	Increased flooding and crop damage
Levelling paddocks and increasing the size of their paddocks which turned waterway into a channel - in times of flood it is not adequate	Increased length of time for flood water to get away and being blamed for our road as hold up of the water by those very people
Lifestyle blocks; lack of management has allowed noxious weeds to become a problem (lantana, croften weed, camfloral, wild olive etc.)	A large cost in controlling seedling weeds
Local National Park harbours feral pigs and cockatoos and weed species	Perpetual attacks by feral animals and unwanted plants compete with my crops
Lots of trees have been planted	Have greater numbers of kangaroos which now inhabit own property
Managed investment scheme hardwood plantations	Increased land values - decreased area left for vegetable production, decrease in standard of roads due to log traffic,

	more feral animals
Many surrounding properties have changed from grazing to vineyard. Slight increase in fox numbers. Some limitations to us regarding spray use. This is not a major impact (we have adapted to the changes)	
Mining	Noise and dust
More feral foxes and rabbits in wildlife corridors and lack of control in area	Lambing percentage affected and less feed for stock
More flooding due to earthworks upstream, not that it happens very often	Wrecking fencing, buildings, drowning stock; also spreading pests and weeds
More foxes, more blue gums, more kangaroos on the roads creating accidents - they have become a real problem	We spotlight foxes especially at lambing time. We think twice about night driving because of the danger of kangaroos
More kangaroos and rabbits. Fencing off areas to keep off stock	Small wasted areas
More plantations, full of feral pests and kangaroos	Increased pressure on pastures
More tree lots around on my property and others have increased fox numbers and damage	Higher lamb mortality
My property is situated on the outer edge of a major floodplain. Floodplain development by irrigators has risen water levels on my property	I now have less high areas to keep my stock alive during floods. This means those areas become severely over-grazed during high floods
National Park - kangaroos and wild dogs from neighbours who won't bait	Kangaroos eat out - land degraded. Economic losses from wild dogs - no lambs - sheep eaten
National Park; housing subdivision	No kangaroo culling increased breeding, reduced carrying capacity
National Parks - foxes	Foxes
Nearby feedlot stinks in hot weather. Feedlot has huge bore which since it's been sunk has reduced output on other smaller local bores	Stink
Nearby pine forest was cut down	We have had an increase in kangaroo damage to trees. Also increase bird life landing on fruit trees destroying crops
Neighbour (uphill) cleared big marri trees - 2 years later, bad salt seeps hit ground surface which cuts through corner of our farm	A few of the salt-tolerant trees we have planted have died and area is deteriorating slowly (1.5-1ha)
Neighbour damming creek	Less stored water; in fact NIL
Neighbour feeds kangaroos, silver eyes and parrots which has significantly increased numbers which have caused damage to the vineyard	Vines get damaged, less grass, damaged fences, bush is heavily eaten out by kangaroos
Neighbour has built a dam on creek - less of water in drought	Community up in arms - didn't really need to dam; hobby farm
Neighbouring dogs roaming onto properties and chasing horse - 1 show animal run into corner fence and broke neck; dirt bikes tearing around properties	Worry that people don't keep their dogs under control and no supervision from private quarters or police/council to prevent properties being used for speed racing of dirt bikes
Neighbouring landowners will not control water and erosion control	Soil erosion
Neighbouring property because National Park	Includes feral pests/different type of feral pests; e.g., pigs
Neighbouring property no longer used for grazing livestock	Heavy scrub harbours feral pigs etc.
Neighbouring property planted to trees	Large increase in native animal damage to pasture and crops
Neighbours clearing the properties or some doing nothing about kangaroos	Kangaroos coming onto my properties and doing a lot of damage to my fencing
Neighbours gave Council footway easement for public access along access road bisecting our land without consultation	Potential for degradation of preserved areas (see above) due excessive use/access by public when there is no adequate infrastructure or control
Neighbours no longer running sheep; they no longer attempt to control wild dogs, or to maintain netting fences	Becomes increasingly difficult to run sheep
Neighbours pine plantations	Water loss, pests entering property and fence damage
Neighbours who have subdivided property and changed to rural residential	Weeds, lousy sheep, footrot, traffic, ____ attitudes
Neighbours who lease land to others or neighbours who don't have commitment to the land; e.g., income from other sources	Increasing weed problem, uncontrolled domestic pets, lack of responsibility for boundary fencing
Neighbours with "Land for Wildlife" cause problems	Wallabies damage pastures and sugar cane crops

Next door property had change of ownership and new owners decided not to continue with weed control	Increase in rubber vine plants appearing over past ten years whereas we never used to have any at all. It is under control though - we annually poison them
No rabbit control	
No trees because of hardwood plantations. More pests - animals and weeds because of neighbours	Attacks on livestock - calves. More pest species getting away because no controlled burns - regrowth pest grasses (wire grass)
Non-cropping land allows roos to come out of the scrub further into cropping areas causing greater loss to crops	Difficulty maintaining a finished crop and fences intact, especially in drought times
Not coordinating pest control with the rest of the neighbours	Pests come onto our land
Noxious weed infestation	Very difficult to control
Odour and dust from nearby quarry and tip.	No land-use changes except grow more screen trees
Olive grove	Lower water table, feral seedling olive trees
One neighbour (absentee) with area of native bush regrowth doesn't control wallabies or repairs fences and no feral control	Repairing fences - breeding area for wallabies to feed on our improved pasture and native grass areas
Organic farmer doesn't control weeds, locusts etc.	Weeds wash down the creek (sweet briar, blackberry, St John's Wart, Bathurst burr); locust spray took 3 weeks to kill them - ate me out in the meantime
Other sheep breeds which join ours, and interbreed; fences in creek, flood gate country won't stop them; some are shot	Makes it hard to keep hair out of woolclip; hard to remove them - so some are shot
Over past 2-3 years increased grazing by large groups of kangaroos	Grazing on different types of vegetation. Corridors or paths where jump fences or go under fences etc.
Overgrazing on neighbouring property	Silting and water flow erosion
Overrun with kangaroos	They eat out country if you try to spell it
People who trespassed and purposely damaged 1/2 trees	
Permanent water	Increase number white cockatoos, wild ducks
Pigs and roos mainly	Cost of eradication
Pine plantations	Weeds and pests
Pine plantations	Foxes
Plantation forests	Increased pest animals
Ploughing the fragile soils for oats crops has led to severe erosion. Hobby farmers have increased the threat of weeds	Silted streams; much more time and money spent on weed suppression
Previously grazed, very large property converted to National Park	Increased threat of fires, increased number of dingoes
Private pine plantations	Increase in trespassers/stock theft - increased access; probable increase in feral animals
Properties have been allowed to go back to scrub	Bottom line; i.e., animals ruining crops
Properties not maintained because of lack of water and because people buy properties for lifestyle (hobby farmers)	More feral animals; more weeds (thistles, blackberries etc.)
Protection of birds and flying foxes	Losses increase in fruit industry and protection measures too costly
Quarrying, landfill, national grasslands	Lack of weed and feral animal control
Rabbits from council laneway	Difficult to keep out and control
Rat tail grass, wild dogs	
Redirection of large runoff drains on to part of property	Extreme erosion on small area
Regrowth - additional vermin from next door and weeds	Crop destruction, loss of income etc.
Regrowth woody weeds	Turns ground bare from native grass
Removal of boundary tree belts, which reduced corridors and wind shelter	Reduced protection from wind; need to increase area own tree planting
Reserved woodland has created habitats for wildlife followed by dingoes. They will not participate in 18 programs	Loss of calves and maimed calves from dingoes
Residential 5-acre lots harbour increased wildlife	Pasture irrigated from Council water reuse is inundated with wildlife
Restrictions on use of flood-prone land and restrictions on use of WLL's	Value loss

Reverted to agistment rather than dairying - resulting in a dramatic increase in invasive species; e.g., fireweed, lantana and blackberry	Required increased land management efforts on our property
River riparian fencing	Exploded weed infestation from upstream property
Rural living subdivision	Lack of understanding of farm practices
Rural living/tree change	No total grazing pressure management - kangaroos, goats, dogs. Increase in weeds - no weed control. Noise from motorbikes etc. Increased fire risk
Rural subdivision of larger farms to 4 hectare farms and lifestyle blocks	Weed seeds from uncaring neighbours; boundary fence repairs left up to me (because the new neighbours are absentee landowners)
Scrub	Loss of money
Severe overgrazing has silted up my watercourse! Horses ring-barked every native tree! Creating a desert! Dead trees then fell on my fences!	Wind erosion from neighbours brings weeds, silt, dust, fence destruction, starving sheep, horses push over fences and wash down creek when storms cause flash floods! Dead sheep and horses, breed flies, and stink
Shelter belts creates habitat for foxes, cats etc.	Increased numbers of foxes, rabbits, requiring ongoing control
Since National Parks resumed 23ac of my property, it has become a fire hazard; feral animals and noxious weeds	Problem with town dogs - foxes and because National Parks won't burn, just waiting for one big bushfire
Some near neighbours are focusing on feral goat harvesting	Lack of removal of ferals on a regular basis results in an overflow of numbers onto properties intent on strict control of same
Some not all neighbours do not control weeds	We have to always control these flow-on effects
Spray drift problems from one neighbour heavily into chemical farming	Threatens my certified organic status
State Forest	No/little control of kangaroo population; little control of feral animals - foxes
State Forest pine plantations	Feral animals/ Lack of runoff of rain since pines have grown, creek dries up
State Park becoming National Park. Constant change of staff/only just get an understanding and agreement for changes and staff change so nothing happens	Impact is from weeds and pest animals (wild dogs). Ageing community unable to cope with many changes. Rabbits now a large problem in National Park
State Pine Forests lack of control of blackberries and other weeds and pests	Increased cost in controlling blackberries and other weeds
State reserves encroaching on small portion of our properties	
Surface water levels in creek have been impacted by tree irrigation - NRM practices have caused silt deposits in sandy creek bottoms	Nuisance - lack of available surface water - levels have dropped sand is not ___ - weeds are maintained
Surrounded by National Park 2 of; therefore kangaroos and wallabies and wombats	Eat a large amount of feed, drink a lot of water in drought time; wombats cause damage with large holes in the ground
The adjoining Boollagoon Reserve does not allow grazing in recent years and has become an overgrown fire danger and vermin abound	Foxes, weed seed
The forest department - pine plantations etc. offer protection for euros (kangaroos) that drink/feed on our property	Less feed and water for our stock
The neighbours have failed to control dingoes, wallabies that are harboured in scrub beside our properties	Invaded by pests that are harboured for protection, but rely on our artificial watering points and improved pastures and crops
The plantations bordering property	Sun, water and pest control
The property has been 8% laser levelled	Improved irrigation management
There is a change from sheep grazing, to cattle only	Cattle only properties often ignore control of Bathurst Burr, Noogoora Burr, Galvanised Burr, Saffron Thistle, Mexican Lolly, Couch grass, Bohera Beauty
They got in and "cleared" woody weeds before Government embargo	Further production has been stifled
Through their protection and clearing the kangaroo population is huge	Kangaroos grazing pasture and fruit
Too much subdivision	Roaming dogs, weeds
Tree lines	Increased pest and native animal numbers
Tree planting, interrupting and blocking watercourses	Flooding, increased vermin and weeds, far greater fire danger, and difficulty in putting fires out and the damage done by the

	fires
Uncontrolled scrub lands	Increased native and feral animals; greater fence damage
Urban growth	
Urban sprawl	Domestic dogs and cats
Vegetation management laws does not allow clearing of productive land that has now become a haven for wildlife (dingoes, pigs)	Loss of calves from dingoes; spread of diseases
Vineyards	Limit of chemical usage
Vineyards	Restrictions on weed spraying
Vineyards and irrigation	Lowering water table
Vineyards planted adjacent to farm boundary prevent chemical weed control at correct timing thereby lowering effectiveness	Weeds not controlled at optimum time
Washouts from road runoff	Fixed with drains to take water
Water contamination	Interruption of water flow and quality
Water drainage	Erosion
Water table	Slight salting
We have approx. 2ac scrub and the rabbits and kangaroos are a bit of a menace around the homesteads	The roos are at a tolerable level but if they continue to multiply they need to be culled
Weeds introduced during pasture improvement	Weeds!
Wetlands	Swans, other birds
Wildlife corridors	Increased numbers of kangaroos
Wildlife corridors	Kangaroo numbers to the point I should be getting paid to run them
Wind farm 2km away, now have major transmission line through property	Ugly visual aspect of transmission line, earthworks of construction, lopping of trees adjacent to new transmission line
Wombats now inhabit this property and district where as they were never known to be in this area. Kangaroo population ever-increasing	Holes from wombats creating erosion. Infrastructure (e.g., fencing) damaged from wombats and kangaroos
Wood-chipping driven wallaby on to us	Loss of some grazing

Appendix 4: Neighbour responses to participants land use changes: Ch 5

Participants' land use changes	Participants' reactions to neighbours' response
Neighbours and myself are involved in tree lines and blocks etc. on our places	
0	Old people live in the past. Young educated people have the energy to think and bring about change and some changes will be good
1 Pivot Irrigation Development; 2 Rivercare and Landcare issues	Most are adopting 1 and 2
18 neighbouring properties now participate in similar Landcare/reveg activities	Encouraged
A DA has been forwarded to Council; some neighbours voicing concerns	They enquired as to effects upon them
A new dam -	blamed for flood we had in December
Additional tree plantings and fencing off of wet areas and planting appropriate grow species in saline area	0
As I am a great believer in drainage on low-lying areas water ___ all property has areas of this ___	, no real problem only that they are different 0
Attempting organic farming	Didn't really bother us
Biodynamic	Pleased to see they noticed the difference between their land and mine
Biodynamic farming introduced in 1969	Misinformed
Both positive and negative reactions to building a poultry farm	It was expected from the people the responses came from
Both us and a neighbouring property have changed over to biodynamic vineyard practices and are working on improving the biodiversity on both our properties	0
Cell grazing, holistic management	I felt I had an influence on how they run their farm
Cell or rotational grazing on a whole-farm basis	Neither; didn't worry me
Cell-grazing, native plantation planting and fencing off	0
Change from grazing to viticulture	Initially did not like the more intensive activities
Change of irrigation layouts to increase water efficiency. Introduction of vegetation corridors	Particularly that it creates interest in doing something positive for the future of agriculture and the environment
Changed crop from sugarcane to grass/trees	Were very helpful and gave advice - made jokes about my trees!! But have started to allow regrowth on their hills!!
Changed from continual grazing to rotational grazing	Pleased that others thought we were doing the right thing; i.e., better land/grass management and better productivity
changed from flood irrigation to drip irrigation	Reaction of more interest
Changed from veg production to grapes. Changed from apples, pears, cherries to cherries only	Okay
Cleaned out 2kms of blocked creek, returning 1000 ac of runoff to Lake Flannigan; this runoff was artificially diverted direct into the sea 30 years ago	Pleased but not surprised; Lake Flannigan dried up 06/07, a first in living memory, and reputedly (hearsay) a first in 100 years; becoming a 500 ac clay pan; very unsightly; all hope the lake refills
Cotton-growing	Reaction apprehensive - understanding
Cutting down of odd trees	Very annoying. The newcomers (20 years) we see them come and cut down trees to build their houses - and as soon as anyone else does it they report them
Deep subsoil water drainage - salt drainage. Tree lines along fence lines - windbreaks	Good. Just be nice if we didn't do a lot of this before the Government decides to offer grants
Did a lot of clay spreading	Do some themselves
Different methods of control weeds and pests	Positive and negative. Really! Don't worry about their reaction to the way we do things if they work
Direct drilling and stubble retention	0
Direct drilling techniques for crop establishment	Relevant and pertinent - they adopted similar systems
Direct drilling with minimum till	It is good to get good feedback from neighbours
Drainage and irrigation improvements	Positive and negative
Efficient stock and land management;	people are interested and impressed 0
Eradication of all woody weeds	Wish they would do the same
Erosion control and rehabilitation	Pleased that neighbours recognise our effort
Erosion control and water harvesting	0
Expanding high-density horticulture, viticulture vegetable growing, value adding to horticulture	Extremely angry about anonymous complaints to Council (all complaints dismissed)
Extensive tree planting on property has been met negatively by	Annoyed and frustrated

other local farmers	
Extensive tree planting, low stocking rates, perennial pastures, weed control	Some hate green people; others are very supportive
Farmgate sales from property	Both; only one negative - unreasonable concern over passing traffic to our farmgate sales area. Most other neighbours positive
Farming for fun versus grazing for profit - was one comment; curiosity from neighbours about our pasture cropping	Curious - new ideas need to be proved to be accepted
Farming on the contours. We now share landscape solutions	Excellent
Fencing off and revegetating a creek.	Neighbour complained that the trees I was planting would eventually drop limbs and then take out his fences in a flood It was Frustrating but I ignored it
Fencing out waterways. Replanting erosion areas	I don't care what they think - I know I'm right. I try to change their attitude by friendly discussion
Fencing out wildlife	Good
Fencing remnants, fencing waterways, improving pastures, planting native trees and shrubs	Positive and negative - happy when they copied
Goat traps have caused some concern	Annoyed
Greening Australia 500ac scrub (pristine). Fenced for protection/compositing farm land	Good
Growing green crops to plough in	I told you so
Growing Rhodes grass	Pleased I had improved the pasture and controlled erosion and annoyed that they were not so impressed as to follow my example!
Growth of pasture due to chemical-free farming practices and balancing our soils. Also ability to water less frequently than other farmers	Good
Hail netting	Let the Council deal with them
Have followed us planting trees for water table reduction and shelter	Taught them to plant trees
Have positively influenced whole community	Pleased
High production pastures and big mixed species fodder crops to overcome the natural very severe bleak New England winter feed shortage	A busload of 40 students and 2 teachers from TOCAL Agricultural College call here on their tour; I learn from them and they from me (I hope)
I put in olive trees;	A bet each way - some positive, some negative they all think I am crazy
I think I started no-till farming in this district, so there has been a lot of discussions	0
Implemented planned grazing, use goats on weeds, organic practices	Both positive and negative. Good. Some took up, some then started to look at own practices
Impressed with pasture renovation and quality of livestock	Pleasing, but a lot of work and expense
Improved irrigation practices	Others have taken up my practices
Improved irrigations layout; revegetation	Pleased
Improving pastures, improving fencing, planting trees/seedlings	Very satisfying, nice knowing that it affects more than just us
In 1971 we installed trickle irrigation, to make irrigating more efficient. Then in 1974 we had to put in underground pumps to lower water table	A bit disappointed actually
Initially some negative response at growing grapes rather than sheep and cattle, but now most are quite happy to drink the wine	Ignored it. It is now 18 years ago, so no longer an issue
Intensive poultry	Jealousy and misinformed
Interest in my electric fencing techniques to discourage kangaroo populations and my clearing (under license) and its improvement to productivity of land	Extremely gratified
Interest in results	Interested in result
Interest in saltbush planting	0
Introduction of intensive native veg (scrub) production	Positive
Irrigation and spraying	0
I've been undergrazing and most neighbours would like to buy me out and crop the soil	I hope they learn how to think outside the square and get out of their spray-crop, monoculture frame of mind (this is a confidential survey, okay)
Landforming for irrigation	Luddities
Litigation regarding fire control	Disgusted
Managing water and salinity	Positive and negative. Open-minded people very supportive. Close-minded people have been terribly destructive. Physically and mentally also caused tension within community
Many years ago we also had a small sand mining operation on a property which we no longer own	Both; the negative reactions made me think and reassess the widespread deleterious impact of such operations in or near watercourses
Minimum till	0
Minimum tilling methods and contouring has been favourably commented on	Pleasing

MLA sustainable grazing - phalaris 5-year trial - adopted. Cell-grazing - rehabilitation of natives. Oversowing natives with modified chisel seeder/low fertiliser	Irrelevant - changes were made using widely available information and proven technology. Measurable results not gut feelings
More cropping, which they have pursued too	Good
Mostly positive. We established a vineyard. One neighbour concerned about noise from vineyard activities	Lacked substance. Council supported our activities. Resolved amicably with time
Move to no-till and stubble retention	Both; it does not affect them but the positive comments are encouraging
Move toward harvesting native grass seed; i.e., exclusion of stock from some areas (better stock management)	Both; some amusement in community - doesn't worry me as it's a bit of fun
Negative reaction to planning applications	Ignorant lifestyle neighbours
No - but we have vineyard	two neighbours who came after the vineyard have had problems with sprays and shooting - hopefully problem now solved 0
Non-native grasses established	Okay
Not too sure about revegetation	Not worried - nature of _____
No-till	Positive
No-till	Unfazed
of Landcare activity;	Neighbours suspicious once stopped - changed views 0
Off-stream watering fenced off river, fenced off a patch of native veg	Not concerned
Opened cellar door	Annoyed - went through formal council development application process for approval - delayed opening
Opening of cellar door against dust and increasing traffic. Want things to stay the same for others but not for themselves. Happy themselves to have change. That appears to be different	A victim. They were not reasonable and appeared to have another agenda
Orchard	Not happy
Orchard land/grazing land swamps and relevant exclusion zones	Both reactions depending on what change and who noticed. We were not all that worried
Organic farming, tree lots	Ignorant of environmental issues
organic status	A little negative
Others have been inspired by direct seeding of pastures and trees	Pleased they have accepted new ideas
Pasture flood areas and general pasture; zero till	Good
Pasture production, crop production	I may not be wasting my time
Pasture to vineyard/winery	Happy
Permit for piggery	When the truth came out all was well
Plantations	Proud
Planted lots of trees as shelter and shade for the environment many years ago. Lots of people admired and began planting	Pleased
Planted over 10,000 trees	Pleased
Planting cabinet timbers, revegetation	Good
Planting fruit trees next to hobby farms	Insensitive
Planting native trees on previously treed country that had been cleared by past generations	0
Planting of tree lines	0
Planting saltbush on land that is quite productive	0
Planting trees, pasture improvement	Happy but hope they follow suit
Positive comment regarding fencing off areas and shelter belt establishment	Pleased
Positive comments about the vegetation we have established	Proud, enthusiastic, grateful
Positive comments on the visual aspect and the effort we've made	Appreciative
Positive to the planting of trees	Pleased
Positive to value of windbreak trees	Good
Positive; 2500 min tree planting P/A; new pastures	Good
Positive; Rotational grazing with cattle instead of set stocking with horses. Starting a biological farming program for soil recovery	Change in animal management greeted warmly; biological farming and cautious, curiosity
Protective canopies (netting) for exclusion of hail, birds and fruit bats (flying foxes)	This is a rural shire with 4th and 5th generation farmers. New residents should be aware of farming practices before they choose to live in the shire
Pulling out pine trees on river and replacing with natives. Their concern was it was on river reserve	Good in the end
Pushing and burning myall trees thick with mistletoe; this is spread to other trees and kills them	Neutral - they were not made aware of the reason; their complaints came via the grapevine
Put a dam in to irrigate a small crop	Encouraged
Received complaint (written) about colour of farm shed! So trivial!	Too much interference in people's lives. Increase governance/government red tape a problem, especially at bottom end

Redclaw farm	Pleased
Restored native flora and fauna	Quite disappointed
Revegetating severely eroded areas when property purchased and not overstocking	Pleased
Revegetation of areas, fencing off from stock of native veg areas. Water conservation	Hoping we are providing neighbours motivation to improve their own properties
Riparian land fencing off of creek	Good
Rural residential subdivision plan of property	Very disappointed as most of them live on part of my farm from previous subdivision
Seeding with no-till disc drill	0
Shelter belts and filter strip	Annoyed
Shortage of water - letting trees die and stopped growing vegetables - selling land	Understanding
Some approve, others disapprove of my methods	Both - some helpful, others not thoughtful
Some neighbours think revegetating corridors is a waste of land	Didn't bother me as I knew I was doing the right thing
Sown perennial kikuyu grass to stabilise soil	Happy
Spreading manure onto land	Petty; they complained about the smell
Started planting trees 1987	Neighbours starting planting too - so spin-off effect made me feel good
Stopped most weed control (spraying) and began cell-grazing stock	Angry, disappointed, rejected
Streamside revegetation	Both; some were impressed by the aesthetic appearance. Others were worried by the possibility of tree limbs and litter choking the waterway
Subdivision development	Did not - no decision had to be made because of age
Subtropical grasses on erosion-prone soils	Reassured that we made an okay decision
Surveyed and installed drains to fill dams and dry out wet areas based on dolerite dykes - it works well	Good - younger ones are interested while others have purchased properties where this has previously been done. In a dryer year, the dams with these drains have more water than others
Switched to Dorper sheep (now gone)	Need g-foot concrete wall to control them; wandered everywhere
Telecommunication tower installed	Half and half - upset
The land went from cattle country to a vineyard	0
The unworkable restrictions on sensible clearing and responsible farming by Government and conservationists	Agree
They built large dam blocking our catchment water so now we have to get out of berries or use town water - they only visit this farm occasionally	They can get away with it as gully catchment is classed as "intermittent" - joke!
They were surprised we would fence off salt affected and native bush areas which included an acre or two of good farmland	He was of the era "you clear all the bush and farm it", so I expected it
Tidy farm up! Development!	Annoyed! Everyone responds to what they see or perceive without understanding the whole issue! Other positives may well outweigh what they perceive to be a negative!
Time control (cell) grazing	0
Time-control grazing and planting of trees	Angry
Time-controlled grazing and controlled watering	Both; positive that they are interested
Tourist facility (tours of olive grove and processing shed, shop and café). Processing plant for olives (processing other growers' olives)	Great and proud
Traveller and others complained after our grazing for profit system was constructed, that there are too many gates on the way to the beach	0
Tree lines (windbreaks, stock shelter); rotational grazing	Okay
Tree planting, farm planning, erosion control, pasture	Pleased to be able to show what can be done and what is possible
Tree planting. Dog fence (one neighbour complained); rest very positive	Have had many comments on tree planting and erosion works - all positive except the "loss of grazing land" by a couple. In reality able to run more stock
Trialling seeding of native trees	0
Turning unproductive nature pastures into perennial pastures or crops	0
Urban sprawl non-farm neighbours have objected to most things we do as farmers; e.g., use underground water, use machinery that makes noise, vehicles that make dust, use chemicals etc.	Put out and annoyed at their wasting of our time, especially as we had taken all reasonable steps to protect their interests
Use of fertiliser - aircraft for spraying thick clearing	0
Use of perennials - eat lucerne and tussock grass	Both; new neighbours have no idea
Use of roundup to knock down poa tussock and reseed with fertiliser use a spreading system; i.e., seed and fertiliser just sits on top of the ground and if conditions are right success is amazing	I am not worried what others think - I know our methods work; i.e., native grasses also reestablish. We do have a coastal influence with many foggy and misty days
Viewed my operation and tree planting with scepticism	I have no concern with what they think

Vineyards	They saw us adding to the diversity of the area
W' drainage and contours	Glad they could see the value in it
We built a cellar door and office complex	Not happy
We cell-graze -	0 neighbours say we are understocked
We changed from a grazing/farming venture to viticulture on 20% of our land	Both; some positive - land values possibly may increase. Some negative - land management issues were more focused
We fenced two main highways that transverse our properties, and a railway line - all both sides - bout 170kms all up - had help with one highway	It makes the roads safer for people to travel, and protects our stock from being killed by trucks, trains etc.
We have given up growing grain sorghum due to the problems of weed control "in crop". Growing and rotating lucerne more, for soil nutrition, grazing and hay	It's nice to be on good terms with all neighbours, even crop growers
We introduced viticulture to the area	Some concerns expressed about control over their chemical use, particularly herbicides
We planted lucerne and since then others have as well	They asked me for advice which I willingly gave
We set aside our enterprise conservation land, no stock, but still own and control. We always run our ewes in the same paddock, mixed aged from birth to cull or CF age	Good; they like the idea of EBC instead of National Parks, and some would do it if they had enough spare land of interest. It was thought of as strange, but they can see the advantages (with labour shortages) can outweigh the perceived/genuine? Lower lambing percentages etc.; all ewes are checked, and culled if need be, as they come into shed for shearing
When I planted grapes in 1968 it caused a bit of a ruckus! I was still a grazier then	Some were negative, some not. Things changed with Hawke and Keating!
Where is the water going?	Some people have a problem
Whole-farm planning changes (not really use)	Good, but that's not why I did it
Willow removal	Both; mostly positive - one negative to willow removal
With drought conditions/lack of irrigation water we grew a lot of maize and banasacers to enhance water usage and grow a large tonnage of harvested feed	Very satisfactory to achieve good milk yields in adverse conditions and fellow farmers visit to talk about the success
Years ago when double-cropping and minimum-till was not as well known	Negative at first, but after we had good results they were positive
Zero-till cropping questions relating to sowing technique. First beginning to pasture crop	Interested and enquiring